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THE
CYCLOPÆDIA;
OR,
Universal Dictionary
OF
ARTS, SCIENCES, AND LITERATURE.

VOL. IV.

THE HISTORY OF THE

ROYAL SOCIETY OF LONDON

FROM ITS INSTITUTION TO THE PRESENT TIME

1660-1840

THE
CYCLOPÆDIA;

OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY

ABRAHAM REES, D.D. F.R.S. F.L.S. *S. Amer. Soc.*

WITH THE ASSISTANCE OF

EMINENT PROFESSIONAL GENTLEMEN.

ILLUSTRATED WITH NUMEROUS ENGRAVINGS,

BY THE MOST DISTINGUISHED ARTISTS.

IN THIRTY-NINE VOLUMES.

VOL. IV.

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CYCLOPÆDIA:

OR, A NEW

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OF

ARTS and SCIENCES.

BATTERY.

BATTERY POINT, in *Geography*, lies on the north or starboard shore of the channel of Cork, in Ireland.

BATTERY, formed of *battre*, to beat or strike, in the *Military Art*, denotes an eminence cast up, on which to plant artillery, that it may play to better advantage. It consists of an epaulement, parapet, or breast-work, about eight feet high, and eighteen or twenty thick. The platform of a battery is laid with planks, that the wheels of the carriages may not sink; and it is made sloping towards the parapet, that the guns may not recoil much, and that they may be more easily drawn back. See *Plate II. Fortif. fig. 21. n. 2.* and *Plate VII. fig. 38.*

In all batteries, the open spaces left to put the muzzles of the great guns out at, are called *embrasures*; and the distances between the embrasures, *merlons*. The guns are generally from twelve to sixteen feet distant from one another, that the parapet may be strong, and the gunners may have room to work.

There are also *batteries of mortars*, the same with those of cannon, except that they have no *embrasures*; the shells being fired over the parapet, commonly at an angle of 45° elevation; and the slope of the breast-work is made inwards, contrary to that of other parapets; having their platforms about six feet square and eight feet asunder.

The *battery* of a camp is usually surrounded with a trench and palisades at the bottom, as also with a parapet on the top, having as many holes as there are pieces of artillery, and two redoubts on the wings, or certain places of arms,

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capable of covering the troops which are appointed for their defence.

All field batteries consist of four parts, *viz.* the *ditch*, the *parapet*, the *platform*, and the *magazine*; which see respectively.

The *Sieur Remy*, in his *Memoirs of Artillery*, has given a table for the ready finding of all the requisites for the construction of temporary batteries, and for their daily service, the pieces being twenty-four pounders; and although these batteries are calculated only for sieges, and are of the coffer-kind, yet from this table may be derived such notions as will greatly help young artists on other occasions.

It is also proper to mention the number of fascines and pickets that is usually expected every day from the labour of each man employed in that service.

Of fascines five or six feet long, and five or six inches thick, bound with two wyth bands each, one man will make 16 or 18 in a day, with two pickets to each.

Of fascines eight or nine feet long by eight or nine inches thick, with two pickets to each, one man usually makes 10 or 12 in a day.

Of fascines 12 feet long by nine inches thick, with three pickets to each, eight or ten are usually expected from the day's work of one man.

The days here understood are such in which the men may work about twelve hours.

In the following table C. stands for hundred.

B

A TABLE

BATTERY.

ATABLE for the construction of Batteries.

Number of 24 pounders in battery.		Length of the parapet in yards.		Number of workmen to construct the battery.		Number of workmen's stools used at the battery, viz. shovels, spades, pickaxes, mattocks, &c.		Fascine-makers, each a bill and hatchet.		Fascines of 8 or 9 feet by 8 or 9 inches.		Fascines of 12 feet by 8 or 9 inches.		Fascines of 5 or 6 feet by 5 or 6 inches, made by the cavalry.		Pickets from 3 to 6 feet long, and about 1½ inch thick.		Mallets to drive the pickets.		Hand-bills, 2 for each embrasure, beside spare hatchets.		Planks for the platforms, 2 or 2½ inches thick.		Gunners to serve in battery.		Soldiers to assist the gunners.		Powder for 100 rounds, at 12lb. each per day.		Shot of 24 pounds for 100 rounds.	
2	14	50	70	15	120	40	2 C	520	10	4	32	4	12	24 C	2 C																
3	20	60	85	20	165	60	3 C	740	14	6	48	6	18	36 C	3 C																
4	26	70	100	25	210	80	4 C	960	18	8	64	8	24	48 C	4 C																
5	32	80	115	30	255	100	5 C	1180	22	10	80	10	30	60 C	5 C																
6	38	90	130	35	300	120	6 C	1400	26	12	96	12	36	72 C	6 C																
7	44	100	145	40	345	140	7 C	1620	30	14	112	14	42	84 C	7 C																
8	50	110	160	45	390	160	8 C	1840	34	16	128	16	48	96 C	8 C																
9	56	120	175	50	435	180	9 C	2060	38	18	144	18	54	108 C	9 C																
10	62	130	190	55	480	200	10 C	2280	42	20	160	20	60	120 C	10 C																
11	68	140	205	60	525	220	11 C	2500	46	22	176	22	66	132 C	11 C																
12	74	150	220	65	570	240	12 C	2720	50	24	192	24	72	144 C	12 C																
13	80	160	235	70	615	260	13 C	2940	54	26	208	26	78	156 C	13 C																
14	86	170	250	75	660	280	14 C	3160	58	28	224	28	84	168 C	14 C																
15	92	180	265	80	705	300	15 C	3380	62	30	240	30	90	180 C	15 C																
16	98	190	280	85	750	320	16 C	3600	66	32	256	32	96	192 C	16 C																

When batteries are erected at leisure, and are designed to stand for some years, they are best made of stone, or brick, or good loamy earth, as the materials may be most easily procured.

To construct the profile of a battery, let its ground line be AB (*Plate II. Fortif. fig. 23. N° 2.*), BD that of the parapet, the inner slope of which is formed by making $Da = 1\frac{1}{2}$ foot, and the perpendicular $aH = 6$ or seven feet; the crown of the parapet HI is formed by making bI a foot or two lower than aH ; and the front of the battery IB is found by making $bB = \frac{3}{4}bI$ when of earth, or $= \frac{1}{2}$ of bI when of masonry. If DC be made $= 2\frac{1}{2}$ or 3 feet, we shall have C the fill of the embrasure, the floor of which CG is to dip 2 feet or two below the level line CF. The platform DE is 18 or 20 feet, the tail E rising about 6 inches above the level line AB; the lower double line represents the sleeper laid lengthwise, and the upper double line shaded with the lines across shews the ends of the planks laid on the sleepers. A gun on its carriage, with the wheels against the knocker at D, is annexed to the figure, for the purpose of aiding the apprehension. For the construction of the embrasures, merlons, ramps, &c. see the articles respectively.

BATTERY, Open, is nothing more than a number of cannon, generally field pieces, or such as carry a ball not ex-

ceeding nine pounds weight, ranged in a line or row abreast of one another, on some small natural elevation of the ground, or an artificial bank about a yard or two high. These cannons are ranged at the distance of about 15 or 16 feet from one another; their shot and loading utensils lying by their sides, and the powder lodged in a hole at some distance behind the battery.

BATTERY, Covered, is when the cannons and gunners are covered by a bank made of brush-wood, faggots, and earth; about eighteen or twenty feet thick, and seven or eight feet high. The cannon used in such batteries are generally from nine to eighteen pounders; sometimes twenty-four pounders are used in them. See *FASCINE Battery*.

BATTERY, sunk or buried, is that whose platform is sunk or let down into the ground, with trenches cut into the earth against the muzzles of the guns, to serve for embrasures.

This sort, which the French call *batterie en terre*, and *ruimante*, is generally used upon the first making of approaches, to beat down the parapet of the place.

BATTERIES, Cross, are two batteries at a considerable distance from each other, which play athwart one another at the same time, and upon the same point, forming right angles; so that they thus combine and produce a greater effect;

BATTERY.

effect; because what one bullet flakes, the other beats down.

BATTERY *en Barbe, Barbet, or Open Battery*, is a name given to a battery, when the floor of part of it is so raised that the guns placed on it have an advantageous command over some part of the neighbourhood, and when the guns thus raised fire over the crown of the parapet without any embrasure. These barbets may be made either in a curtain, or at the salient angle of a flanker. They should be always $2\frac{1}{2}$ or 3 feet lower than the crown of the parapet, and about 8 or 9 yards broad at the top, with a proper slope to the base, of a length suitable to the number of guns to be mounted on them, allowing about five or six yards for each, and at each end have a proper ramp for ascending them. For the further illustration of their nature and construction, let P Q R V X (*Plate III. Fortif. fig. 25.*) be a common bank of a line, the parapet of which is R S T V; the inner slope R S being about 6 or 7 feet higher than Q R; then the bank *en* R, raised so high that the cannon may fire over the crown of the parapet S T, is the barbet, the height of which *en* is about 3 or 4 feet. On the top of the barbet is raised a platform, as in other batteries. Let the figures 26 and 27 represent part of the plan of a line, and one of its flankers, or of a battery constructed in such a form; where Aa is the length of the barbet, or raised battery, suited to the number of guns to be used, which are to be drawn up the ramps placed at the ends; the breadth being about 8 or 9 feet, and the length *ab* about 7 or 8 yards.

BATTERY, *Cavalier*. See CAVALIER.

BATTERY *d'Enfilade*, is one which sweeps the whole length of a straight line, &c.

BATTERY *en Echarpe*, is that which plays obliquely.

BATTERY *de Revers, or Murdering Battery*, is one that plays on the back of any place; and being placed on an eminence, sees into it.

BATTERY *joint, or par camarade, or cameretta*, is when several guns play at the same time upon one place.

BATTERY *en Rouage*, is that used to dismount the enemy's cannon.

BATTERY *à Ricochet*, is adapted to the method of *ricochet* firing, first invented and practised by Vauban, at the siege of Aeth in 1692. The guns are loaded with small charges, and are elevated, so as to fire over the parapet; and the shot is hereby made to roll along the opposite rampart. This method of firing with guns has since been applied to mortars and howitzers with success.

BATTERY, *Coffer*, is that where the sides of the wall and merlons only are formed of fascines, and all the cavities or included spaces filled with earth.

To construct a battery of this kind, mark out with a line the limits of the parapet eighteen or twenty feet thick; and three or four feet before the parapet, mark out with lines or stakes the limits of the ditch, ten or twelve feet broad, or even more, if earth is wanted; allowing eight yards in length for one gun, and six yards more for every other gun. On the outlines of the parapet cut a trench five or six inches wide and deep, and there lay a row of fascines, the ends being jammed one into the other; and let them be staked down. Lay on them another row, so that the joinings of these may not be directly over the joinings of the lower one, and let all the knots of the bands be turned inwards; stake these down; and on them lay in like manner a third and fourth row, &c. until the height be about three feet. The same kind of work being done at the ends, and for the emplacement if wanted, the coffer for the wall will be finished. Then let the men be disposed along the place intended for the ditch, and with proper tools break the ground and

throw it into the coffer; where, as the earth is thrown in, other men are to spread it, and stamp it down with rammers; and thus the coffer is to be filled. When the wall is finished, let the embrasures be staked out (see MERLON), and a coffer formed in like manner for each merlon, which is also to be filled with earth, and rammed down. Proceed to complete it in the same manner with FASCINE Battery.

BATTERY, *Fascine*. See FASCINE Battery.

BATTERY, *Gabion*. See GABION.

BATTERY, in Law, denotes an act that tends to the breach of the peace of the realm, by unlawfully striking, beating, or offering other violence to another person.

Battery is frequently confounded with assault, though in law they are different offences; because, in the trespass for assault and battery, one may be found guilty of the assault, yet not convicted of the battery; there may therefore be assault without battery; but battery always implies an assault. The least touching of another's person wilfully, or in anger, is a battery; for the law cannot draw the line between different degrees of violence, and therefore totally prohibits the first and lowest stage of it: every man's person being sacred, and no other having a right to meddle with it in any the slightest manner. Upon a similar principle the Coracian law "de injuriis" prohibited "pulsation" as well as "verberation;" distinguishing verberation accompanied with pain from pulsation without any. However, battery is in some cases justifiable or lawful; as where one who hath authority, a parent or master, gives moderate correction to his child, his scholar, or his apprentice. Thus also on the principle of self-defence, if one strikes me first, or even only assaults me, I may strike in my own defence, and if sued for it, may plead "son assault demesue," or that it was the plaintiff's own original assault that occasioned it. So likewise in defence of my goods or possession, if a man endeavours to deprive me of them, I may justify laying hands upon him to prevent him; and if he persist in violence, I may proceed to beat him away. 1 Finch. L. 203. Thus too, in the exercise of an office, as that of churchwarden or beadle, a man may lay hands upon another to turn him out of church, and prevent his disturbing the congregation. 1 Sid. 301. And if sued for this or the like battery, he may set forth the whole case, and plead that he laid hands upon him gently, "molliter manus imposuit," for this purpose. On account of these causes of justification, battery is defined to be the "unlawful" beating of another; for which the remedy is, as for assault, by action of trespass "vi et armis," in which the jury will give adequate damages. Atrocious battery is subject to trial by inspection in pursuance of the order of the court; in which case the battery must be alleged so certainly in the declaration, that it may appear to be the same with the battery inspected. In the case of a person's beating the servant of another, besides the remedy of an action of battery or imprisonment, which the servant himself may have against the aggressor, the master also, as a recompence for his immediate loss, may maintain an action of trespass, "vi et armis," in which he must allege and prove the special damage he has sustained by the beating of his servant, "per quod servitium amisit;" and then the jury will make him a proportionable pecuniary satisfaction. A similar practice obtained among the Athenians; with whom masters were entitled to an action against such as beat or ill-treated their servants. A person guilty of battery against a clergyman, is liable to three kinds of prosecution for the same offence; an indictment for the breach of the king's peace, a civil action for damages, and a suit in the ecclesiastical court; last, "pro correctione et salute animæ" by enjoining penance, and then

again for such sum of money as shall be agreed on for *taking off* the penance enjoined; it being usual in these courts to exchange their spiritual censures for a round compensation in money (2 Roll. Rep. 384.); perhaps, says judge Blackstone, because poverty is generally esteemed by the moralists the best medicine "pro salute animæ." Bl. Com. vol. iii. and vol. iv.

BATTERY is sometimes used in speaking of the fabric of metalline utensils. In this sense, battery-works include pots, saucepans, kettles, and the like vessels, which, though cast at first, are to be afterwards hammered or beaten into form.

Some make battery for the kitchen, *batterie de cuisine*, comprehend all utensils for the service of the kitchen, whether of iron, brass, copper, or other matters. Others take the term in a narrower sense, and restrain it to utensils of brass or copper.

A society for the mineral and battery work of England was incorporated by queen Elizabeth.

BATTERY, in *Electricity*, is a combination of coated surfaces of glass, so connected together, that they may be charged at once, and discharged by a common conductor. Mr. Galath, a German electrician, was the first who contrived to increase the shock, by charging several phials at the same time. Dr. Franklin, after he had analyzed the Leyden phial, and found that it lost at one surface the electric fire which it received at the other, constructed a battery, consisting of eleven panes of large sash-glass, coated on each side, and connected in such a manner that the whole might be charged together, and with the same labour as one single pane; and by bringing all the giving sides into contact with one wire, and all the receiving sides with another, he contrived to unite the force of all the plates, and to discharge them at once. A more complete battery is described by Dr. Priestley, of which he says, that after long use he sees no reason for wishing the least alteration in any part of it. This battery (see *Plate I. Electricity, fig. 1.*) consists of 64 jars, each ten inches long, and $2\frac{1}{2}$ inches in diameter, coated within $1\frac{1}{2}$ inch of the top; and contains in the whole 32 square feet. The wire of each jar has a piece of very small wire twisted about the lower end of it, to touch the inside coating in several places; and it is put through a pretty large piece of cork, within the jar, to prevent any part of it from touching the side, which would tend to promote a spontaneous discharge. Each wire is turned round, so as to make a hole at the upper end; and through these holes a pretty thick brass rod with knobs passes, one rod serving for one row of the jars. The communication between these rods is made by laying over them all a thick chain. When part only of the battery is used, the chain is laid over as many rods as will furnish the required number of rows of jars. The bottom of the box, in which the jars stand, is covered with a plate of tin, and a bent wire touching the plate passes through the box, and appears on the outside. To this wire any conductor designed to communicate with the outside of the battery is fastened, as the small wire in the figure, and the discharge is made by bringing the brass knob to any of the knobs of the battery. When a very great force is required, the quantity of coated surface may be increased, or two or more batteries may be used. Franklin's Exp. and Obs. ed. 1769. p. 28. Priestley's Hist. &c. of Electricity, ed. 1775. vol. ii. p. 99.

However complete the battery above described appeared to be at the time of its construction, later electricians have discovered many imperfections to which it was subject; of which the principal are those that result from the form and size of the jars, the substance of the glass, the height of the coating, and the connections within the battery. In

consequence of these imperfections in its structure and contrivance, it is prevented from receiving more than about half the charge which it ought to receive in proportion to the quantity of its coated surface.

The most perfect batteries of modern construction, since that of Dr. Priestley, have been made in Holland for Teyler's museum at Haerlem, by Mr. Cuthbertson of Polandstreet, London, then residing at Amsterdam. Of these batteries there are two, differing in their magnitude and mode of construction, but allowed to be equally perfect. The first was completed in the year 1784, and is composed of 135 jars in 9 boxes, each containing 15, which may be used separately or combined, as the nature of the experiment requires. Each box is a separate battery of itself; and the description of one box with a view of the figure, will be sufficient for explaining its construction and use. In *Plate I. Electricity, fig. 2.* is exhibited a perspective view of Teyler's first battery, with its parts arranged in proper order for receiving a charge from the electrical machine. Each box, as we have already observed, contains 15 jars; each jar is 11 inches high, and 6 inches in diameter, contracted at the mouth to 4 inches, and coated so as to contain about 140 square inches; and thus the whole battery will contain about 132 square feet of coated surface. Each box is divided into 15 partitions, 5 of which are in the length and 3 in the breadth; the height of the sides of the box being somewhat lower than the coating of the jars, as are also the partitions in which they stand. The lid of the box is made without hinges, for the convenience of releasing it from the box, that it may be removed while experiments are performed. It is taken off by lifting it upwards. The outside coatings of the jars are connected by means of cross wires passing under the bottom of each jar; and those on the inside by means of a brass frame, bearing 15 brass balls, fixed upon the frame above the centre of each jar. All these balls, excepting the four at the corners, have wires screwed to them and hanging downwards into the inside of each jar; but the wires of the four corner jars are screwed to a foot, which is cemented to the bottom of each in the inside. Upon these wires the whole frame rests, and is kept in its proper position. The four corner balls have holes, which receive the ends of the wires, and terminate at a proper height from the jars. By this contrivance the inside connecting frame may at any time be easily removed; and as this part of the machine is important, the construction of the said frame is shewn separated from the battery in *fig. 3.* It is according to the above construction that Mr. Cuthbertson forms his present batteries, excepting that he has increased the size of the jars, so as to make one battery contain about 17 square feet; and he engages to prove by experiment, that the batteries of his construction are far superior to any others. Teyler's second grand battery was finished by Mr. Cuthbertson in 1789. This is the largest and most complete battery that was ever made. The whole battery, standing in proper order for receiving a charge, is exhibited in *fig. 4.* It consists of 100 jars of the same shape with that of those already described, only that they are so enlarged in size, that each of them contains $5\frac{1}{2}$ square feet of coated surface, instead of 140 inches, and the whole battery contains 550 square feet of coating; and for convenience, it is put into four separate cases, each containing 25 jars in the form of a square, 5 on each side. The boxes are lined with lead on the inside for forming the outside communication; each jar has a perpendicular stand resting upon its bottom, and supported from falling sideways by three stays on the inside. Upon the top is screwed a three inch brass globe, from which proceeds a brass tube about one inch in diameter,

BATTERY.

diameter, to a large brass globe, supported by the middle jar at a proper height, so as to keep the inside communication properly arranged. A view of the figure will shew how the four are combined, so as to charge and discharge all the 100 jars at once.

Lieutenant colonel Haldane proposes the following method for measuring the force of an electrical battery, during the time of its being charged.

Let the battery be insulated, and at a small distance from it place an insulated electrical jar, and near the jar, one of Mr. Cuthbertson's electrometers. The electrometer being adjusted according to the degree of force which is intended to be employed as a measure of force to be communicated to the battery, connect the electrometer with the jar; make a metallic communication between the interior side of the jar and the exterior side of the battery, and connect the interior side of the battery with the conductor of an electrical machine; then, by the operation of the electrical machine, the battery receives a quantity of the electrical fluid, and becomes charged. The fluid, which departs from the exterior side of the battery, is received by the electrical jar, which also becomes charged; but this jar, being connected with the electrometer, explodes as soon as it acquires a force sufficient to put the electrometer into motion. The quantity of the electrical fluid which is received by this jar, between each of the explosions, is a measure of the quantity of the fluid in the battery; and the number of explosions or discharges of this jar shews the number of measures which the battery contains, and consequently the force which it is capable of exerting when discharged.

For the author's demonstration of this method, and the illustration of it by appropriate experiments, we must refer to Nicholson's Journal, vol. i. p. 156, &c.

BATTERY, Galvanic; the name usually given to an apparatus for accumulating the electricity which is produced by the mutual agencies of certain metallic and carbonaceous substances, and peculiar fluids.

The first instrument of this kind was invented by the celebrated Volta of Pavia, in 1800, and various forms of it have been since adopted by different philosophers.

The original battery, or the electrical pile, is composed of plates of zinc, plates of silver, and pieces of pasteboard, of the size of the plates, moistened in a solution of salt in water: and arranged in the order of zinc, silver, pasteboard, zinc, silver, pasteboard, and so on, till a series sufficiently numerous is formed. On account of the expence of silver, copper has been lately generally substituted for it, with but little diminution of effect; and solutions of muriate of ammoniac, of nitrous acid, and of muriatic acid, have been employed instead of the solution of common salt, with very great advantage as to the increase of the power of the combination. In general any two metallic substances which are perfect conductors of electricity, may be used, provided the interposed fluid is capable of oxidating at least one of them.

The powers of galvanic batteries appear to be very much connected with the chemical changes going on in them, and hence plates of one metal may be made to supply the place of the two metals provided their different sides be exposed to different chemically acting fluids, as has been shewn by the experiments of Mr. Davy. Thus copper, silver, and lead, all form efficient combinations when they are arranged with two different sets of pasteboard, one moistened with diluted nitric acid, and the other with solution of hydrosulphuret of potash; the order being metal, pasteboard moistened with acid, pasteboard moistened with hydrosulphuret, &c. In such a case, if the battery is required to be of considerable permanency as to its effects, it is necessary to separate the

pasteboard moistened in the chemical agents from each other by a third set of pasteboards, moistened in common water.

In instances when piles are erected perpendicularly either with two metals or with one metal, in consequence of the oxidation and the loss of moisture from pressure and evaporation, the electrical action usually ceases after a few days; and in order to renew it, a second construction of the series becomes necessary. Several methods have been proposed for making instruments more permanent in their operation than the pile, and more easily rendered active; but the most ingenious contrivance appears to be that of the trough, discovered by Mr. Cruickshank. It consists of a box of baked wood, in which plates of copper and zinc, or of silver and zinc soldered together at their edges, are cemented in such a manner as to leave a number of water-tight cells, corresponding to the number of the series: the arrangement becomes active when the cells are filled with the proper saline fluids; and it may at any time be easily freed from oxide by the use of muriatic acid.

In the common apparatus of Volta, that part bounded by the most oxidable metal, as, for instance, the zinc, is found in a positive state, with regard to electricity, and the other part, as the copper, in a negative state; and when a communication is made between the two ends, by means of a conducting body, a constant circulation of electricity is established.

The electricity of the galvanic battery is capable of being partly transferred into the Leyden phial; and its effects, as has been fully shewn by the experiments of Messrs. Nicholson, Carlisle, Woolaston, Van Marum, and Ritter, are similar to those of common electricity, in a low state of intensity. It gives shocks to living animal organs, and excites muscular contractions in bodies for a considerable time after death. It assumes the form of fire in passing from one conducting body to another in its highly concentrated state; and it ignites small metallic wires or leaves, and causes them to enter into combustion. It sets fire to charcoal, sulphur, alcohol, and other inflammable bodies; and it rapidly decomposes water and various other fluids.

The intensity of the electricity in Galvanic batteries is greater in proportion as the series composing them are more numerous: but the quantity of it depends upon the quantity of surface they contain. Hence equal numbers of large and small plates arranged in different batteries produce nearly the same effects on the human body which is an imperfect conductor, and which can admit of the passage only of a certain quantity of electricity of a low intensity in a given time; but the large plates are in a determinate ratio, much more powerful in igniting the metals, and in affecting perfect conductors through which a large quantity of electricity, in any state of intensity, easily and instantly passes.

Many important philosophical discoveries, which will be fully described in the article GALVANISM, have been already made, by means of the galvanic apparatus, in different parts of Europe; and a number of enlightened experimenters have been employed in investigating the principles on which its operation depends. The theory of it is, however, as yet obscure, and the perfect developement of it will probably be connected with views more profound than any that have been as yet obtained of the nature and agencies of electricity, and its relations to chemical changes. See Phil. Trans. for 1800 and 1801. Nicholson's Journal, vol. iv. and v., and vol. i. new series. Journals of the Royal Inst. vol. i. Tilloch's Phil. Mag. vol. x. xi. and xii. Annalen der Physik. Journal de physique. Annales de Chimie.

BATTERS *d'estrade*, scouts or horsemen, sent out before, and on the wings of an army, two or three miles, to make

make discoveries; of which they are to give an account to the general. See SCOUTS.

BATTEUX, CHARLES, in *Biography*, honorary canon of the church at Rheims, which was his native city, became professor of philosophy at the Royal College of Paris, and distinguished himself by his judgment, learning, and character. He was chosen a member of the Academy of Inscriptions in 1759, and of the French Academy in 1761. His death, which happened at Paris in 1780, is supposed to have been accelerated by the chagrin resulting from the want of success of the elementary works which he drew up by order of government, for the use of the military school. His chief publications, written in French, are the following: "A Translation of the Works of Horace," 2 vols. 12mo.; "The Morals of Epictetus, extracted from his own writings," 12mo. 1758; "A Course of the Belles Lettres," 5 vols. 12mo. 1760; to which are annexed his treatises, before published; "The Fine Arts reduced to a single Principle," and "On Oratorical Composition;" "History of Primary Causes," 8vo. 1769; "The four Poetics of Aristotle, Horace, Vida, and Boileau, with Translations and Remarks," 2 vols. 8vo. 1771; "Elements of Literature, extracted from the Course of Belles Lettres," 2 vols. 12mo.; "Elementary Course for the Use of the Military School," 45 vols. 12mo.; and "Translations of Ocellus Lucanus, and Timæus Locrensis." Nouv. Dict. Hist.

BATTIE, WILLIAM, born in Devonshire, in 1704, received his education at Eton School, whence he went in 1722, to King's College in Cambridge. On the death of his father, his mother moved to Eton, and afterwards to Cambridge, that she might be near her son, and assist in lessening his expences. The Craven Scholarship becoming vacant soon after his admission; the Doctor offered himself as a candidate, and had the good fortune to be successful. Of the importance this small stipend, only 25l. per annum, was to him, we may judge, from what he says on the subject, in a letter to a friend. "I shall now," he says, "begin to live agreeably, and have, I hope, got through the worst part of my life." A recollection of the utility of this stipend to him, it is probable, Bowyer says, induced him, in the latter part of his life, to found a similar scholarship, at the same university. Pursuing his studies, in 1726, he was made Bachelor, and in 1730, Master of Arts; he was also now one of the Fellows of the College. In 1729 he published a specimen of an edition of Isocrates, in one volume 8vo. He at first proposed studying the law, and his finances not being equal to the expence of taking chambers in one of the inns of court, in London, he communicated his intention to two wealthy cousins in the city, of the name of Coleman; but as they declined assisting him, he turned his mind to the study of medicine, and in 1737, he took the degree of Doctor in that faculty. For a short time he practised medicine at Cambridge. Removing thence, he went to reside at Uxbridge, where, acquiring the confidence of some of the principal families in the neighbourhood, he soon came into considerable practice. About the year 1739, he married the daughter of Barnham Good, one of the masters of Eton, having kept up an intimacy with the lady from the time of his quitting the school. He was now also noticed by his relations, the Colemans, who were so much gratified by the consequence to which they saw him rising, that the survivor of them left him 30,000l. Continuing a few years longer at Uxbridge, he at length removed to London. In 1745, we find him, Fellow of the College of Physicians. The same year he spoke the Harveian Oration, which was published the following year. About the same time he was elected Fellow of the Royal Society. In 1749, he com-

pleted his edition of Isocrates, which was published in two volumes, 8vo. Though this work was not well received by the critics, it was always a great favourite with the Doctor. The year following he experienced a serious mortification. For taking an active part in a dispute between the College of Physicians and Dr. Schomberg, and being one of the most strenuous in opposing his admission as a Fellow, he was held up to ridicule in a satirical poem, under the name of the Battiad, in which a ludicrous account is given of the dispute, as well as some severe sarcasms on his favourite work. The Battiad is supposed to have been the joint production of Moses Mendez, Paul Whitehead, and Dr. Schomberg. It was published, at the time, in folio, and afterwards, in 1776, in a collection of humorous pieces, in 2 vols. 8vo. Another edition of this collection, much enlarged, was printed in 1792, in 4 vols. 12mo. There being at this time but one public asylum in London, for the reception of insane persons, which had been long found insufficient to contain all the indigent objects labouring under this affliction, a subscription was set on foot by some wealthy and benevolent individuals, to erect another edifice for the purpose, on the plan of Bethlehem Hospital. The scheme was so much approved, and so largely patronized, that in 1751 the managers of the fund were enabled to take, and fit up, a large building on the north side of Moorfields for the purpose, and as Dr. Battie had been very active in promoting the subscription, he was appointed physician to the institution, which was called St. Luke's Hospital. It contained one hundred and ten beds, eighty of which were appropriated to recent cases, such as were supposed capable of being relieved, or cured by medical treatment, and thirty for old and incurable cases. By the good conduct of the managers, and the character the charity thence acquired, the committee found themselves enabled, in 1781, to take a piece of ground, in Old Street, and erect a large and magnificent building for the reception of the patients, who were removed into it in 1786. The new building contains beds for 185 recent and curable patients, and for 120 incurables. The present physician, who was elected into the office, in 1781, is Dr. Samuel F. Simmons.

In 1757 Dr. Battie published a treatise on Madnefs, 4to. in which, having thrown out some censures on the medical practice formerly used in Bethlehem Hospital, Dr. John Monro, whose father was implicated in the censures, replied, rebutting his charges, and having humorously taken for the motto to his remarks, "O major tandem parcas insane minori," the Dr. was afterwards called by the wits, Major Battie. In 1762 he published "Aphorismi de cognoscendis et curandis morbis nonnullis, ad principia animalia accommodati," taken principally from his Lumleian lectures. In February 1763 he was examined before a committee of the House of Commons on the state of the private mad-houses in the kingdom, which he shewed them, from instances that had fallen under his notice, to be so ill conducted, as sometimes to be used as prisons for persons whose relatives were interested in getting them out of the way. This gave rise to a series of regulations, made by the legislature, with a view of preventing the continuance of those practices; but they were not completely suppressed until the year 1774, when the power of licensing private mad-houses was vested in the college of physicians.

As the Doctor had for several years confined his practice to maniacal cases, he had now leisure to indulge his inclination for building, to which he was much attached. Besides a large house, No. 88, Great Russell Street, Bloomsbury, for his town residence, he built an elegant villa at Twickenham, lately the residence of the Countess Dowager Pawlet. He

also erected a more considerable house on the banks of the Thames, at Marlow, in Buckinghamshire, where he passed much of his leisure time, in the latter part of his life. These houses were built under the immediate inspection of the Doctor, and after his own designs. He died of a paralytic stroke, at his house in Great Russell Street, the 13th of June 1776, aged seventy-two years. Having no male issue, his great property, upwards of 90,000*l.* was divided between his three daughters, of whom the eldest was married to captain, afterwards admiral sir George Young, who sold the house at Marlow, called Court Garden, to Richard Davenport, esq. an eminent surgeon of Essex Street, in the Strand, London; the second, to Philip Rashleigh, esq. a gentleman of Cornwall; and the third, to the late sir John Call, baronet.

BATTIFOLIUM, or **BATTIFOLLUM**, in *Antiquity*, a kind of tower or defence, frequently mentioned by Latin historians of the middle age. It seems to have been wood, and to have been erected on sudden and hasty occasions.

BATTLE, in *Geography*, a small market town of England, in a hundred of the same name, in Sussex, is situated six miles from Hastings, and 56 south-east from London. It was originally called Epiton; but the decisive victory at Hastings, gained by William, duke of Normandy, over king Harold, induced the former, when he was fixed on the throne, and founded the abbey, to change the name of the town to that which at present it retains. Battle consists of one principal street, indifferently built; and the parish church is a neat building, the incumbent of which is styled dean of Battle. The inhabitants support also a charity school for forty boys. The gunpowder which is manufactured here is esteemed the best in Europe, and hence called "Battle powder," though the town cannot boast of any other trade. The neighbourhood, however, is so fertile, that an incredible number of large cattle are constantly sent up to the London markets for sale, especially what are denominated stall-fed oxen, which produce the largest beef in England. Henry I. granted a market to be kept on every "*Lord's Day*;" but Anthony, lord Montague, who, about 1600, built himself a beautiful seat here, obtained an act of parliament to change the market day to Thursday, as it now continues. Battle is reckoned unhealthy, on account of its low dirty situation. Its greatest boast is the magnificent abbey built by William the Conqueror, on Heathfield, near the town, in 1067, to compensate, in some small degree, for the effusion of blood the year before; the highest altar of the fabrick standing on the very spot where the body of the brave but unfortunate Harold was found. This abbey was filled with Benedictine monks from Normandy, and endowed with such extensive privileges, that if a convict were passing to execution, it was in the abbot's power instantly to release him, should they meet on the road. At the dissolution its revenues were valued at 88*l.* 14*s.* 7*d.* The ruins of the abbey are very stately; and what remains undestroyed, serves as a house for the family of Webster, and for the purposes of the town, the gate-house being used as the hall in which are held sessions and other meetings for this peculiar jurisdiction. From Standard and Tillman hills are very extensive prospects. A fact related of abbot Hamo, in 1581, is worth recording; a body of Frenchmen landing and attacking Rye and Winchelsea. Hamo raised whatever force he could collect, repaired to Winchelsea, and having fortified it as well as he was able, checked the progress of the enemy, till the force of the country was sufficiently powerful effectually to repel them. Battle has three fairs, and two hundred and ninety-four houses, inhabited by 2040 persons.

BATTLE Island. See **BAY of St. Louis.**

BATTLE, a river in New South Wales, which runs N.E. into Sashakawan river, S.E. from Manchester house.

BATTLE, or *Battel*, *Wager of*, in *Law*, a species of trial of great antiquity, which had its origin in the military spirit of our ancestors, blended with superstition, and which consisted in a kind of appeal to Providence, under an apprehension and hope, however presumptuous and unwarrantable, that heaven would give the victory to him who had the right. Concerning the early history and general prevalence of this mode of trial, see **COMBAT**. This trial, which had been the immemorial practice of all the northern nations, and which had been first reduced to regular and stated form among the Burgundi, about the close of the fifth century, and passed from them to the Franks and Normans, was introduced into England, among other Norman customs, by William the Conqueror; but it was only used in three cases, one military, one criminal, and the third civil: the first in the court martial, or court of chivalry and honour; the second in appeals of felony; and the third upon issue joined in a writ of right. In these writs of right, the "*jus proprietatis*" could not often be ascertained without difficulty; and this mode of determining it was allowed for the sake of such claimants as might have the true right, but yet by the death of witnesses, or other defect of evidence, be unable to prove it to a jury. Although the writ of right itself, and of course this mode of trial, be at present much disused, yet it is still law and in force, if the parties chuse to abide by it.

The last trial by *battel* that was waged in the court of common pleas at Westminster, though one afterwards occurs in the court of chivalry in 1631, and another in the county palatine of Durham in 1638, was in the 13th year of queen Elizabeth, A. D. 1571; and was held in Tottil fields Westminster, "*non sine magna juris consultorum perturbatione*," says sir Henry Spelman, who was himself a witness of the ceremony. The form of it, described by judge Blackstone, is as follows.

When the tenant in a writ of right pleads the general issue, viz. that he hath more right to hold, than the demandant hath to recover; and offers to prove it by the body of his champion, which tender is accepted by the demandant; the tenant in the first place must produce his champion, who by throwing down his glove as a gage or pledge, thus wages or stipulates *battel* with the champion of the demandant; who, by taking up the gage or glove, stipulates on his part to accept the challenge. The reason why it was waged by champions, and not by the parties themselves, in civil actions, is because, if any party to the suit dies, the suit must abate and be at an end for the present; and therefore no judgment could be given for the lands in question, if either of the parties were slain in *battel*; and also that no person might claim an exemption from this trial, as was allowed in criminal cases, where the *battel* was waged in person.

A piece of ground is then in due time set out, of sixty feet square, enclosed with lists, and on one side a court erected for the judges of the court of common pleas, who attend there in their scarlet robes; and also a bar is prepared for the learned serjeants at law. When the court sits, which ought to be by sun-rising, proclamation is made for the parties, and their champions; who are introduced by two knights, and are dressed in a coat of armour, with red sandals, barelegged from the knee downwards, bareheaded, and with bare arms to the elbows. The weapons allowed them are only batons, or staves, of an ell long, and a four-cornered leather target; so that death very seldom ensued this civil combat. In the court military indeed they fought with sword and lance, according to Spelman and Rushworth; as likewise in France only villeins fought with the buckler and baton, gentlemen armed at

BATTLE.

all points. And upon this and other circumstances, the president Montefquieu hath, with great ingenuity, not only deduced the impious custom of private duels upon imaginary points of honour, but hath also traced the heroic madness of knight-errantry, from the same original of judicial combats. But to proceed.

When the champions, thus armed with batons, arrive within the lists, or place of combat, the champion of the tenant then takes his adversary by the hand, and makes oath that the tenements in dispute are not the right of the demandant; and the champion of the demandant, then taking the other by the hand, swears in the same manner that they are; so that each champion is, or ought to be, thoroughly persuaded of the truth of the cause he fights for. Next an oath against sorcery and enchantment is to be taken by both the champions, in this or a similar form; "hear this, ye justices, that I have this day neither eat, drunk, nor have upon me, neither bone, stone, ne grass; nor any enchantment, sorcery, or witchcraft, whereby the law of God may be abased, or the law of the devil exalted. So help me God and his saints."

The battle is thus begun, and the combatants are bound to fight till the stars appear in the evening: and, if the champion of the tenant can defend himself till the stars appear, the tenant shall prevail in his cause; for it is sufficient for him to maintain his ground, and make it a drawn battle, he being already in possession; but, if victory declares itself for either party, for him is judgment finally given. This victory may arise, from the death of either of the champions: which indeed hath rarely happened; the whole ceremony, to say the truth, bearing a near resemblance to certain rural athletic diversions, which are probably derived from this original. Or victory is obtained, if either champion proves *recreant*, that is, yields, and pronounces the horrible word of *craven*: a word of disgrace and obloquy, rather than of any determinate meaning. But a horrible word it indeed is to the vanquished champion: since as a punishment to him for forfeiting the laud of his principal, by pronouncing that shameful word, he is condemned, as a recreant, "*amittere liberam legem*," that is, to become infamous, and not be accounted "*liber et legalis homo*;" being supposed by the event to be proved forsworn, and therefore never to be put upon a jury, or admitted as a witness in any cause.

This is the form of a trial by battle; a trial which the tenant, or defendant, in a writ of right, has it in his election at this day to demand; and which was the only decision of such writ of right after the conquest, till Henry II, by consent of parliament, introduced the *grand assize*, a peculiar species of trial by jury, in concurrence therewith; giving the tenant his choice of either the one or the other. Which example, of discountenancing these judicial combats, was imitated about a century afterwards in France, by an edict of Louis the Pious, A. D. 1260, and soon after by the rest of Europe. The establishment of this alternative, Glanvil, chief justice to Henry II., and probably his adviser herein, considers as a most noble improvement, as in fact it was, of the law.

The trial by battle may also be demanded at the election of the appellee, in either an appeal or an approvement, and it is carried on with equal solemnity as that on a writ of right; with this difference, that there each party might hire a champion, but here they must fight in their proper persons. And therefore if the appellant or approver be a woman, a priest, an infant, or of the age of sixty, or lame, or blind, he or she may counterplead and refuse the wager of battle; and compel the appellee to put himself upon the country. Also peers of the realm, bringing an appeal, shall not be challenged to wage

battle on account of the dignity of their persons; nor the citizens of London, by special charter, because fighting seems foreign to their education and employment. So likewise if the crime be notorious; and if the thief be taken with the "mainour," or the murderer in the room with a bloody knife, the appellant may refuse the tender of battle from the appellee; for it is unreasonable that an innocent man should stake his life against one who is already half convicted.

The form and manner of waging battle upon appeals are much the same as upon a writ of right: only the oaths of the two combatants are vastly more striking and solemn. The appellee, when appealed of felony, pleads *not guilty*, and throws down his glove, and declares he will defend the same by his body: the appellant takes up the glove, and replies that he is ready to make good the appeal, body for body. And thereupon the appellee, taking the book in his right hand, and in his left the right hand of his antagonist, swears to this effect. "*Hoc audi, homo, quem per manum tenco, &c.*" "Hear this, O man whom I hold by the hand, who callest thyself John, by the name of baptism, that I, who call myself Thomas, by the name of baptism, did not feloniously murder thy father, William by name, nor am any way guilty of the said felony. So help me God, and the saints; and this I will defend against thee by my body, as this court shall award." To which the appellant replies, holding the bible and his antagonist's hand, in the same manner as the other: "Hear this, O man, whom I hold by the hand, who callest thyself Thomas, by the name of baptism, that thou art perjured; and therefore perjured, because that thou feloniously didst murder my father, William by name. So help me God and the saints; and this I will prove against thee by my body, as this court shall award." The battle is then to be fought with the same weapons, viz. batons, the same solemnity, and the same oath against amulets and sorcery, that are used in the civil combat: and if the appellee be so far vanquished, that he cannot or will not fight any longer, he shall be adjudged to be hanged immediately; and then, as well as if he be killed in battle, providence is deemed to have determined in favour of the truth, and his blood shall be attainted. But if he kills the appellant, or can maintain the fight from sun-rising till the stars appear in the evening, he shall be acquitted. So also if the appellant becomes recreant, and pronounces the horrible word of *craven*, he shall lose his "*liberam legem*," and become infamous; and the appellee shall recover his damages, and also be forever quit, not only of the appeal, but of all indictments likewise for the same offence. Blackst. Com. vol. iii. p. 337, &c. vol. iv. p. 346, &c.

BATTLE, in the *Military Art*, signifies an engagement between two hostile armies, drawn up in regular order, in a country sufficiently open for them to encounter in front at the same time; or should some obstacle occur to hinder the readily entering into action of the whole line, for the greater part of an army to begin the attack upon the troops opposed to them, the rest remaining in fight, ready to act as occasion may require their assistance or co-operation.

Other conflicts, when only certain points of the armies are engaged, though generally of much longer duration, and often attended with superior slaughter, are only termed fights, or, as they are called by the French, *combats*. (Feuquiere's Memoires, chap. 80.) Under this denomination rank therefore, though as obstinate as most others on record, the engagements of Seneffe, of Steinsterke, of Oudenarde, and of latter days, those of Zorndorf and Hochkirchen, equally celebrated on account of the carnage which attended them, and the importance of their consequences.

The

The loss of a battle involves almost always that of the artillery of the vanquished, and frequently of the baggage. As all these losses must be repaired before the beaten army can again look their conquerors in the face, the enemy consequently remains for a length of time master of the country, and at liberty to carry all his projects into execution. These inconveniences are rarely so severely felt in case of ill success in a partial combat, however desperate. Greater part of the artillery is generally preserved, and the baggage almost entire; for the opposite armies not closing in front, the divisions which have been engaged alone become the sufferers.

But in a set or pitched battle, the present object of attention, where both parties have time and room sufficient to arrange and extend themselves in regular order, the case is widely different. The least unforeseen advantage afforded to an enemy, or the most trivial circumstance unattended to, may baffle the efforts of the most experienced general, may snatch the palm of victory from the hands of numbers and valour, convert a successful pursuit to a disorderly flight, and lead to the irretrievable ruin of an army, possibly even of a state.

The ancients never joined battle without a great deal of preparation and religious ceremony; as making auguries, offering up sacrifices, haranguing to excite the courage of the soldiers, giving the word, or a tessera, &c. The signals of battle were, among the Romans, sounding the classicum, or general charge, striking upon their shields with their javelins, and displaying from the prætorium a peculiar flag, called by Plutarch (in Fab. Max. and in Pomp.) a red mantle. Cæsar also mentions this flag in his *B. Gallico*, l. ii. c. 20. In the moment of onset, a shout was raised by the whole army, for the double purpose of encouraging their fellows, and striking terror into the enemy. Similar to this was the custom which prevailed among the Greeks, of singing the *præan*, or hymn of combat, as they moved forward to the charge.

The rigid superstition of the Jews at first prevented them from fighting, or even from defending themselves, on the sabbath-day; but fatal experience of the inconvenience of the latter precept, induced them, in their wars with the princes of the Syro-Macedonian dynasty, to dispense with its observance. It was, however, in consequence of the aversion they still retained to a violation of that holy day, that Pompey became master of Jerusalem by assault, without any effectual resistance. *Dion. Cass. lib. xxxvii.*

The Romans did not carry their regard for religion so far. They had indeed their peculiar days, called "*præliæres dies*," wherein alone it was *lawful* to join battle; and others whereon it was unfit, called "*dies atri*;" but less scrupulous than the Hebrews, these latter were only observed in respect of attacking. No day was too sacred for them to defend themselves in. (*Macrob. Saturn. lib. i. c. 6.*) We observe frequent instances of their engaging by night. It was by night that Scipio destroyed near Utica the armies of Asdrubal and Syphax (*Liv. xxx. c. 5.*); and the decisive battle between Pompey and Mithridates (*Plut. in Pomp.*) was fought by moonlight.

The Athenians were prohibited, by the ancient laws of their country, from drawing out their forces for battle till after the 7th day of the month; and Lucian, speaking of the Lacedæmonians, relates, that by the statutes of Lycurgus, they were not to fight before the full-moon. A similar custom prevailed among the ancient Germans, who reputed it an impiety to engage in the wane of the moon; and Cæsar intimates that his victory over Ariovillus was owing to that prince's having, contrary to the religious notions of his

countrymen, fought during the decrease of the moon. The barbarians were intimidated with the apprehension, and afforded Cæsar an easy conquest. To use his own words: "*Acie commissa impeditos religione hoste vicit.*" *Cæsar. de Bel. Gal. lib. i.*

An idea of the manner in which warlike operations were carried on, and battles fought, among nations in their primitive barbarous state, has been given under the article *ATTACK*. We shall not here repeat what has been already said on that subject.

Authors are fond of quoting the battle of Thymbra, between Cræsus and Cyrus (*Xenoph. Cyrop. lib. vi. vii.*), as the first general engagement ever fought. But as it is only related in the *Cyropædia*, a work whose historical veracity has been severely called in question, and as its recital is attended with circumstances of the most romantic cast, we shall content ourselves with barely mentioning it, and pass on to instances better authenticated, and less embellished by the marvellous.

At the battle of *Marathon* (*Herod. Erat. sect. 107. 117.*) the Greeks, conducted by Miltiades the Athenian, demonstrated the possibility of compensating by discipline, valour, and military skill, for any inferiority in numbers. A manœuvre not without its faults, but novel in the art of war as then understood, obtained for them a victory as splendid as extraordinary; and which we may rank as the earliest in profane history, of which any particular account has been transmitted to us.

The battle of *Platæa*, from the numerous forces engaged on either side, best deserves the denomination of a pitched battle. (*Herod. Calliope, sect. 61—74.*) It was fought upon the true ancient model. Hurry and confusion reigned predominant. Greeks and Persians engaged in two several places, without any attempt at co-operation, or the smallest exertion of military genius on the part of their commanders. In the true language of Homer, here "man was opposed to man, and shield met shield;" and the Greeks seem to have fairly achieved this astonishing conquest by excelling their adversaries in the vulgar qualities of bodily strength and brutal courage.

After toiling through the heavy and sanguinary period of the Peloponnesian war, where, though convinced at every page of the rapid improvement of the Greeks in tactics, we do not meet with any of those general or important contests, the subject of the present article; and after taking a cursory examination of the massacre of Cynaxa; we at length arrive at the battle of *Leuctra*. (*Plut. in Pelop. Xenophon. Hellen. lib. vi. Diod. Sic. lib. xv.*) This brilliant engagement, between numbers comparatively trifling, deserves from a scientific reader more attention than that of Platæa, as it is indisputably the first occasion on which victory was obtained merely in consequence of an able disposition. The famous column of Epaminondas, which obliged 24,000 Lacedæmonians, the bravest troops in Greece, to yield the honour of the field to 6,000 Thebans, has been repeatedly cited with admiration by the most learned authors, and imitated by the first military geniuses, on various occasions.

The battle of *Mantineæ*, the next instance worthy of particular observation, was won by the same general (*Xenoph. Hellen. lib. vii.*) on the very same principle. The Lacedæmonians, though conducted by their king Agesilaus, one of the ablest leaders of his age, suffered themselves to be again destroyed, by the precise disposition which had already proved so fatal to them at Leuctra. The Spartan glory, by the loss of this battle, sustained a blow it never afterwards recovered. Epaminondas, whose genius had made the bravest soldiers in all Greece shrink before weaker nerves, weaker spirits, and

inferior numbers, expired on the field he had immortalized no less by his personal exploits, than his able arrangements before the action. Henceforth pitched battles are more frequently distinguished by masterly strokes of generalship.

The formidable phalanx, then a late invention, no less than his own military talents, secured to Philip of Macedon his important triumph at Charonæa. (Diod. Sic. lib. xvi. ch. 86.) The three great battles of Alexander against Darius were gained but with little difficulty, owing to the superior tactics of the Greeks. Those of Issus and Arbela in particular (Arrian. Alex. iii. sect. 15. Quin. Curt. lib. iv.) were only slaughter. When we read that in the latter, with the loss of only 1200 of his own men, the Macedonian destroyed, according to the least exaggerated accounts, 40,000 of the Persians (Arrian says 300,000), it is pretty plain that the resistance was but nominal, and that the conquerors had little more trouble than to do execution on their enemies.

The Grecian history, subsequent to Alexander, is replete with instances of pitched battles; but of which little or no particular account has been left us. We are for the most part in the dark with respect to the order observed in drawing up the rival armies, and the manœuvres which accelerated or retarded a victory. The abrupt termination of the history of Diodorus Siculus, deprives us of any details respecting the battle of Ipsus, except the brief and unsatisfactory account of Plutarch (in Dem.). The number of the slain alone leaves us sometimes a little room to judge of the importance or the obstinacy of a conflict.

Polybius, however, has left us (lib. ii.) a full and interesting account of the decisive engagement at *Sellasia*; which, for a time, completely subjected the Grecian states to the power of Macedon. Here again the phalanx determined the fortune of the day, and demonstrated the superiority of its close and impenetrable order, over the more loose and shallow bat-talions of their antagonists.

Among the Romans we shall find still further occasion to remark the rapid improvement of ancient tactics. Guided by Polybius and Livy, we peruse with peculiar interest the account of battles fought for the mastery of the world, perpetually differing in situation, in success, and in consequences. That of *Tunis*, in particular, between Regulus and Xanthippus, calls strongly upon the attention. We are not dazzled by a long list of numerous forces and barbarous auxiliaries, fatigued by a repetition of desultory attacks and repulses, or bewildered amidst a series of complex manœuvres. Two armies, nearly equal in numbers, of small strength, but supereminent valour, headed by renowned generals, encounter on a spot of ground easily surveyed by the eye of imagination. We remark their several dispositions. The simple narrative of the historian points out clearly and satisfactorily the faults or advantages of those dispositions, the mistaken rashness of the Roman, and the consummate generalship of Xanthippus; and before we enter upon the vicissitudes of the action, we are fully convinced that the errors committed by Regulus must ultimately lead to his total defeat. Polyb. lib. i.

The march of Hannibal into Italy furnishes us with several instances of pitched battles, various in their nature, important in their consequences, and interesting in description. Far from being fatigued with following the brave Carthaginian through a continual scene of slaughter, we consider and admire his conduct, feel for his difficulties, eagerly accompany him in the field of carnage, and take a lively interest in his proceedings. The three famous engagements of the *Trebia* (Polyb. lib. iii. Liv. lib. xxi. sect. 53—56.); of

the lake *Thrasymenus* (Polyb. ib. Liv. lib. xxii. sect. 4—7.); and of *Cannæ* (Polyb. ib. Liv. xxii. sect. 44—52.); rising in importance one above the other, chiefly arrest our attention. We find that previous to every one of these, the arrangements made by Hannibal were such as almost to ensure success. A series of artful movements was constantly employed to draw the Romans into the snares prepared for them; and their commanders, destitute of the genius it was necessary to oppose to so formidable an enemy, rushed, as it were, blindfold upon their ruin; though possessed in each of the contests we have just named of every advantage of numbers, resources, and, we may even add, of valour. The talents of a single man reduced those advantages to nothing. Their numbers were converted into an hindrance to themselves, their resources were intercepted or rendered useless, and their valour, degenerating into despair, precipitated them madly upon certain destruction.

No action was ever more obstinately fought, or as a pitched battle deserves more consideration, than that of *Zama* (Liv. lib. xxx. sect. 32—35. Polyb. Fragin. lib. xv.), where the fortune of a Scipio finally triumphed over the Carthaginian republic. Without more than barely naming it here, we refer the reader for a more particular account of that celebrated affair, to the article *ZAMA*.

From this time, Roman discipline and valour reigned triumphant in every struggle with foreign nations. The armies of Antiochus, Perseus, and Mithridates, were destroyed, for the most part, with scarcely an effort; and the battles they ventured in defence of their dominions are only miserable instances of the inferiority of mere courage, supported by tenfold numbers, to the cool and steady bravery of veteran soldiers, directed and managed by the talents of an experienced general.

But however cheaply the legions of Flaminius, of L. Scipio, of P. Æmilius, and of Lucullus, had earned their laurels, a harder task was imposed on those who, under Cornelius Sylla, and Julius Cæsar, turned their arms against their own countrymen. They had to engage with troops equally courageous, expert, and strictly disciplined; with men who, under Marius and the great Pompey, had exterminated the hordes of the savage Cimbri, and had subjugated the eastern world; in a word, with Romans. Three pitched battles, those of *Pharsalia*, *Thapsus*, and *Munda*, signalized this bloody period, and gave ample scope for the exertion of the utmost talents of the matchless Cæsar. Yet in the last of these engagements, that consummate general confessed, that he contended not for victory, but for his life; a satisfactory evidence of the desperation with which it was fought. Plut. in Cæs.

The two battles of *Philippi* are equally famous. Few have been more decisive in the event, or more distinguished for the uncommon perseverance and obstinacy with which they were contested.

In the age of Tacitus, we find the military science of the Romans brought to perfection. Similar to the train of artillery which modern generals carry into the field, the army of Vitellius at *Cremona* planted its ballistæ to play upon the enemy, and with showers of immense stones, swept them away by whole ranks. (Tacit. Hist. lib. iii. sect. 23.) This battle, and the subsequent storming of the adverse camp by the legions of Vespasian, give us a perfect insight into the mode of warfare as then practised. Tacit. *ibid.* sect. 21—33.

In the lower ages of the empire we meet with very few instances of conflicts, remarkable either for their long duration or for any celebrated manœuvres put in execution by rival generals. Nations relapsed fast, even in this destructive science, into their original barbarism. Armies were no longer com-poled

composed of troops regularly trained and inured to service, but of cowardly and undisciplined plunderers, to whom victory or defeat was alike the signal for disbanding, on whose exertions therefore but small dependence could be placed, and from whose successes little or no benefit could be derived. Numbers soon became, as formerly, the criterion of advantage. War teemed with sanguinary combats, productive of trifling consequences. Courage supplied the place of generalship; fury and carnage, of discipline.

Never did a series of pitched battles follow each other in more rapid succession, than during the period subsequent to the first irruption of the Arabs into the more civilized provinces of Asia. These enthesiallic followers of their prophet, issuing from a peninsula of contemptible extent when compared to the empires they so madly attacked, dared to match their own puny forces against the united efforts of the Roman and Persian monarchies. As we accompany them in their progress, the most incredible victories crowd upon and harass our reflections. It is true, that among these engagements, so general, so bloody, and so decisive, we do not find the slightest trace of discipline or generalship. A religious fury, altogether irresistible, compensated with the Arabs the want of both these requisites. Aiznadin, Kadafia, and Yermouk, are lasting monuments of Moslem glory; but they do not convey the least information to the military reader, or recompense in interest the attention he may bestow in perusing them.

Alike barren, dry, and uninteresting, are the details of most of those battles fought between the time of Charlemagne and the beginning of the seventeenth century. Whether we peruse the murderous annals of the Crusades, where all Europe and Asia seem mingled in reciprocal carnage; or the bloodless combats of the Italians in the days of Machiavel, when, after fighting a whole day, armies have separated without the loss of a man on either side (Machiav. Hist. Flor. lib. vii.); we are alike disgusted with the want of circumstances to excite our attention.

Cressy, Poitiers, and Agincourt are names venerated with reason by every Englishman; but setting aside any consideration of the splendid carnage which attended them, and examining them in a military point of view, how little shall we find to extol, how much to censure. In all the three cases, the English armies were brought into the most imminent danger by the boyish imprudence of their leaders, who marched them, as it were blindfold, into the heart of an enemy's country, without taking the smallest pains, either to secure the necessary supplies of provisions, or to ensure a retreat. Not to be behind hand in imprudence, the French generals, although certain of starving their antagonists into a surrender merely by an inconsiderable delay, had three times successively the infantry to march up and attack the English, strongly and advantageously posted, and on ground too where not a fourth of their own numbers was capable of acting. Untaught by experience, they lost the three great battles by exactly the same fault; and in all three (the contested tradition of the artillery used at Cressy alone excepted), we find no reason to commend the military science of our ancestors. Indeed, at Poitiers, the Black Prince possessed sagacity sufficient to line the hedges on both sides of a narrow way with archers, for the purpose of annoying the French gens d'armes as they advanced through it to the attack: a stratagem not half so commendable as that of Nevil, earl of Salisbury, at the petty skirmish of Bloreheath, in the reign of Henry VI. (Holinshed); an affair as much surpassing Poitiers in a tactical consideration, as inferior in the bloody list of the killed, and the consequences that ensued upon it.

In proportion as we approach nearer to modern times, we view the military science making faster strides towards improvement. The invention of gunpowder effected by degrees an important change in the whole art of war. The arms and order of the battalions underwent a total alteration. The cavalry, formerly the main dependence of an army, inasmuch that no person of family would serve in any other capacity than as a horseman, became a mere appendage to the infantry, who, since the invention of fire-arms, have generally decided the event of battles. The musquet and bayonet are now substituted for the pike and sword; and armies, like fortified places, must be approached in form, and battered down by artillery, while the most complete defeat is rarely attended with worse consequences than the loss of the surrounding territory.

About the year 1630, the entrance of Gustavus Adolphus and his Swedes into the German empire, and the great events which signalized the war of thirty years, render military history more interesting. The celebrated battles of *Leipzig* and *Lutzen*, where the first modern use was made of the column, now the chief instrument of the gain of victories, are remarkable epochs. On those days the hard-earned laurels of Tilly and of Wallstein faded in a moment before the comprehensive genius of Gustavus, who, by his skilful dispositions bought, though with his life, the title of the first general of his age. A succession of heroes, Weimar, Bannier, Torstenfon, and Wrangel, adopted and improved upon his maxims. Condé and Turenne profited anew by the example; and a succession of victories obtained under their auspices, rendered the arms of Louis XIV. during 50 years invincible.

On entering upon the history of the war of 1690, we are surprized at the rapid improvements in that part of the military art, the subject of the present article. The engagement of *Steinkirk* presents a remarkable instance of the recovery of an affair judged entirely desperate. The battle of *Landen* shews us an army entrenched behind a number of fortified villages, driven from all its defences, and carried as it were by storm. The bayonet, used first by Catinat at the action of *Marfaglia*, added a new and terrible weapon of offence to the infantry, and by degrees entirely superseded the use of the pike. The reader will now observe armies more numerous and more regularly subsisted than formerly, plans of attack and defence more ingenious and connected, artillery more formidable and better served, and a degree of method in military operations not before practised.

In the war of succession, or that which took its rise from the separate claims of the houses of Bourbon and Austria to the Spanish monarchy, the three great battles of *Hochstedt*, of *Ramillies*, and of *Turin*, immortalized by the abilities and splendid victories of Eugene and Marlborough, claim particular attention. To enlarge upon each under the present article, would trespass too much on the boundaries assigned to us; we therefore refer the scientific reader to the heads *HOCHSTEDT*, &c. where he will find a succinct account of those engagements, illustrated by the critical remarks of an excellent military judge, M. de Feuquieres.

Of all the battles fought by Charles XII. in his nine years' war with the Russian empire about the same period, that of *Pultowa* alone is remarkable in a tactical point of view. *Narva*, *Duna*, *Cliffow*, &c. furnish but splendid and transitory instances of successful rashness in a military madman. The battle, or rather five battles, of *Lefno* on the *Soffa*, fought by general *Lewenhaupt* against the whole forces of the Czar, are interesting in so far as they display the astonishing resources of Swedish valour.

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From a tranquillity of fifty years, hardly interrupted by the short contest for the succession of Poland, Europe was aroused by the war of 1740. With wonder we behold a nation, hardly before reckoned in the number of her powers, a nation of soldiers, start into energy; and, headed by a monarch who to the most consummate generalship joined the qualifications rarely found in military men, of love for the sciences, and genius for their improvement, perform the most astonishing and romantic exploits. It would be superfluous to follow the Prussian hero through his career of victory and glorious distress, or to enumerate the various means and manœuvres by which he triumphed at Friedberg, at Prague, at Lissa, at Zorndorf, and at Torgaw, over the firmness and discipline of Austrian forces, the talents of a Daun, and the enterprize of a Laudohn. Nor have we room to enter into details of his defeats at Kolin, Hochkirchen, and Cunnorsdorff; defeats which only throw additional lustre on his transcendent abilities.

It seemed impossible for human genius to surpass the bounds prescribed by the immortal Frederic to modern tactics. His hand had modelled armies into mere machines, liable to be directed with promptitude at the pleasure of the mover. The systems practised in the Prussian and Austrian schools, seemed to defy alteration or improvement; and the art of drawing up armies in order of battle particularly was reduced to certain rules, adapted to all situations, and which ensured every presumptive means of success.

A revolution, the effects of which have been severely felt in the most remote corners of the globe; a revolution, which has shaken the religious and political opinions of the most powerful nations, arrived to overturn monarchies, to change the face of Europe, and to convert it into one vast theatre of war. The military art did not escape the general influence. When the armies of Prussia and Austria, numerous, valiant, and bred up in the schools of Frederic and Laudohn, poured their united forces upon the French republic, opposed only by raw levies, undisciplined, half armed, and conducted by generals, many of whom knew nothing of service by experience; what resources could we suppose a nation to possess, capable of counterbalancing such disadvantages! But with amazement we view the disciplined invaders, at the end of the first campaign, driven back with shame and defeat. We view the best officers in Europe in a disgraceful retreat before mere novices in the art of war. We view enthusiasm supply the place of commanders, of numbers, and of discipline.

One general battle had subjugated Belgium to the disposal of France, when the treachery of a general not only occasioned the loss of that country, but endangered the frontier of the republic itself, then covered only by a disorganized army. Nevertheless, during a long and bloody campaign, the forces of almost the whole of Europe united strove in vain to break through the first line of the bordering fortresses. The scene was soon totally changed. The collected energy of a nation, overbearing all opposition, repelled the attack; retaliated invasion; and by seven of the most brilliant campaigns recorded in history, achieved such important, rapid, and extensive conquests as almost exceed credibility.

We must not place to the sole account of enthusiasm these wonderful successes. Enthusiasm alone, though backed by still greater numbers, must ultimately have proved insufficient, when opposed to disciplined troops and skilful generals. The art of war gradually assumed a new face. To the maxims of the German school, others succeeded still more prompt, more energetic, and peculiarly adapted to the nation which carried them into execution. To the excellence

of their artillery, their skill in the art of managing the bayonet, and the incredible rapidity with which they have executed the different modes of charging in column, as well as to the extraordinary talents of their self-taught generals, the French owe chiefly their successes in the late war. Under some future article we shall hazard some observations on their mode of engaging.

In a war so productive of bloody and general engagements as the last, it would be superfluous to dwell on particular instances. Never in one campaign did so many battles take place as in 1794, when from the beginning of April forwards hardly a day passed without some desperate conflict. In point of consequences, we must assign the first rank to Jemappe, Turlemont, Haguenau, Fleurus, Millefimo, Arcole, Marengo, and Hohenlinden; but if we only consider the slaughter on both sides, Lodi, Verona, Stockach, Novi, and Zurich stand pre-eminent. A few remarks upon these, with some other affairs of principal consequence, will be found under their proper heads.

When we consider the immense resources required to maintain a large army, and the inconvenience with which the movements of more unwieldy bodies are still attended, we shall find room to commend the less extensive scale on which we carry on our wars, compared to that of more ancient times. Indeed the armies, which we are assured have been brought forth to battle in the earlier ages, almost stagger our belief. Sesostris is said (*Diod. Sic. i.*) to have led 600,000 foot, 24,000 horse, and 27,000 armed chariots, on his famous expedition into Upper Asia. The same historian swells the armies of Ninus and Semiramis to two and three millions of men. We are told in scripture that Zerah, a barbarous potentate, invaded the kingdom of Judah with a million of his subjects, who were totally exterminated by the Jewish monarch Aza; nor are the accounts of the numbers engaged at mount Zemaraim on both sides, and the carnage of the Israelites on that occasion less marvellous. (*II. Chron.*) Darius, in his Scythian expedition marched at the head of seven hundred thousand of his subjects (*Herod. lib. iii.*). Xerxes invaded Greece with a fleet of more than 1300 triremes, and a land army of 2,100,000 men. According to Herodotus (*lib. vii.*), the whole of his sea and land forces numbered above five millions. These numbers, immense as they are, will hardly appear exaggerated, when we reflect on the hosts afterwards brought into the field by the Goths and Huns, and the formidable swarms of Croises in the middle ages. The last Darius, when he engaged Alexander at Issus, mustered in his army six hundred thousand men; and some historians make his forces at the battle of Arbela amount to a million.

The ease with which these immense hosts were defeated by comparatively trifling numbers of Greeks, gives us the most mean idea of their bravery and military skill. We must except the instance of Plataea, where the victory was obstinately disputed, and the carnage consequently dreadful. There are few instances upon record of a battle so completely decisive. Of 300,000 men, of whom the Persian army consisted at the commencement of the action, not four thousand escaped the destruction of that fatal day. (*Herod. ix.*)

The Romans, although they sometimes kept very numerous forces on foot in different parts of their dominions, seldom employed above forty thousand men in the same army. In their war with the Cisalpine Gauls, subsequent to the first Punic, they levied between seven and eight hundred thousand troops; but these all acted in separate corps. One of the largest armies they ever brought into the field, was that defeated, or rather destroyed, at Cannæ by Hannibal. It consisted of 76,000 foot and 7,200 horse, of all whom

only

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only about 3000 escaped death or captivity. This defeat, terrible as it was, was some years after revenged by the slaughter of 60,000 Carthaginians on the banks of the Mætaurus. (Polyb. lib. ii & iii. Livy.)

We shudder at the cruelties which sometimes accompanied the triumphs of Rome over her more barbarous and undisciplined enemies. L. Scipio destroyed 50,000 Syrians at Magaelia. Marius, in his contest with the Teutones, took or exterminated above 300,000 of them. In a second battle, against the Cimbri, he slew 120,000, and captured half that number. In three battles against the generals of Mithridates, Sylla cut in pieces 200,000 men. The bloody defeats he sustained from Lucullus, during the siege of Cyzicus, cost the same Mithridates three hundred thousand of his forces. On one occasion, Julius Cæsar annihilated an army of 368,000 Helvetii; on another, he extirpated upwards of 430,000 Germans, who had crossed the Rhine in quest of new settlements. (Livy. Plut. in Mar., Sylla, & Lucull. Cæf. de Bell. Gall.)

In the civil wars of the Romans themselves, we find instances, considering the inferior numbers of the troops engaged, of slaughter equally dreadful. In the battle before the Colline gate of Rome, Telesphus, a general of the Marian faction, commanded 79,000 men against Cornelius Sylla; 12,000 of these being taken, were chiefly massacred in cold blood after the action; all the rest perished either on the field or in the flight by the swords of their implacable countrymen. In justice to Cæsar we must observe, that his triumphs over the Pompeian party were in a great measure exempt from these atrocities. (Plut. in Sylla. Eutrop.)

It is the well-founded remark of a judicious and elegant writer, that our European battles appear only as skirmishes, when compared to those which have deluged the plains of Asia with blood. (Voltaire, *Essai sur l'esprit et les mœurs des nations*) In the year 1218, fatally distinguished as being the epocha of the first irruption of the Moguls and Tartars into the southern provinces of Asia; the destroyer Ghengis-Khan marched to the siege of Otrar at the head of 700,000 combatants. Mohammed, the reigning sultan of Karazm, opposed him with an army 400,000 strong. The weaker party was defeated, and the Tartar conqueror commenced his sanguinary career by the destruction of 150,000 of his enemies. This first chastisement only paved the way for others still more terrible. In following the great Khan through the dreadful scenes transcribed by De la Croix from the best Eastern authorities, we are shocked at the unheard of severities exercised upon such cities as most incurred his anger by an obstinate resistance. The particulars of such tragedies would but disgust the reader. To select a few of the most remarkable instances:—At the storming of Karazm, Mohammed's capital, 200,000 persons were massacred, and half that number sold for slaves; 90,000 were shot to death with arrows in cold blood on the plains of Nefas; 1,747,000 were butchered in the two cities of Nisabur and Tars, and their dependencies; 1,600,000 in the district of Herat; and in the last battle fought by Ghengis Khan against the rebels of Targut, 300,000 are reported to have perished. To dismiss the subject, the Chinese record inform us, that in the first fourteen years of the Mogul empire, the numbers of persons destroyed by Ghengis Khan amounted to the dreadful total of eighteen millions and upwards. (Petit de la Croix, *Hist. de Gheng. Khan*, Par. 1740. *Mod. Univ. Hist.* vol. iv.)

The subsequent wars of the Moguls abound with examples of almost equal enormity. In the siege of the capital of the Chinese empire by Oktay Khan, a million of people were slain on both sides. Timur Bek, who carried on his expeditions upon the same plan as Ghengis, could bring

800,000 men at once into the field, with whom he so completely defeated at Ancyra 400,000 Turks under Bajazet, that not a fortieth part escaped the common destruction. In a word, it is in Asia that war has always been waged on the most gigantic scale.

Less bloody in their conquests, and more generous in their disputes, the armies, which during the two last centuries have been set on foot by European nations, were comparatively trifling in number. The battle of Malplaquet, where 220,000 men were engaged on both sides, is most remarkable for the number of the combatants; those of Hochstedt and Prague for the destruction of the human species. At Hochstedt, the French and Bavarian army, which before the action mustered 60,000 men, was reduced to one-third of that number. The battle of Prague cost the king of Prussia, by his own confession, 18,000 of his best troops, while the Austrians lost 24,000 men.

It is with sorrow we are obliged to remark, that the carnage on several occasions, during the last unhappy contest, has been unexampled in the history of modern war. Upon the Rhine, in particular, the loss on both sides, towards the latter end of December 1793, is computed at 80,000 men.

The following concise list of the most remarkable and decisive battles which have taken place (chiefly in Europe) from the earliest ages, may not prove wholly unacceptable.

	B. C.
Marathon, between the Greeks and Persians, fought 490	490
Himera, in Sicily, between the Greeks and Carthaginians,	480
Plataea, Greeks and Persians,	479
Mycale, in Ionia,	479
Eurymedon,	470
In Egypt, between the Athenians and Persians,	460
Of the Assinaros, in Sicily, between the Athenians and Syracusans,	413
Cynaxa, in Persia,	400
Coronea, between Agesilaus and the forces of the Theban alliance,	394
Leuctra, where the Spartans were entirely defeated by Epaminondas and the Thebans,	371
Mantinea,	363
Cheronea,	338
Of the Granicus,	334
Ilius,	333
Arbela, or Gaugamela, which subverted the Persian empire,	331
Of the Hydaspes, between Alexander and Porus,	327
Ipsus, in Phrygia,	301
Beneventum, in Italy, between Pyrrhus and the Romans,	274
Agrigentum, in Sicily, between the Romans and Carthaginians,	262
Tunis, in Africa, do.	255
Panormus, in Sicily, do.	251
Of the Macra, in Africa, between Hamilcar Barca and the revolted mercenaries,	239
Trabia, in Italy, between Hannibal and the Romans,	218
Of the lake Trasymenus, do.	217
Cannæ, do. one of the most complete defeats mentioned in history,	216
Sena, on the Metaurus, where the army of Afrubal was cut off by Nero, the Roman consul,	207
In Spain, between Scipio and Afrubal the son of Gisco,	206
Zama, Hannibal totally defeated by Scipio,	202
Magnesia, between L. Scipio and Antiochus,	190
Pydna, between Perseus and P. Aemilius,	168

BATTLE.

	B. C.	A. D.
Nepheris, decisive of the third Punic war,	147	1690
Cirta, in Numidia, between Marius and Jugurtha,	106	1690
Near the Rhone, where the Romans sustained a terrible defeat from the Cimbri and Teutones'	105	1690
Aquæ Sextiæ, between Marius and the Teutones,	102	1691
Verceilæ, in which Marius totally exterminated the Cimbri,	101	1691
Cheronæa, between Sylla and the army of Mithridates,	86	1692
Orchomenus, do.	85	1693
Before the gates of Rome, between Sylla and the Samnite Telestinus,	82	1697
Cabira, between Lucullus and Mithridates,	71	1700
Tigranocerta, between Lucullus and Tigranes,	69	1702
Carthæ, Crassus defeated by the Parthians,	53	2 Aug. 1704
Pharfalia, between Cæsar and Pompey,	48	12 May, 1706
Philippi,	42	27 August, 1706
Actium,	31	14 April, 1707
	A. D.	30 June, 1709
Bedriacum, between the legions of Otho and Vitellius,	69	11 Sept. 1709
Cremona, between the generals of Vitellius and Vespasian,	69	Denain, 1712
Lugdunum, in Gaul, between Severus and Albinus,	198	Peterwaradin, 5 Aug. 1716
Chalons, between Ætius and Atila, in which 300,000 persons fell on both sides,	451	Belgrade, 16 Aug. 1717
Aznadin, in Syria,	634	Parma, 18 June, 1734
Kadesia, in Fars, which subverted the empire of the Sassanides in Persia,	634	Guastalla, 8 Sept. 1734
Yermûk, in Syria, where the Saracen general Khaled totally defeated the Greeks,	636	Molwitz (the first defeat given to the Austrians by Frederic III.), 30 March, 1741
Fontenay, in France,	841	Czaflow, 6 May, 1742
Hastings,	1066	Fontenoy, a memorable battle, 30 April, 1745
Ascalon in Palestine, between the Croises and the Saracens,	1192	Friedberg in Silesia, where the king of Prussia totally defeated the Austrians, 24 May, 1745
Bouvines,	1214	Rotto-freddo in Italy, 31 May, 1746
Otrar in Tartary,	1218	Culloden, 16 April, 1746
Of the Indus, between Ghengis Khan and Jalalo'ddin,	1221	Prague, 6 May, 1757
Bannockburn,	1314	Kolin (the first defeat sustained by the king of Prussia), 18 June, 1757
Cressy,	1346	Plaffey, which laid the foundation of the future power of the British nation in Bengal and Hindostan, 23 June, 1757
Poictiers,	1356	Rosbach, 5 Nov. 1757
Angouri, between Bajazet and Tamerlane,	1402	Breslaw, 22 Nov. 1757
Agincourt,	1415	Lissa, 5 Dec. 1757
Towton,	1461	Zorndorff (in this battle the king of Prussia totally defeated the Russians with terrible slaughter), 25 Aug. 1758
Bosworth, between Henry VII. and Richard III. which finished the war between the houses of York and Lancaster,	1485	Hoehkirchen, 14 Oct. 1758
Flodden,	1513	Minden, 1 Aug. 1759
Marignano, between Francis I. and the Swiss,	1515	Cunnersdorff (the king of Prussia here sustained a complete defeat from the Russians), 12 Aug. 1759
Pavia, between Francis I. and Charles V.	1525	Torgau, 3 Nov. 1760
Mohatz in Hungary, which decided the fate of that kingdom,	1526	Freyberg, decisive of the seven years' war, 29 Oct. 1762
S. Quintin,	1557	Choczim, 30 April, 1769
Nieuport, by prince Maurice over Albert,	1600	Foczan, 1789
Prague, by the duke of Bavaria over the Elector Palatine,	1620	Jemappe, in which the Austrians were defeated by Dumourier, and lost in consequence all their possessions in the Netherlands, 6 Nov. 1792
Leipzig, by Gustavus Adolphus over count Tilly,	1631	Tirlemont, where Dumourier was defeated by the prince of Saxe-Cobourg, and the Netherlands subsequently recovered, 18 March, 1793
Lutzen, memorable for the death of Gustavus Adolphus,	1632	Between Dietz and Louvain, fought by the same generals, with similar success, 22 March, 1793
Nordlingen, where the Protestant league in Germany was totally defeated,	1634	Haguenau, 8 Dec. 1793
Breitenfeld, near Leipzig,	1642	In the neighbourhood of Landau (the Austro-Prussian army was almost destroyed by the republican generals Hoche and Pichegru), from the 22 to the 27 Dec. 1793
Edgehill,	1642	Moucron (Gen. Clairfait was again defeated by Pichegru), 29 April, 1794
Rocroy,	1643	Fleurus (the prince of Cobourg was defeated by Jourdan. This battle ultimately decided the fate of the Netherlands), 26 June, 1794
Naseby,	1645	Liege,
Jancowitz,	1645	
Worcester,	1651	
Before Vienna, which was relieved in consequence,	1683	

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Liege, between Jourdan and Clairfait,	17 and 18 Sept. 1794
On the Roer between the same generals, (Gen. Clairfait was overthrown in both these actions.)	1st to 3d Oct. 1794
Montenotte,	10 April, 1796
Millesimo,	17 April, 1796
Dego,	18 April, 1796
Bridge of Lodi,	11 May, 1796
Ettingen,	9 July, 1796
Near Nuremberg,	22 Aug. 1796
Castiglione,	15 Aug. 1796
Roveredo,	4 Sept. 1796
Arcole,	5, 6, and 7 Nov. 1796
S. Marco,	13 and 14 Jan. 1797
Before Mantua (Gen. Provera and his whole division laid down their arms),	16 Jan. 1797
On the Tagliamento,	16 March, 1797
Tarvis,	25 March, 1797
Stokach,	25 March, 1799
Verona,	26 and 30 March, 1799
Magnan,	5 April, 1799
Of the Adda,	27 April, 1799
Zurich,	4 June, 1799
On the Trebia,	17, 18, and 19 June, 1799
Novi,	16 Aug. 1799
Zurich,	24 Sept. 1799
Engen,	3 May, 1800
Moskirch,	5 May, 1800
On the Riss,	9 May, 1800
Ulm,	21 May, 1800
Marengo,	14 June, 1800
Hohenlinden,	3 Dec. 1800

The chief view of the great commanders of modern times has been, till of late years, rather to harass, or starve an enemy, by frequent alarms, by cutting off his supplies of provisions, carrying off his baggage, seizing his posts, &c. than to stake their fortune and reputation on the event of a day; a battle generally deciding the fate of a campaign, and not infrequently of the war. It is therefore a rule never to venture a general action without important reasons, or when absolute necessity leaves no other choice.

Reasons for seeking and engaging the enemy are, a decided superiority in number or quality of forces; discord among the commanders of the opposite army, when actuated by different interests; an obvious incapacity on their part, demonstrated by a neglect of the ordinary precautions in encamping, or on a march, the necessity of relieving a considerable place besieged by the adversary; an apprehension of the total ruin and dispersion of an army, unless prevented by success in a general engagement; an intelligence of reinforcements coming to the enemy, whose junction would render him superior, and change the state of affairs; a particular advantage obtained in some preceding action, which, however indecisive, has given the enemy a smart check, and produced an evident superiority; or in fine, the obligation of putting all to the risk of a battle.

The most proper reasons for avoiding it are; the having less to hope for from a victory, than to fear from an overthrow; inferiority, either in number or courage of the troops; an expectation of fresh succours, or the junction of a considerable detachment; the impossibility of bringing the enemy, too advantageously posted, to an engagement on fair terms, or of forcing him in his entrenchments; or the prospect of ruining his army by temporising, and declining battle. See ACTION.

But a resolution to engage being once taken, in consequence of one or other of the reasons above recited, the next object to be considered is the means of carrying it into execution with the strongest presumption of success. Those

measures are partly preparatory to the affair; but the most important and essential chiefly take their rise out of the different circumstances of the action itself, and are those which almost always determine its success.

Preparatory to fighting, a general should carefully observe the following particulars. He should form the order of battle according to the strength and quality of the troops of which his own army is composed, always having an eye towards counteracting the disposition in which it is expected to find the enemy. The general officers should be assigned their respective posts, and copies of the order of battle carefully sent to such as have a separate command, who must be responsible for its observation in every respect. All the troops must be perfectly armed and equipped; the proper number of cartridges distributed previously to the battle; waggons loaded with ammunition, and arms stationed in the rear of those battalions, which, it is presumed, will have the hottest fire to sustain; and a fresh reserve provided at the park of artillery; as well to give out before and during the action, if wanted, as after it is over, when there are generally many missing. Time, if possible, should be allowed to the troops to rest and refresh themselves, before the engagement. Physicians, surgeons, and medicines must be provided, and rather more in number than may be deemed barely sufficient. The army must be totally disencumbered of the heavy baggage, and the remainder lodged in a place of safety at some distance. The advantages of sun and wind, however trivial, are not to be neglected. The soldiers should likewise be inspired with the desire of fighting, and a certainty of victory; inflamed with the hope of plunder and good quarters; and the officers reminded of glory and of rewards.

Those occasions of conquering which commonly only present themselves on the day of battle are, taking advantage of the ground; strict observance of the disposition already concerted, and, should a correction prove necessary, the making of it without confusion, and with the knowledge of all those officers, who, from their situations, should become apprised of it. The artillery is to be planted along the line, according to the nature of the country; and every opportunity narrowly watched of gaining an advantage, either by extending the wings to turn, if possible, the flanks of the enemy; or by closing and protecting, to draught sufficient troops from them for a grand attack where the enemy may appear most feeble. Should the march to the enemy be made by night, or little probability offer of finishing the contest before dark; the word should be given to the whole line before they march. If the advance is made in line, due care should be taken to preserve the equality of the wings, and the requisite distance between the lines; frequent halts should be made to give the artillery time to fire and load, and the ranks to recover their order. Frequent warnings, above all, should be given the soldiers to receive the enemy's fire, and abstain from returning it till they have drawn their adversaries' ammunition from them: for troops who have parted with their fire will most infallibly give way on seeing an opponent advance, ready to pour in a heavy volley upon them. If, however, both parties pursue the same maxim, the only expedient is, to march up close to the enemy, give in a general discharge upon them, and prevent its being returned by immediately having recourse to the bayonet, under cover of the smoke, which seldom fails to produce an important effect.

If the advancing army, by reason of the distance it has to march, or the inequality and close nature of the ground, or desiles, it must pass, cannot come at the enemy in front, the approach must be made in a sufficient number of columns, to admit the formation in order of battle, out of distance of be-

ing charged when in column. The general officers who conduct these columns should also carefully observe the motions of each other, so that the heads of their divisions may at least preserve a front; and that, when arrived at the ground where the army is to deploy into line, the movement may be executed with diligence and caution, and at too great a distance to be attacked by the enemy before all the battalions are drawn up in the pre-concerted order.

The commander in chief should post himself where he may best and most conveniently remark the effect of the first charge, and whence he may with the least difficulty disperse his orders, either to sustain the troops who may have broken the enemy, or to replace such as have themselves been thrown into disorder. For both these purposes he should make use of the supernumerary forces stationed between the two lines, or of those of the reserve, as he may judge most advisable. Every other general officer should be at his particular station, either to lead to the charge, or to remedy the disorders which may arise in the brigade entrusted to his command.

If the battle becomes general and bloody, and success inclines to neither side, the commander in chief should direct his principal effort against that part of the line where the enemy's resistance is most obstinate; and in this case he should himself hasten to the spot, to animate the troops by his presence, and induce them to charge, under his eye, with greater vigour. If success is complete throughout the first line, and it entirely overthrows that of the enemy, the principal attention of the general, and of the other officers, should be employed to restrain the soldiers, prevent them from leaving their colours to follow up the flyers, and, committing the pursuit to some detached corps of cavalry and infantry, to march in good order, at a steady pace, to sustain these detachments, and assail the second line of the enemy. The artillery should always accompany the first line, in the order already distributed, in case the nature of the ground allows of it. The remainder of the army should follow the movement, always observing, without confusion, the distance between the two lines appointed by the order of battle.

Should the first line give way, or be thrown into disorder by the enemy, the battalions are to retire through the intervals left between those of the second line, behind which they are to halt and rally. Great care is here necessary to be taken by the officers, that instead of passing through the intervals, the routed troops do not directly rush in upon the ranks of the second line, and either carry them off in the general flight, or throw them into such confusion and disorder as it may be impossible to repair before the enemy are upon them.

On the first line's giving way, the second should march up briskly to its relief, and charge furiously upon the enemy without giving him time to repair the disorder into which the action and pursuit must of course have in some measure thrown him. By executing this with promptitude and determination, it is often easy to retrieve the ground which has been lost, and to defeat and render useless the enemy's first line, already considerably weakened and deranged by the former attacks. It is the sooner effected, as the enemy's fire which does most execution is thrown away; the subsequent discharges, from the great hurry of loading, being of little consequence, in comparison with the first. The great mischief is, that the second line, on seeing the first give way, are usually struck with a panic which magnifies the enemy, and on his nearer approach, either betake themselves to flight, or make but a faint resistance.

If, on the other hand, the victory still remains constant, and the adverse second line is overthrown, the general in chief should use still greater care than formerly to prevent his sol-

diers from dispersing, lest they should be charged and routed by the first line of the enemy, which may have retired and rallied behind their second. He should push the beaten troops, still keeping his men in good order, and in line, till their confusion is general. He must then progressively augment the number of his detached forces; without, however, once suffering any individual to quit his colours unless commanded. It is at this moment that he should employ his reserve, and the different corps which have not been engaged, to pursue the enemy, prevent them from rallying, and, *last of all*, to make prisoners, which the men should never be suffered to do during the combat, or even to think of the booty, till the victory is absolutely gained, and the enemy so scattered and at a distance, as to leave no longer any fear of their turning upon the different detachments employed in the pursuit. The general may then, for the rest of the day, suffer his soldiers to collect the booty. If, in full pursuit, the detachment fall in among the enemies' baggage, they must not be suffered to disband instead of following up their advantage. Their officers must with extreme attention, severity, and even blows, if milder methods are of no avail, push them forward till they have got clear of the baggage, employ them only in taking the enemy prisoners, or cutting them down, and leave the pillage for the rest of the troops.

The first care of a general after the gain of a battle, should be to pay proper attention to his wounded, and visit, or at least send to visit, the principals among them; to learn what valiant actions have been performed in different parts of the field; and to praise in general the whole army, particularly those who most deserve it. He should collect the trophies of his conquest, such as the prisoners, colours, standards, kettle-drums, and artillery, taken from the enemy; give, without delay, a first account of his victory to his court, and follow it up by another and more circumstantial detail, accompanied by the colours and standards he has won. Then, after burying the dead, disburthening his camp of the wounded of both parties, the prisoners, artillery, and other superfluities, and suffered the army to take a little repose, in the execution of all which the least possible delay should be made, the victorious general may apply himself to derive from his success every advantage which time or place can furnish, in the execution of the plan already concerted or resolved on.

But as the fortune of war is changeable, and notwithstanding every possible precaution taken to ensure success, a defeat will sometimes happen, the whole care of a general, as well as his officers, should such an unforeseen event take place, must be exerted to prevent an entire rout. The commander should have this possibility always present to his mind. His own experience and sagacity, pointing out to him the critical moment preceding the loss of a battle, will also teach him to take all those measures proper for diminishing the disorder of a flight. A last effort may be made with such troops as yet remain unbroken, to give time to those already routed to re-assemble and rally in the rear, and thus secure an orderly retreat. A post may be occupied impregnable to the enemy; or a defile be secured through which the defeated army may pass, and re-form behind it in safety.

As the loss of the battle generally involves that of the baggage, should it accompany the troops, and almost always that of the artillery, the general should only remain in the first position to which he has retired for safety, as long as may be necessary to collect the remainder of his forces, after which he may conduct them to a fortified camp, and there repair his losses, as well with cannon and arms brought from the adjacent garrisons, as by the succours which may arrive to him. If the loss is so serious as to threaten that of some considerable place, he should throw the best of his infantry into the garrison, and keep the field with the cavalry, in
order

order to accommodate the enemy if he form the siege; or keep him in awe, and prevent him from dividing his forces, if his object is only to penetrate into the country, and lay it under contribution.

If the conqueror, on account of his loss in the engagement, finds his infantry too much weakened to undertake a heavy siege; should he be disabled from attempting it for want of heavy artillery and ammunition; or should he derive no other profit from his victory than that of disconcerting his enemy's projects, remaining master of the open country during the rest of the campaign, or procuring his men quarters upon hostile territory; the vanquished general ought after the first retreat, to occupy a defensible position in the vicinity of some large town, whence he may procure those accommodations and sustenance which he may have deprived himself of: such as, cordials and medicines for the sick, fresh baggage in lieu of that lost, &c. He should encourage his troops, without again facing the conquerors till he has repaired his losses by the arrival of new succours, new arms, fresh ammunition, and artillery, has cured the wounded, and find himself strong enough to oppose the enemy, and prevent his establishment in advantageous quarters.

Grand, Military Discipline.—Mémoire de Feuquieres, c. lxxx.

BATTLE was also a term formerly used to denote a body of forces drawn up in order of battle, and amounts to the same with what is otherwise called BATTALION.

In this sense we meet with the length or depth of the *Battle*; the front, rear, and flanks of the *Battle*.

BATTLE, *length of the*, is the number of soldiers in rank, or the space from the left flank to the right.

BATTLE, *depth of the*, is the extent of a file, or number of men from front to rear.

BATTLE, *line of*. See LINE.

BATTLE *array*, the same with order of Battle.

BATTLE, *order of*, signifies the disposition of the squadrons and battalions of an army, into one or more lines, according to the nature of the ground, either for the purpose of engaging an enemy, or being reviewed by the general.

The Egyptians, whose priority in civilization and in communicating the arts to the rest of mankind is universally allowed, were naturally, although they ranked many great conquerors among their first monarchs, a pacific nation. We have no authorities to enable us to judge of the progress they had made in the art of war; but from the fanciful account of the battle of Thymbra, given by Xenophon in his *Cyropædia*, we may fairly presume that they usually fought in large and deep battalions, forming a complete square. On the above occasion he mentions twelve of these unwieldy bodies, each consisting of ten thousand men, and who formed the chief dependence of Croesus against the army of Cyrus.

A people so particularly favoured and protected by heaven, as the ancient Jews, little needed the assistance of human invention, when, on any emergency, a new miracle was always ready to insure them success against their enemies. We find, therefore, nothing in the sacred scriptures that can give us an idea of any order of battle observed among them; although the regular division of their numerous forces under David, who distributed them into twelve main bodies according to their tribes, and each of these into thousands, or regiments, into hundreds or companies, into tens, and even into threes, and even into single men; that they would not entirely forget such matters in the field. The Jewish writer, followed by the author of the "Dissertation sur la tactique des Hébreux," asserts, that they arranged their armies in one single line, of considerable depth, for some between twenty and thirty miles. Along the front of these were

placed the light armed men, viz. the most expert archers, spearmen, and slingers, who began the onset by a warlike shout, and with casting thick showers of darts and stones against the enemy's front, in order to cause terror and confusion, and stop the rushing in of the chariots, which among the Canaanites were very numerous, by wounding the horses and drivers. This is the more probable, as it is a method common to most of the Asiatic nations. *Anc. Univ. Hist. vol. iii. p. 184.*

The order of battle described by Xenophon (*Cyropædia*) to have been used by Cyrus at the action of Thymbra, though perhaps a visionary one as applied in the text, may serve to give an idea of the method generally used by the ancient Persians in drawing up their armies, with which Xenophon must have been well acquainted. The cavalry, in the situation which it is indispensably necessary for them to observe, were posted on the wings. The heavy armed infantry, carrying, besides the pike, a sword for close combat, and drawn up twelve deep, formed the first line. The second consisted entirely of light armed, who threw their darts over the heads of the former, and annoyed and disordered the enemy in their approach. The third line, destined to the same purpose as the second, was composed entirely of archers; their bows which were extremely well bent and strung, carrying far beyond the front ranks, so as to excessively accommodate the enemy. With these were sometimes intermixed slingers, who threw large stones with great effect. For this purpose the Rhodians afterwards substituted leaden balls. The fourth line, consisting of heavy armed, and similar to the first, was intended to support the preceding ones, and prevent them from giving way. It also served as a rear-guard and a corps-de-reserve to repulse the enemy who should penetrate so far. The Persians also made use of moveable towers, erected on large carriages, each drawn by sixteen oxen, and containing twenty men, who threw stones and darts. These were placed in line in the rear of all the army, behind the corps-de-reserve, and favoured the rallying of those troops which were pushed and thrown into confusion by the enemy. They placed likewise great reliance in armed chariots, which they drew up sometimes in front of the battle, and sometimes upon the flanks, when in fear of being enveloped.

Such was the extent of the military science of those nations, who under Xerxes threatened Europe and the West with subjugation. But we see no occasion on which they knew how to profit by the advantage of the ground to carry the war, when necessary, into a difficult country, to make use of defiles and ambuscades, either for the purpose of covering themselves from the attacks of the enemy, or of annoying him on his march; or to protract an unequal campaign by avoiding a decisive action with a superior antagonist, and reducing him to distress for want of forage and ammunition. Neither do we observe that they paid the requisite attention to the supporting of their flanks by river, morasses, or heights, when it would have been advantageous by giving them an equal front to an army much more numerous, and putting them out of danger of being surrounded. *Rollin, Hist. Ancienne; liv. iv. ch. 4.*

The Persians made some alterations in this system; but they were far from being judicious. Artaxerxes Mnemon at the battle of Cunaxa, threw all his forces into one line, for the purpose of surrounding or outflanking those of his brother Cyrus; but he ruined the clumsy order of square battalions, whose narrow ranks rendered it impossible for them to take advantage of a success with the necessary promptitude, to retreat with facility, or manœuvre with any effect. The disposition of Mnemon to the Rhodian, in opposing the

passage of the Granicus by Alexander was less faulty. He formed two lines; the first of cavalry to assail and disorder the Greeks as they attempted to gain the bank of the river; and the second, at some distance, of infantry, with the intention, no doubt, of supporting the first: but, however judicious this arrangement might have been, he wanted genius or inclination to profit by it, and tamely suffered the Macedonians to reach the shore, defeat the cavalry opposed to them, and form their phalanx undisturbed for the attack of his heavy-armed foot, without stirring from his position, or casting a single javelin. It is impossible to read, without indignation, the unfoldlike details of the pompous march of Darius, and the extreme folly, as well as ignorance, conspicuous in the order of battle he made his armies observe at Issus and Gaugamela. His awkward evolutions on the former occasion, disordered his forces before the commencement of the action. In the latter instance he preferred the ruinous arrangement of his infantry by nations, in huge square battalions; he intermixed them with corps of horse not less unwieldy; and, not content with having committed faults so inexcusable, he surpassed them both by another. The nature of the ground, not allowing his immense army to extend itself upon a single front, seemed to point out the necessity of a second line, or at least a corps-de-reserve. He indeed drew up, behind his centre, several immense battalions for which he had no room in front; but so close to the first line, that when these gave way, the reserve, instead of supporting, served only to augment their disorder. Against such an enemy, it is by no means surprising that Alexander should have been, with inferior forces, so completely successful. Xenoph. Anab. lib. i. Arrian. in vit. Alex. lib. i. & iii.

We now turn to the Greeks, who, of all people of antiquity, the Romans excepted, were the best judges of warlike affairs and military conduct; but we cannot easily excuse them for the oversight they almost constantly committed in the drawing up of their whole army on one front, and trusting to a single effort the success of the day. Their infantry consisted of two kinds of soldiers. The heavy armed, who carried large bucklers, lances, and swords, and in whom consisted the principal strength of the army; and the archers and slingers who were generally distributed along the front of the line, and employed their stones, darts, and arrows, to disorder the ranks of the enemy. Having made their discharges, they retired round the flanks into the rear of the heavy armed, whence they continued throwing their darts during the rest of the action. As for the heavy armed, or Hoplites, we shall follow Thucydides in describing their disposition, according to the Lacedæmonian system, that nation being then reckoned the most expert among the Greeks in military knowledge. Their battalions consisted of four lesser divisions, each consisting of 128 men, and subdivided into four others, each of 32 men. The effective force of every large corps thus consisted of 512 soldiers, who were usually drawn up in smaller ones of four men in front, and eight in file. We find seven of these regiments engaged at the first battle of Mantinea, during the Peloponnesian War. The depth of the files was, however, often altered, when judged necessary by their commanders.

The Lacedæmonians never made use of cavalry before the Messenian war, on which occasion they were convinced of the impracticability of carrying on their operations in a flat country without it. Even then they rarely exceeded the number of six hundred, and these were chiefly composed of the inhabitants of a little district in Laconia called Sciritis, a circumstance from which they derived their appellation of Skirites. They were always drawn up on the left flank of

the army, a post they claimed by right. Soaverse were the Greeks in general to the use of cavalry, that in the most flourishing periods of the Athenian republic, they never mustered above 1,200 in their army.

The Greek tacticians of the middle ages have exhausted their imaginations in forming fanciful orders of battle, principally for the cavalry. Minute geometricians and theoretical soldiers, they have considered the art of war in a light entirely mechanical; and employing their pencils at random, have given us upon paper such plans and dispositions as only could exist in their own ideas, and could only originate in their ignorance of the practical part of the science. It is hence we derive the rhomb, the wedge, the orbicular, oval, and angular manner of disposing their forces, manœuvres perhaps of use in exercising a squadron, but not to be adopted in the field without imminent and inevitable danger. To form a proper estimation of ancient tactics, we should consult the writings of those celebrated characters, who only recount what they have in person seen, and themselves performed. Such are Xenophon, Polybius, Julius Cæsar, and Arrian. In reading them we trace the military art among the ancient Greeks and Romans to its highest pitch of perfection. The principal offensive and defensive operations of a campaign in the open country, or of a siege, are developed with order and perspicuity, and the images they present to us are distinctly imprinted on our imagination. Thucyd. lib. iii.—Rollin, Hist. Anc. liv. x. ch. 2.—Potter. Archæol. tom. ii. lib. 3. ch. 9.—Ælian. tact. ch. 18.—Guisehard, Memoires Milit. in disc. prelim.

Philip and Alexander put the last hand to improving the order of the Greek infantry in the creation and establishment of their formidable phalanx. For a particular account of its formation and evolutions, we must refer the reader to the article PHALANX. For several ages, this was the order of battle which most prevailed among the nations of the then known world. The Carthaginians, the Syrians, the Egyptians, adopted its use. We find the generals of Mithridates employed it against Scylla, and the barbarous Helvetii and Germans in their contests with Julius Cæsar. But the difficulty of preserving the necessary union and order in so large and numerous a body; and the want of a second line to support it when obliged to give way, were glaring defects in its disposition, and it was therefore eventually forced to give place to the more convenient and scientific arrangement of the Roman legion.

A Roman legion arranged in order of battle, consisted of thirty manipuli, of various strength according to the establishment of the legion. Supposing it of 5000 men, each manipulus of the Hastati and Principes was composed of 140 soldiers;—those of the Triarii only of 60; the remnant of the troops were Velites, or light armed. Livy, in describing the war with the Latins, gives the following account of the ordonnance of the legion. The Hastati, drawn up in separate manipuli, formed the first line. The Principes, chiefly old experienced soldiers, were placed behind the former, but with intervals between their companies sufficiently wide to receive the Hastati in case they should be obliged to retreat. The Triarii, all veterans, who besides the short sword common to all the legionaries, were armed with long pikes, composed the third line; their intervals being so extended as to enable them to receive both the Principes and Hastati within them without any disorder, and still facing the enemy. If therefore the Hastati found themselves unable to sustain the charge, they retired gently within the Principes, and joining with them, renewed the combat. If these proved too weak for resistance, both retired amidst the Triarii, where rallying, they formed a new line, and charged with more vigour than

over. If again defeated, the battle was lost : the Romans had no further resource. Livy, lib. viii.—Machiavel, art. di Guer. lib. iii. ch. i.

These successive retreats are no where mentioned except in Livy as above stated ; and prejudiced as we are in favour of the military science of the Romans, we find it difficult to conceive the practicability of their execution. Livy has, in fact, much mistaken the intention of the disposition in quinque of the ancient legion. Its sole design was to enable the army to form with facility in that order of battle which the situation of the enemy, or nature of the ground, might render most applicable. At the moment which preceded the charge, the manipuli of the second line, marching briskly up into the intervals of the Hastati, formed a continued front, ten files in depth, and equal to that of the enemy. The Triarii remained as a corps-de-reserve. It was thus, as we shall incontestably prove in our account of those actions, that the Roman infantry were arranged at the *Trebia* and at *Canna*. It was thus, with some little variation, that they fought at *Zama*. Neither was it unusual with them to dispose their manipuli according to the principles of the column, as in the battle of *Tunis*, and that between Scipio and Asdrubal the son of Gisco, in Spain. Where there was but little to fear from the impetus of the enemy, the intervals of the Hastati were filled up by the Velites ; the Principes remaining at their posts in a second line ; but, opposed to the close and heavy order of the Macedonian phalanx, a directly different disposition was observed. The manipuli of each line, preserving their intervals, and acting as separate corps, harassed the enemy by desultory attacks, obliged them to abandon their united order, in which situation only they were invincible, and penetrating the phalanx in every direction, obtained an easy triumph. Guisehardt, *Memoires Militaires*, ch. iv.

As to the Velites, and in later times the archers and slingers, they were not drawn up in this regular manner ; but disposed of either before the front of the Hastati, or feathered up and down among the void spaces of the first line, or finally, placed in two bodies on the wings. These always began the battle, skirmishing in flying parties with the foremost troops of the enemy. If they were repulsed, which was usually the case, they fell back to the flanks of the army, or retired through the intervals into the rear. When they retreated, the Hastati advanced to the charge. The auxiliary forces generally composed the two points of the battle, and covered the whole body of the Roman infantry. As to the cavalry, it was posted on the wings, fighting sometimes on foot as well as on horseback ; and here we find some reason to arraign the judgment of the Romans, who never allotted a proportion of more than 300 cavalry to each legion whatever might be the nature of that country which was the theatre of the war. They made no difference between the plains of Lombardy and the mountains of Liguria ; and in the Alps maintained the same number of squadrons, as in the fertile valleys of Apulia.

But the order of battle in quinque was in process of time abandoned by the Romans. The tactics of Cæsar widely differ from those of Scipio and Æmilius Paulus ; and the march and order observed by Metellus in his Numidian war against Jugurtha, transmitted to us by Sallust, are the last traces we find in history of the disposition which proved so fatal to Hannibal, to Philip, and to Persus. The manipuli with intervals ; the three lines of Hastati, Principes, and Triarii, differing in arms and in number, disappear, and about the age of Marius, the legion assumes a new form. Instead of thirty companies, we then find it divided into ten cohorts, equivalent to our battalions, since they each consisted of from five to six hundred men, drawn up in a single

line, with a depth of eight or sometimes nine in file. The legions of Vespasian, according to Josephus, were drawn up six deep. This last arrangement continued to be observed without alteration during the flourishing ages of Rome ; but as we advance nearer to modern times, we perceive their military art decline in its perfection, in proportion to the decay of their greatness. Under Leo and Mauritius it is as difficult to recognize the tactics, as the empire of the Cæsars. The difficulty of ascertaining the period of these successive alterations has deterred those authors who have been most capable from undertaking the office ; and finding it easier to suppose that Livy and Plutarch have furnished us with sufficient information on the subject, they have concurred with those writers to mislead and perplex us. Sallust, *bell. Jug.*—Cæsar.—Joseph. *de bell. Jud.*—Guisehardt, *prel. disc.*

For further observations on the discipline and constitution of the Roman infantry, see the article **LEGION**.

For a long succession of barbarous ages, we find nothing to interest us in military tactics. Imitating in a rude degree the order of battle pointed out to them by their ancestors, the western nations from the sixth to the fifteenth century, fought in large bodies, divided into an indefinite number of lines or *wards*, in every one of which the infantry, inferior in strength and importance of service, composed the centre, flanked by the heavy armed cavalry, who always decided the fate of battles. It is in vain to search for military science in these periods, and we shall therefore pass them over with all possible rapidity.

The introduction of artillery and fire-arms necessarily introduced an alteration in this system. The cavalry ceased to be the arbiters of success, and declined rapidly in their importance. The destructive effect of the newly invented engines rendered it impossible to avoid making a material change in the order of the battalions. Their depth was gradually decreased. The method of engaging in wards was abolished, as exposing numbers of troops to be sacrificed without occasion ; and two lines with a corps-de-reserve were in time thought quite sufficient for the purpose of action. The front of the army was proportionally extended, and embraced a greater extent of country. The advantages of ground, before judged in comparison trivial, were now eagerly sought after. Generals became from necessity tacticians, and by little and little, continually improving, sometimes slowly, sometimes with rapidity, the military art assumed the face it wears in our times ; under the auspices progressively of a Gustavus, a Condé, an Eugene, a Marshal Saxe, and a Frederic the Great, whose names will never be forgotten by the latest posterity.

Under the articles **COLUMN** and **LINE**, to which they of right belong, we shall attempt to illustrate and compare the French and Prussian systems of the order of battle as now practised by both these nations ; and accompany them with instances from among the number which have of late years fallen under our inspection.

BATTLE, in a *Naval* sense, denotes an engagement between two fleets, squadrons, or even single ships. See **ENGAGEMENT**. The ancients had divers forms of sea-battles ; as the half-moon, circle, and forecups. In all these, not only the ships engaged each other, and by their beaks and prows, and sometimes their sterns, endeavoured to dash in pieces, or overset and sink each other, but the soldiers also annoyed the enemy with darts and slings, and, on their nearer approach, with sword and spears, boarding each other by living bridges between the ships.

By way of preparation they took down their sails, and lowered their masts, and secured whatever might expose them to the wind, choosing rather to be governed by their oars.

BATTLE, Line of. See **LINE**.
BATTLE, Square. See **Square BATTALION**.
BATTLE, Attainder by. See **ATTAINDER**.

BATTLE royal, in *Cock-fighting*, denotes a fight between three, five, or seven cocks all together; so as that the cock which stands longest gets the day.

BATTLE-AXE, an ancient military weapon, which, at different periods, formed a principal part of the offensive armour.

Homer never ascribes this weapon to any but the barbarians, for the battle-axe was not used in war by the politer nations. Eustathius tells us, it was the favourite weapon of the Amazons. The only instance where Homer has placed it in the hands of a warrior occurs in the thirteenth book of the *Iliad*, when Pisander fights Menelaus; it is there called *ἄξιν*, and is described with singular minuteness.

— ἢ δ' ὅπ' ἀσπίδος ἔλατο καίην
 Ἄξιν εὐχάλκον, ἐλάτω ἀμὲν πέλεκυν,
 Μακρῆ, ἔϋξενω. 1. 611.

The *Πέλεκυς*, mentioned in the fifteenth book, 1. 710, was perhaps not very different:

Ἄλλ' αἰ γ' ἐβίβην ἰσχυροί, ἠὰ θυμὸν εἰχοντες
 Ὄξει, δὴ πέλεκυσσι, καὶ ἄξινισσι μακροῖσι.

Something of this kind, it seems, was in use among the Bactrians, when they attended Xerxes' expedition: beside bows and arrows, we are told they were armed with a sort of hatchet, called Sagaris: (Herodotus, *Polymnia* lxiv.) The Lycians had axes and daggers: (*Ibid.* xcii.) and the Egyptians huge battle-axes.

At the siege of the Roman capitol, by the Gauls under Brennus, we find one of the most distinguished warriors armed with a battle-axe (*Plut. Camillus*): and Ammianus Marcellinus, many centuries afterwards, describing a body of Gauls, furnishes them all with battle-axes and swords. From Tacitus, it should seem, the ancient Germans had clubs, but no such weapons as those we are speaking of: and the only instance in his writings where *securis* occurs as an implement of combat, is where the Othonians are particularly described as striking on the helmets of their antagonists with their axes. (*Taciti Hist.* II. xlii.) In short, it was even then never used but among the Roman auxiliaries.

The introduction of the battle-axe into this country has been frequently attributed to the Danes; but proofs of its earlier use among us are not wanting, and there are instances known where it has been found even among the sepulchres of the ancient Britons. Mr. Rooke, in the *Archæologia* of the Antiquary Society (vol. x. p. 113.) has described a fragment of an ancient battle axe found among some Druidical remains in a barrow at Aspatria in Cumberland, June 1789. And in the same volume (pl. xl.) are two representations of the old Galwegian bill, or battle-axe, found in a moss near Terreagles, the seat of Marmaduke Maxwell Constable, esq. of Netdale in Ireland. Others have been found among the barrows on the downs of Wiltshire, and in the north of Scotland.

That it was used in the early Saxon times, we have the authority of several manuscripts of the ninth century; and the French writers have recorded a particular instance of its use in France, so far back as the year 510. Clovis, they say, bribed the ministers and captains of Ragnacharius to deliver up both him and his brother: and when the prisoners were brought before him, he first reproached them for suffering themselves to be chained, and then dispatched them with his battle-axe. See *Greg. Turon.* l. ii. c. 42.

The battle-axe, however, was more used by the Danes than any other of the Northern nations: and they were, in course, more expert with it. At the battle of Stamford,

Oct. 24, 1066, between Harold king of England, and Harold Harfager of Norway, when the Norwegians were obliged to retire, and the English begun to pursue them with great eagerness, a total stop was put to their pursuit for several hours by the desperate boldness of a single Norwegian, who defended the pass of Stamford-bridge with his battle-axe; he killed more than forty of the English, and was himself slain only by stratagem. (*Hen. Hunt.* l. vii. p. 211.) The battle-axe principally in use among the Anglo-Saxons appears to have been the *bipennis*, or double-edged axe; the *gisarma* is supposed to have been the bipennis with a longer handle or halbert: and the *pole-axe*, with an edge on one side, and a sharp point on the other, probably came in with the Normans.

During the middle period of our history we read but little of this weapon, though the Welsh infantry at the battle of Agincourt, 1415, found it particularly serviceable in dispatching those whom the archers had wounded with their arrows. One of the last instances of its effectual service was at the battle of Tewksbury, during the quarrel of the Roses, when the duke of Somerset clave lord Wenlock's head.

Towards the sixteenth century, it seems to have been gradually disused, though one instance occurs where a pistol placed in its handle bespeaks a wish in the warriors of that period to improve its use. (See **ARMS**.) It was perhaps most serviceable when our knights were completely cased in armour; and has since degenerated into the halbert or partisan.

BATTEMENTS, in the *Military Art*, indentures, or notches in the top of a wall, parapet, or other building, in form of embrasures, for the sake of looking through them, &c. much affected in the old fortification.

BATTOCHES, or **BATTOGUES**. See **BATTACKS**.

BATTOLOGY, from *βαττός*, *battus*, *babbler*, and *λεγω*, *I speak*, in *Grammar*, a multiplying of words without occasion, or a needless and superfluous repetition of the same words, or things.

BATTONI, or **BATONI**, **POMPEIO**, in *Biography*, an eminent Italian painter of the Florentine school, was born at Lucca in 1708. He was the son of a goldsmith, and brought up to that business; but discovering a strong predilection for painting, he was supported in the Roman school by a subscription; and at Rome he employed himself in studying the antique, and copying the works of Raphael, and likewise in forming a style of his own, from a diligent observation of nature. Having distinguished himself both as a designer and a colourist, he was engaged in the execution of many important works, and painted altar-pieces and other pictures for various churches in Rome, Milan, Breiscia, Lucca, Parma, Messina, and other cities; as well as history-pieces for private persons. One of his most admired works, is a holy family, purchased for a large sum by the grand duke of Russia. Battoni, however, acquired his principal fame as a portrait painter. Besides three popes, he painted several of the Imperial families of Austria and Russia. In recompence for a picture, which commemorated the interview of the emperor Joseph with his brother at Rome in 1770, he received several magnificent presents; and he, with all his male issue, was ennobled by the emperor. By the beautiful daughter of the surveyor of the Farnese palace, whom he married in early life, he had several children; and two of his daughters were highly celebrated for their taste and proficiency in music. As to his character, he was simple and modest, sincere, friendly, and charitable; much attached to religion, and very assiduous in the exercise of his profession. He seldom appeared in public, preferring a retired life, partly on account of the defects of his education, and partly by reason of the awkwardness of his figure, which approached

proached to deformity. As a painter, he acquired eminence by the native force of his genius; and he had no rival but Mengs, who surpassed him in knowledge and learning, whilst he was inferior to him in natural talents. Battoni, having completed his 79th year, died in 1787. Pilkington. Biog. Diet.

BATTOON, or BATOON. See BASTON.

BATTORY, a name given by the *Hollanders* to their magazines or factories abroad: the chief of which are those at Archangel, Novogored, Bergheim, Lisbon, Venice, and Antwerp.

BATTOW, in *Geography*, a village on the west coast of Africa, S. E. from Cape C.ulloos, on the west side of a small river opposite to Zeebo, or Swibo, on the east side. About half a league east, are two rocks lying under water, and the breakers over them are seen at sea at the distance of a league, and serve to point out the Cape and Road. N. lat 5°. W. long. 8° 30'.

BATTRE LA MESURE, Fr. to beat time, in *Music*. There are various ways of marking the measure and accents in music: by dividing each bar into 2, 3, or 4 equal parts with the motion of the hand, the foot, a *baton*, or a roll of paper. In common time of 2 minims or 2 crotchets in a bar, called *binary* measure, the hand is merely moved down and up. In time of 4 crotchets in a bar, the French frequently mark each portion of it, by *beating* the hand down to the first crotchet, moving it to the left for the 2d, to the right for the 3d, and lifting it up for the last. In triple time, or *ternary* measure of 3 minims, 3 crotchets, or 3 quavers, it is usually beaten, 2 down and one up, or the 1st down, the 2d to the left, and the 3d up.

The beating time is of great antiquity. The ancient Greeks had various ways of regulating the accents of song, and steps of the dance. See RHYTHM and GREEK MUSIC.

The Italians often beat the two first portions of a bar, and lift the hand up for the rest, both in common and triple time.

At the Opera, concert-spiritual, and even at private concerts (formerly) there was a person at Paris, armed with a truncheon (*laon de Mesure*) like a general, whom Rousseau, in his Dictionary, ridicules, and says that he had been very aptly called the *Baclaron*, or wood-cutter; though when he wrote his musical articles for the *Encyclopedie*, the Italians and other nations, still had a *Coryphe* to regulate the measure in the numerous bands employed in their churches when there was a *grin Funzione* in celebration of some fast or holy time. But it was in England at the Commemoration of Handel in Wehne 1740, that, in the most numerous band that ever was assembled in modern times, a Corypheus was first dispensed with. See TIME, MEASURE, ARSIS & THESIS, BAR, ACCENT, & BATTUTA.

BATTUS, LISIEN, in *his History*, was born at Ghent, about the year 1540; but his father being obliged to remove to Rostock, on account of the troubles about religion, when he was only ten years old, he was put under the best masters that place could afford, and he so well profited by the instruction he received, that in 1559 he was appointed teacher in mathematics. In this office he continued until the year 1565, when the country being at once afflicted with war and the plague, he went first to Padua, and then to Venice, where he was admitted doctor in medicine. Returning to Rostock, he practised medicine with so much success and reputation, that he was appointed professor in that science, in which post he died, April 1591. Some small medical tracts, left by him in manuscript, were published in the Miscellanea of Henry Surenhus, at Frankf. 1611, 8vo. His son, Conrad Battus, following in the steps of his father, returning from his travel, took the degree of doctor in medicine at Basle, in 1604, but falling down stairs, at his brother's house at Rostock, soon after his return there, he received

a wound in his groin, from a knife he had in his pocket, which occasioned his death. He also left some short essays on medical subjects, which were published with his father's, in the Miscellanea.

BATTUS, CHARLES, a Flemish writer of some eminence, who flourished about the end of the 16th century, published in 1593, a translation of the works of Guillemaeo, into his own language, folio, Dordrecht, and in 1615, the works of Ambrose Para, folio, Amsterdam, with numerous plates engraved on wood; also a manual for fargeons, with a treatise on wounds of the head, from Hippocrates, 12mo. Haller. Bib. Chirurg. Elov. Diet. 11 fl.

BATTUS, in *Ecclesiastical History*, an order of penitents at Avignon, and in Provence, whose piety carries them to exercise severe discipline upon themselves, both in public and private.

BATTUSZANI, in *Geography*, a town of European Turkey, in the province of Moldavia, 44 miles N.N.W. of Jassy.

BATTUTA, Ital. a bar in *Music*, or those portions of a musical composition, where the time is *beaten*, or marked, with the hand or foot. The *Crucea* dictionary defines *battuta*; quella misura di tempo che da il maestro della musica, in *battendo a' cantori*. Varchi, who died in 1566, and who is quoted in the *Crucea* as authority for the use of this term, says; quanta noia, e fastidio n' apportino coloro agli oechi, e agli orecchi, i quale che non ballano a tempo, o non cantano a *battuta*. What pain and uneasy sensations do those give us, who neither dance nor sing in time!

Amendae parlarino in rime, canzoni, e altre spezie di dire con *mijura* di piede, e di tempo fillabitati. Both pronounced in rhyme, songs, and other species of poetry, in measured feet, and poetical numbers. This passage is cited from a MS. of 1400.

It is not easy to imagine how music, in many parts, could be composed *in score*, with bars or vertical lines drawn through them all, whence the term *score* was derived; nor what kind of bars could contain the quantity of a *maxima*, equal to eight semibreves, unless we suppose that semibreves were sung or played as quick as quavers are now. See TIME, ACCENT, ARSIS, and MEASURE.

The most ancient kind of time-table that has occurred in the course of our researches, consisted of only four several kinds of musical characters.

The Maxima		
equal to		
2 Longs		
4 Breves		
8 Semibreves		

Among Italian musicians we frequently find the words a *battuta*, which import *in time* or *measur'd*, after recitative or a "all'libitum." Accordingly, *a* in the Italian musical language, when it precedes a substantive, has the power of *in*.

BATU-PULUDAN, *fluens lapidei* (*Talent.*) in *Natural History*; one of the synonyms of MADERPORA LABYRINTHICA. *Gmel.*

BATTUA, *Butus, Butoc, or Bulhoue*, in *Ancient Geography*, a town of Dalmatia, now BUDUA, which see.

BATUA, in *Geography*, a kingdom of Africa, in the empire of Monomotapa, extending from the mountains of the

the Moon to the river Magnico, whose prince is a vassal of the emperor. It is famous for its gold mines.

BATUDA, a method of fishing mentioned in some *Middle Age Writers*, wherein the fish are driven by beating the water with poles, till flocking into one place, they are the sooner caught.

BATUECAS, *Los*, in *Geography*, a people of Spain, in the kingdom of Leon, and diocese of Coria, inhabiting a valley called "the valley of the Batuecas," encompassed by mountains that are almost inaccessible, between Salamanca to the north, Coria to the south, the river Tornez to the east, and the rock of France to the west. These people are supposed to be the remains of the ancient Goths, who took refuge in this valley among high mountains in their escape from the Moors. Others say, that their ancestors were ancient Spaniards or Iberians, who retired hither at the time of the invasion of the Goths. They are distinguished by their barbarism and rusticity to such a degree, that the Spaniards proverbially denominate an uncivilized person, one who comes from the valley of Batuecas.

BATURIN, a town of the Ukraine, on the river Desna, belonging to the Russians, and situate in the district of Neschin, which forms a part of Lesser Russia. It was destroyed by the Russians in 1708; but the castle has been twice rebuilt, and the town in some degree repaired.

BATUS, in *Entomology*, a species of *CERAMBYX*, found in India and South America. The thorax is wrinkled and spinous: wing-veins bidentated: antennæ long, with hooked prickles. *Linn.* This is *Capricornus niger*. *Mus. Petrop.*

BATUSABER, in *Geography*, the capital of the kingdom of Yohor, in the southern extremity of the peninsula of Malacca, situated about 6 leagues from the sea, on the river Yohor or Jor, in a marshy situation, so that its small wooden houses are raised upon poles about 8 feet from the ground.

BATZ, or **BATZEN**, in *Commerce*, a copper coin mixed with some silver, and current at different rates, according to the quantity of alloy, in many parts of Germany and Switzerland.

B. AV. See **CHARACTER**.

BAVANY, or **BOWANY**, in *Geography*, a river of Hindoostan, which runs into the Cavery, 7 miles north of Errood in Coimbatore. N. lat. $11^{\circ} 25'$. E. long. $77^{\circ} 50'$.

BAVARIA, **CIRCLE OF**, called *Bayern* by the Germans, one of the circles of Germany, derives its name from the duchy of Bavaria, which is the most considerable part of it, and is bounded on the east by Austria and Bohemia, on the south by Carinthia and Tyrol, on the west by Suabia and Franconia, and on the north by the Upper Palatinate, which, if considered as belonging to it, verges towards Upper Saxony. The dominions of the elector of Bavaria and the Palatinate, for these electorates are united, are computed to contain 16,176 square miles, and 1,934,000 inhabitants. Hoeck estimates Bavaria at 1,339,900, and the Palatinate at 305,000. See **PALATINATE**. Busching distributes the 20 states of the circle of Bavaria into ecclesiastic and laic. To the former he refers the archbishopric of Saltzburg, the bishoprics of Freisingen, Ratibon and Passau, together with the priory of Berchtoldsgaden, and the abbies of St. Emeran, Lower and Upper Munster, all which three lie in the city of Ratibon. The latter are composed of the electorate of Bavaria, the duchies of Neuburg and Sulzbach, the landgravate of Leuchtenberg, the princely county of Sternstein, together with the counties of Haag and Ortenburg, and also the lordships of Ehrenfels, Sulzburg, and Pyrbaum, Hohenwaldeck, Brieteneck, and the imperial city of Ratibon. Of this circle, the elector of Bavaria, and the archbishop of Saltzburg, are joint summoning princes. The diets, though usually held at Ratibon, are sometimes

summoned to Wasserburg, Landshut, and Muldorf. When the military force of the empire, in time of peace, was settled in 1681, at 40,000 men, the number required to be furnished by this circle was 800 cavalry, and 1494 infantry; and towards the 300,000 florins granted in 1707, it paid 18,252 florins, 9 kruitzers. The elector of Bavaria is the military commander of the forces of the circle.

Bavaria is part of the Rætia Vindelicia and Noricum of the ancients, and is supposed to have derived its name from the *Boii*, a warlike people that migrated from Gallia Celtica, crossed the Rhine, and first settled in Bohemia. About the time of the emperor Augustus, they were expelled the country by the Marcomanni, and removed into Noricum; and their settlement was called "Bojer" or "Bayerland:" in Latin, "Bujaria," or "Bujoraria," whence, in process of time, was formed Bavaria. In the 6th century, when the empire of the Franks was divided among the four sons of Clovis, Bavaria became subject to the dominion of the Austrasian kings, and was governed by dukes. In the 9th century, princes of the Franconic family assumed the style of kings of Bavaria, while Lieutpold in 889, was the first duke; and his progeny extend to the present day, though interrupted in 946, when, Berthold dying without children, the emperor Otho gave Bavaria to his brother Henry of Saxony. In 1071, Welf, son of Azo of Este, became duke of Bavaria, which, in 1138, passed to the house of Austria; but in 1154, it reverted to the house of Welf, in the person of Henry the Lion. In 1180, it finally returned to the first family, by the succession of Otho of Wittelbach, a descendant of Arnulph, second duke of Bavaria, A.D. 907. After the family had been unjustly deprived for more than two centuries, the Palatinate and Bavaria have recently been inhabited by a branch of the family of Deux Ponts, the son of the elector being now nominal duke of Deux Ponts.

BAVARIA, *Duchy or Electorate of*, comprehends the greater part of the circle, and is divided into Upper and Lower Bavaria, and the Upper Palatinate. The length from north to south is somewhat interrupted, but may be about 150 British miles, and the breadth about 120. The duchy is bounded on the north by Bohemia and the Upper Palatinate; on the east by Austria, and the bishoprics of Saltzburg and Passau; on the west by the duchy of Neuburg, the marquisate of Burgau, and the bishopric of Augsborg; and on the south by the county of Tyrol, and the bishopric of Brixen. Upper Bavaria is, for the most part, mountainous, cold, and barren, producing little corn and less wine; but it is covered with forests, interspersed with large and small lakes, and abounds in cattle, wild fowl, game, baths, medicinal springs, and salt works. It is also enriched with mines of silver and copper, lead and iron. It has also many quarries of marble. Lower Bavaria, being much more level, is more fertile, and produces plenty of grain, pasturage, and fruit. The mountains of Upper Bavaria may be considered as branches of the Alps. The chief rivers of this duchy are the Danube, the Isar, the Inn, the Lech, the Nab, the Atmuhl, and the Regen. Its large inland lakes are 16, and its smaller ones 160. Rander, in his "Tour through Germany," (Vol. ii. p. 290.) reckons 33 cities, besides Munich the capital, 80 market towns, 8000 villages and hamlets, 39,949 taxable farms, 12,000 solitary houses, 6000 uninhabited farm-houses, 180,000 hearths, 3,050 churches, 548 chapels, 908 parishes, 12 collegiate foundations, and 142 convents. Upper Bavaria is divided into two governments or regencies: that of Munich, and that of Burkhausem. The principal towns of the former are Munich, Pfaffenhausen, Abensperg, Ingolstadt, Donawert, Friedberg, Landeberg, Weilheim, Tölz, Wasserburg, Traunstein, and Reichenhall. Those of the latter, are Burkhausem, Octting, Troisburg, Brannau,

Braunau, Uttendorf, Friburg, Ried, and Scharding. Lower Bavaria is also divided into two governments; that of Landshut, comprehending, besides other towns, Landshut, Erding, Dingelring, Teisbach, Hals, Rottenburg, Mosburg, and Osterhofen; and that of Straubing, the chief places of which are Straubing, Pögen, Cham, Kelheim, Stadt-am-Hoff, and Deckendorf. The states of the duchy consist of the clergy, nobility, and burghesses, of which a committee assembles at Munich whenever it may be necessary: but before the accession of the house of Deux Ponts, the administration had become the most lethargic of any in Germany; and on this account the political importance of Bavaria has, in some measure, declined; and in the dangerous conflict that has subsisted, and may still subsist between France and Austria, it may be difficult for this power to preserve a shadow of independence. By the fifth secret article of the treaty of Campo Formio, October 17, 1797, the French republic engages to employ its influence, that his majesty the emperor shall receive the archbishopric of Salzburg, and that part of the circle of Bavaria which lies between the archbishopric of Salzburg, the river Inn, Salza, and Tyrol; including the town of Wasserburg, on the right bank of the Inn, with an arrondissement of 3000 toises.

The established religion of Bavaria is the Roman catholic; and no other is even tolerated: and thus the spirit of industry is very materially checked and restrained. The clergy, both secular and regular, are very rich; but the peasants are wretched in the extreme, their chief subsistence arising from the herds of swine that are fed on acorns and crabs in the woods and forests. The regular military force is estimated at 12,000. The principal manufactures of the country are those of coarse woollen cloth, silk and woollen stuffs, velvet, tapestry, stockings, clocks, and watches. The principal exports are wheat, cattle, wood, salt, and iron. Besides the mines of silver and copper near Podenmais, in the bailliage of Viechtach, and of lead at Reichenthal, the chief mineral riches of Bavaria consist in the salt springs at Traunstein, which pervade mountains of saline earth, like those at Hallein, in the archbishopric of Salzburg, and occupy many people in productive industry. There are other springs at Reichenthal. These latter springs are 20 in number; but salt is only made from 4 of them: for which purpose part of the water proceeding from them is conveyed by pipes to the cauldrons at Traunstein, which is about 3 leagues distant. The salt annually made from these springs amounts to 250,000 quintals.

The title of the elector is "By the grace of God, duke of Upper and Lower Bavaria, as also of the Upper Palatinate; Palgrave of the Rhine, arch-steward of the holy Roman empire, and elector and landgrave of Leuchtenberg." He has 5 hereditary officers, *viz.* a master of the household, a steward, marshal, cup-bearer, and huntsman. The Bavarian order of St. George was revived in 1729, by the elector Albert. The knights of the order are styled "defenders of the immaculate conception of the blessed Virgin Mary," and are required to produce unquestionable proofs of the nobility of their ancestry for 8 generations in both lines. The elector is grand master; and its ensign is a cross, enamelled blue, with a St. George in the middle; on the reverse of which is the name of the restorer of the order in a cypher surmounted with the electoral cap, and bearing at the 4 angles the letters L. V. P. E. which signify "justus velut palma florebit," *i. e.* the righteous shall flourish like a palm-tree. The cross is worn pendent to a broad sky-blue ribbon, with a black and white border. The elector has the fifth seat in the electoral college, and several votes at the diets, both of the empire and the circle, in the colleges of the princes and counts. His ordinary revenue, including the tolls on all

the vessels which pass up and down the Danube, and other navigable rivers, with that which arises from the monopoly of corn, salt, beer, tobacco, and wines, together with his own domain, is supposed, by some, to amount to 700,000*l.* per ann. Busching and baron Reissbach estimate it at 800,000*l.* Reider at 1,031,250*l.* and others at 1,166,600*l.*

The Bavarians are little distinguished in literature; but they are a vigorous race, adapted to the fatigues of war. They have, however, an university at Ingolstadt, and an Academy of Sciences at Munich. Baron Reissbach (*Trav.* 1, 107) gives a very unfavourable account of their corporeal form and general disposition and character. The character of a Bavarian, he says, is a very round head, a little broad chin, a large belly, and a pale complexion; so that many of them appear like caricatures of men! They have large fat bellies, short clubbed feet, narrow shoulders, a thick round head, and short necks; and they are heavy and awkward in their carriage. But the women are, in general, extremely beautiful, well shaped, of clear transparent complexions and much more lively and graceful in their gestures than the men. The chief ornament of the men is a long broad waistcoat, strangely embroidered, from which their breeches hang low and loose. The women disguise themselves with stays in the shape of a funnel, covering the breast and shoulders, and hiding the whole neck. He says, that no pen can describe the ridiculous mixture of debauchery and devotion, which is exhibited every day; and he adds, that the propensity to feasting, indolence, and beggary, which prevails in Bavaria, is countenanced and sanctioned by the example of the priests. Indolence, he says, is the prevailing character of the Bavarians: and Bavaria well deserves the character given of it by an officer of Gascony, of being the greatest brothel in the world. With their indolence, intemperance, and devotion, they unite, according to his account, a certain ferocity of temper, which often occasions quarrels, mutual abuse, and scenes of blood. The Bavarian peasant, says this writer, is gruff, fat, dirty, lazy, drunken, and undisciplined; but he is brave, economical, patriotic, and such a slave to his word, that when it has once been given, it is never violated. Considerable benefit, however, has been derived from the laudable plans for destroying mendicity and encouraging industry, proposed and carried into effect at Munich by count Rumford. See *MUNICH*.

By the plan of indemnities, agreed upon between the First Consul of France and the emperor of Russia, in pursuance of the 7th article of the treaty of Luneville, it was agreed to propose that the indemnities to the archduke, grand duke, should be for Tuscany, and its dependencies, the archbishopric of Salzburg, the provostship of Berchtoldsgaden, the bishopric of Trent, that of Brixen, and part of that of Passau, situate beyond the Itz and the Inn, on the side of Austria, except the suburbs of Passau, with a radius of 500 toises, and the abbey, chapters and convents, situate in the above-mentioned dioceses. These principalities were to be taken out of the circle of Bavaria, and incorporated in the circle of Austria, and their ecclesiastical jurisdictions, both metropolitan and diocesan, were to be also separated by the limits of the two circles; Mulldorf to be united to Bavaria, and its equivalent in revenue taken from those of Freisingen. To the elector Palatine of Bavaria were to be assigned, for the duchy of Deux-Ponts, the duchy of Juliers, the palatinate of the Rhine, the marquise of Berg-op-zoom, the seignory of Ravenstein, and others situate in Belgium and Alsace; the bishoprics of Passau, with the reservation of the part of the archduke; of Waltzburgh with the reservations herein-after mentioned: of Bamberg, of Aulstift, of Freisingen, and of Augsburg; the provostship of Kempten; the imperial

perial cities of Rothenbourgh, Weissenbourgh, Windshelm, Schweinfurt, Goelshelm, Sennefelt, Alltheufen, Kempten, Kaufbeuren, Memmingen, Dinkelsbuhl, Nordingen, Ulm, Bofstingen, Buchorn, Waugen, Lentkirch, Ravensbourgh, and Allichshausen : the abbeyes of St. Ulric, Itsee, Wengen, Soeflingen, Elchingen, Ursburg, Roehenbourgh, Weltenhaußen, Ottobeuren, Kaiserheim. By the treaty of Preburg, 26 Dec. 1805, the electorate (now the new kingdom) of Bavaria acquired the margraviate of Burgau and various other territories.

BAVARIA, *Palatinate of*. See UPPER PALATINATE.

BAVAY, PAUL, *Ignatius De*, in *Biography*, born at Brussels in 1704, applied himself early, and exclusively, to the study of chemistry, in which his father had wasted a considerable patrimony. At length, in 1735, he went to Lovain, where, at the end of two years, he was admitted Doctor in Medicine. He now returned to Brussels, and acquired so much reputation by his success in his practice, that, in 1746, when the French were in possession of the city, he was made physician to the military hospital there. In 1749, the French having evacuated Brussels, he was appointed Demonstrator in Anatomy, but being opposed by the principal physicians, and his practice condemned, probably on account of his professing to cure some diseases by a nostrum of his invention, he went to Dendermond, where he continued for some time. Returning again to Brussels, he died there, Feb. 20, 1768. His works are, "Petit Recueil D'Observations en médecine sur les vertus de la confection tonique, résolutive et diuretique," Bruxelles, 1753, 12mo. "Methode courte, aisee, peu couteuse, utile aux medecins, et absolument necessaire au public indigent pour le guerison des plusieurs maladies." Bruxelles, 1759, 12mo. The principal ingredients in his medicine, are said to be squills and Florentine orris. Eloy. Dict. Hist.

BAVAY, in *Geography*, a town of France, in the department of the North, and chief place of a canton in the district of Avesnes. The place contains 1455 and the canton 9266 inhabitants: the territory includes 145 kilometres and 20 communes. N. lat. 50° 25'. E. long. 3° 45'.

BAUBEE, a term used in Scotland for a halfpenny. Johnson.

BAUBIGNY, in *Geography*, a town of France, 1½ league from Paris.

BAUBIS, in *Zoology*, a French name of a race of running dogs, called *chiens Normans*, or dogs of Normandy.

BAUBULA, in *Geography*, a river of Spain, in the province of Arragon, which runs into the Xalon, about a league below Calatmaid.

BAUCIDIAS, in *Ancient Geography*, an island of Greece in the Saronic gulf. Pliny.

BAUCONICA, a town of the Vangiones, in Gallia Belgica, 9 miles from Mogontiacum, and 11 from Borbingtonum; supposed to be *Oppenheim*, which see.

BAUD, in *Geography*, a town of France, in the department of Morbihan, and chief place of a canton in the district of Pontivy, 3¼ leagues south of Pontivy. The place contains 6115 and the canton 13,007 inhabitants; the territory includes 242½ kilometres and 4 communes.

BAUDANVILLER, a town of France, in the department of the Meurte, and chief place of a canton in the district of Blamont, 1¼ league south of Blamont.

BAUDEKIN. See BALDACHIN.

BAUDELLOT, CHARLIS-CÆSAR, in *Biography*, was born at Paris in 1648, and studied first at Beauvais, and then at Paris. He was, against his inclination, bred to the law, and pleaded as counsellor of the parliament of Paris for some time with success. But he afterwards devoted

himself to the study of antiquities. Having had an opportunity, in a journey to Dijon, to visit the libraries and cabinets of the place, he began to make a collection of books and medals; and he was thus led to write a book "On the utility of Travelling;" 2 vols. 12mo, 1686; the subject of which was inscriptions, medals, statues, bas reliefs, and other relics of antiquity. It passed through several editions in French, and was translated into English. This work introduced him into an acquaintance with the most celebrated antiquaries of Europe, and was the means of his admission into the academy of Ricoverati at Padua. In 1705, he was made a member of the academy of Belles Lettres; and he had the charge of the valuable cabinet of the dukes of Orleans. He was the author of several dissertations on subjects of Medallic history and antiquities: and he is said to have composed the first travels of Paul Lucas. He died in 1722, with the character of a mild, modest, and benevolent man. Nouv. Dict. Hist.

BAUDERON, BRICE, born at Charolles, about the middle of the sixteenth century, distinguished himself by his knowledge in pharmacy, to which he applied with such success, that a Pharmacopœia, published by him in 1588, became the standard book for many years in France. It was founded on the Pharm. Lyonensis, and of Du Boys, with the observations of Catalaun on distilled waters. Philemon Holland translated it into Latin, and published it in London, in folio, 1639, and at the Hague in 1640. It has been since many times reprinted, both in French and Latin. He also published "Praxis de febribus, et de symptomatibus in morbis internis," 4to, 1620, Paris. In the preface to this book he says, he is now 80 years of age. He died three years after, 1623. His son, Gratian Bauderon, who was brought up to the same profession as his father, died in 1615, aged 35 years. Haller Bib. Med. Pract. Eloy. Dict. Hist.

BAUDIER, MICHAEL, historiographer of France under Lewis XIII. was born of a noble family in Languedoc. He was the author of many works containing valuable information, collected with greater industry than taste or genius. The principal are, "A general History of the Seraglio and Court of the grand Signior," 8vo. Paris, 1633; "A general History of the religion of the Turks, with the life of their prophet Mahomet, and the four first Caliphs," &c. 8vo. 1636; "A History of the Administration of Card. d'Amboise, minister of state under Louis XII.;" Paris, 1634, 4to; "History of Marshal de Thoiras," Paris, 1644, fol. and 1666, 2 vols. 12mo. He left in MS. a history of Margaret of Anjou, wife of Henry VI. of England, which is said to have been translated and published as an original work in England. Baudier was attached to the polite arts, and made a collection of medals and curiosities, such as his fortune would allow. The time of his death is not known. Nouv. Dict. Hist.

BAUDIUS, DOMINIC, a learned philologist, was born in 1561, at Lille, in Flanders, and retired with his parents, who were of the reformed religion, from the persecution of the duke of Alva, to Aix-la-Chapelle. After having studied at Leyden, Geneva, Ghent, and other places, he settled at Leyden, where he applied with assiduity to the study of jurisprudence, and was made doctor of laws in 1585. He visited England, and then travelled into France, where he obtained several distinguished patrons, and resided for 10 years. In 1602, he was nominated professor of eloquence at Leyden, and he also delivered lectures in history and jurisprudence. In 1611, the States made him joint historiographer with Meursius, and as such he wrote in polished

lished Latin, a "History of the Truce." He also acquired great reputation, both as a poet and prose-writer in that language. Towards the close of his life, he incurred the displeasure of prince Maurice, by his harangues in favour of peace; and he offended many persons by his political and religious sentiments, as well as by his moral conduct, which was not such as to secure respect. His poems indicate an irritable temper, and abound with classical abuse and defamations; and particularly against the enemies of Scaliger. Moreover, he was boastful, vain, importunate, and selfish: and his licentiousness, both with regard to wine and women, involved him in much disgrace. He died at Leyden in 1613. His poems, which manifest gravity and sonorousness of diction and elevation of sentiment, were first collected and printed in 1587; and a more complete collection was printed at Leyden in 1607, and reprinted at Amsterdam, and other places. The "Letters" of Baudius, published after his death, are more esteemed for their style, than his poems. He also published "Harangues," and some other pieces, all in Latin. Gen. Dict.

BAUDOBRICUM, or BAUDOBURGA, in *Ancient Geography*, a place of Gallia Belgica, upon the banks of the Rhine, south of Confluentes. The machines of war, called *Palatæ*, were under the conduct of a prefect residing in this place; and the head-quarters of the general were at Mogontiacum, or Mayence.—*Baudobrica* was also another place of Belgica Prima, north-east of Augusta Trevirorum, now *Boppard*.

BAUDOUIN, FRANCIS, in Latin *Baldwinus*, in *Biography*, an eminent civilian and man of letters, was born at Arras in 1525, studied at Louvain, and in his youth resided at the court of Charles V. At Geneva he became intimate with Calvin, and embraced the reformed religion. In France he conformed to the religion of the country, and taught the law at Bourges from 1538 to 1545. In Germany he delivered lectures at Strasburg, Heidelberg, and other places, avowing himself a protestant; but by joining Cassander in a project for bringing about a coalition of religions, he excited the lasting displeasure of Calvin and Beza, and others of the reformed party. He enjoyed the favour of cardinal Lorraine, the inveterate enemy of the Calvinists, and is supposed to have induced Antony, the weak king of Navarre, to abandon them. By that prince he was patronized, and appointed his delegate at the council of Trent. Upon the death of Antony in 1562, he was invited to Douay and Besançon, and finally settled at Paris, where his reputation, acquired by several learned works, which he had published, rendered his lecture popular among persons of the first distinction. The duke of Anjou afterwards Henry III. wished to engage his pen in the justification of the massacre of St. Bartholomew; but to this prince he delivered his sentiments like an honest man, and was so much esteemed by him that he appointed him one of his counsellors of state. Whilst he was preparing to follow Henry to Poland, he was seized with a fever, which terminated his life at the college of Arts in Paris in 1573. He was distinguished by his extensive knowledge, admirable memory, and persuasive eloquence. Notwithstanding the just reproach which he incurred by his versatility in religion, so that he was opprobriously denominated an "Hermaphrodite," he appears to have been a man of moderate and tolerating principles, and whilst he condemned the severities exercised against the protestants in the Low Countries, he also censured the unjustifiable zeal of Calvin in the persecution of Servetus. His Latin style was pure and elegant, and he left several works on the civil law, and also in ecclesiastical history and controversy, which have been much esteemed. Gen. Dict. Nouv. Dict. Hist.

BAUDRAND, MICHAEL ANTONY, a celebrated geographer, was born at Paris in 1633. When he had

finished his studies, he accompanied cardinal Antonio Barberini as his secretary to Rome; and upon his return to France, he was employed in revising Ferrarius's Geographical Dictionary, which he enlarged by one half, and published at Paris in 1671, fol. By his travels in Germany, and his visit to England, he was furnished with a variety of observations that were useful to him in the compilation of his geography. Upon his return to France in 1677, he composed his Geographical Dictionary in Latin, intitled "Geographia ordine literarum disposita;" Paris 1682, 2 vols. fol. After a journey to Rome in 1691, he applied himself at Paris to the completion of his French Geographical Dictionary, which he was prevented from publishing by his death in the year 1700. This work was published at Paris in 1705, in folio, but it is said to be a corruption rather than a translation of the Latin Dictionary, printed in 1682. Gen. Dict.

BAUDROYE, in *Ichthyology*, the name of the *angler*, or *spring fish*, *LOPHIUS PISCATORIUS* in *Comperac's Paris &c.*

BAUERWITZ, or PAURWITZ, in *Geography*, a town of Silesia, in the province of Jagendorf, on the river Zinna, 15 miles N.W. from Ratibor. The neighbourhood is a rich corn country.

BAUGÉ, in *Commerce*, a drugget manufactured in Burgundy, with thread, spun thick, and coarse wool.

BAUGE, in *Geography*, a town of France, and principal place of a district in the department of the Mayne and Loire, seated on the river Coesnon, 6 leagues E.N.E. from Angers. The place contains 5003, and the canton 13,935 inhabitants: the territory includes 280 kilometres and 17 communes. N. lat. 47° 31'. E. long. 0° 10'.

BAUGY, a town of France in the department of the Cher, and chief place of a canton in the district of Bourges. The place contains 723, and the canton 7933 inhabitants: the territory includes 262½ kilometres and 17 communes.

BAUHIN, JOHN, in *Biography*, born at Amiens in 1511, was early sent by his father to learn the practice of medicine and surgery, under an uncle of the same name at Paris. Here he had opportunity of hearing the lectures of Fernelius and Sylvius, and of seeing the practice of Tagault, then in high reputation. Under these celebrated masters he made such progress, that when only seventeen years of age, he was taken into the service of Catherine Queen of Navarre, and made her physician. Reading about this time the translation of the New Testament into Latin by Erasmus, and becoming thence a profelyte to the reformed religion, to avoid persecution he came to England, but at the end of twelve months, being assured of protection, he returned to Paris. Here however he was soon laid hold of, accused of heresy, and committed to prison, whence, at the end of eighteen months, he only escaped with his life, through the intercession of his patriess, queen Catherine. Removing from Paris he went to Antwerp, where for some time he taught and practised medicine and surgery: but the persecution against the favourers of the new doctrines commencing there, he fled with his family to Basle. Here he was at first employed by Frobenius, the famed printer, in correcting the press, until after giving the necessary proofs of his proficiency in medicine, he was admitted to practice, and soon acquired considerable celebrity, and in 1580, was made dean of the faculty. He died in 1582, aged 71 years. The only work left by him, is "Quæstiones tres medicæ, totidemque conclusionis;" printed at Basle, in 1558, fol.: probably an academical exercise. *Athenæ Bourgeoise*.

BAUHIN, JOHN, son of the former, born at Lyons, in 1541, shewing early a disposition to the study of botany, after going through the preliminary exercises, was sent by his father, when only twenty years of age, to accompany the celebrated Gesner in his excursions over the greater part

of France, Germany, Italy and Switzerland. In this journey he collected a prodigious number of plants, which formed the basis of his principal work, the "Historia Plantarum," which he even then had in contemplation, as appears by his correspondence with Gesner, carried on long after his return, but which was not published until several years after his death. Having accomplished the principal object of his travels, he first settled at Basle, where in 1566 he was elected professor in rhetoric. Some time after he removed to Yverdon, and at length, on the invitation of the duke of Wirtemberg, to whom he was made principal physician, he went to Montbelliard, where he continued to reside the remaining forty years of his life. Though botany engaged the greater part of his time and attention, yet he was not unmindful of other parts of natural history, as appears by his account of the medicinal properties of the principal mineral waters of Europe, particularly of the waters at Boll, in the principality of Wirtemberg, written at the command of the duke, to which he has added descriptions of those complaints in which mineral waters are mischievous; and his "Historia memorabilis luporum aliquot rabidorum, qui circa annum 1590, apud Mompelgartum, multorum damno, publicè grassati sunt," published at Montbelliard, 1591, 8vo. He died in 1613, aged 72 years. His correspondence with Gesner, principally on botanical subjects, with his book "De plantis a divinis sanctissime nomen habentibus," was published by his brother Gaspard, at Basle, 8vo, 1591, parvum libellum, Haller says, et quasi specimen fecuturi operis. In 1593, he published at Montbelliard also, in 8vo. "De plantis abfinthii nomen habentibus." The prodromus of his great work was published at Yverdon, in one volume 4to. in 1619, under the names of J. Bauhin and Henry Cherler, his brother-in-law, who had contributed to its perfection. In this specimen, Haller says, you see the rudiments of a natural classification of plants. The "Historia plantarum nova, et absolutissima, cum auctorum consensu et dissenfu, circa eas;" upon which the author had bestowed above forty years' labour, was at length published at Yverdon in 1650 and 1651, in three volumes in folio, under the care of Dr. Chabré. Notwithstanding the numerous errors in this book, many of which Haller says should be imputed to the editor, who was but indifferently qualified for the task he had undertaken, it is a noble and valuable work, and deservedly places the author in the first rank among the improvers of botany. Haller's Bib. Botan. Gen. Biog.

BAUHIN, GASPARD, born at Basle in 1560, twenty years later than his brother John, having the advantage of his brother's experience to guide him in his inquiries, made proportionally early advances in knowledge. After passing through the necessary preliminary studies, under Fabricius ab Aquapendente, Sev. Pinæus, and other celebrated anatomists at Padua, Montpellier, and Paris, and having collected in his travels a large number of plants, many of them unnoticed by his brother, he returned to Basle in 1580, and was admitted doctor in medicine. In 1582, he was made Greek professor, and in 1558, professor of anatomy and botany, of which he is called in his epitaph the Phœnix. He was afterwards made professor of the practice of medicine, archiater, or principal physician to the city of Basle, dean of the faculty of medicine, and rector of the university, which distinguished honours he continued to hold to the time of his death, which happened in 1624.

Indefatigable in his attention to the duties of his several offices, he discharged them with such regularity as to secure to him the affection of his pupils, who materially assisted him in collecting plants, necessary in completing his botanical works, to which also his correspondents in different parts of Europe largely contributed.

Notwithstanding the number and variety of his offices, much of his time must have been employed in composing and preparing for the press his numerous publications on anatomy and botany; and though great additions and improvements have been made in our knowledge in those sciences since his time, many of our author's works are still consulted, and held in estimation. A few of the titles to his principal works follow: for the rest, see the Bib. Anat. and Bot. of Haller. "Franc. Roussetti l. de partu cæsareo, e Gallico in Latinum transf." 4to. 1586, Basle Two years after he republished this work with an appendix, containing additional cases of women who are said to have undergone the operation and recovered; to which is also added a description of the valve of the colon, of which he claimed the discovery. "Theatrum Anatomicum, infinitis locis auctum, Francof." 1621, 4to. including several smaller works on anatomy, published by him before at various times. "Vivæ imagines partium corporis humani æneis formis expressæ, ex theatro anatomico Caisp. Bauhini desumptæ;" Basle 1620. The figures are principally from Vesalius and Eustachius; some are proper to the author. In this work also are contained other discoveries in anatomy made by the author. "De hermaphroditorum monstroforumque partium naturâ." Oppenheim, 1618, 8vo. In 1598, he published "Matthioli opera, quæ extant omnia," fol. Franc. in which there are many plants Haller, says, not before described. "Pinax theatri botanici, seu Index in Theophrasti Dioscoridis, Plinii, et botanicorum qui a seculo scriperant opera," &c. Basileæ 1623, 4to. a work extremely useful to persons consulting the older botanical writers. "Catalogus plantarum circa Basileam nascentium," Basil 1622, 8vo; the largest catalogue extant, Haller says, of plants growing in a single district.

BAUHIN, JOHN GASPARD, son of the former, born March 12th 1606, after being well instructed in the Latin and Greek languages, and initiated in the knowledge of botany, anatomy, and other branches of medicine under his father, went to Paris in 1624, where he continued two years, attending the schools of the most celebrated masters there. He afterwards visited England, Leyden, Padua, and various other places; the same of his ancestors procuring him an easy introduction, wherever he went, to the most distinguished persons. Returning to Basle in 1628, he was made doctor in medicine, and two years after professor in anatomy and botany, which offices he held for thirty years. In 1660, he was made professor in the practice of medicine, and was several times appointed dean of the faculty, and rector of the university. He died July 14, 1685.

Notwithstanding the numerous honours conferred upon him, he does not appear to have contributed much to the improvement of the science he professed, having only left three dissertations of little note or value. "De peste, de morborum differentiis et causis, et de Epilepsia."

BAUHINIA, so named by Plumier in honour of the two famous botanists, John and Caspar Bauhin, in *Botany*. Lin. gen. 511. Reich. 554. Schreb. 697. Plum. 13. Juss. 351. Class and order, *decandria monogynia*. Nat. Ord. *lomentaceæ*: *leguminatæ* Juss. Gen. Char. *Cal.* perianth oblong, gaping longitudinally on the lower side, reclining on the other, gaping also five ways at the base, with five cohering leaflets above, deciduous. *Cor.* petals five, oblong, waved with attenuated reflected tops, expanding; the lower ones a little larger, the upper ones more distant, all with claws placed on the calyx. *Stam* filaments 10, declining, shorter than the corolla; the tenth much the longest; anthers ovate, always on the tenth, seldom on the rest. *Pist.* germ oblong, sitting on a pedicel; style filiform, declining; stigma obtuse, rising. *Per.* legume long, subcolumnar, one-celled. *Seeds* many, roundish, compressed, placed according to the length of the legume.

BAUHINIA.

legume. *Leaf*. Char. *C. l.* five-cleft, deciduous. *Pet.* expanding, oblong, with claws, the upper one more distant, all inserted into the calyx. *Legume*. Species, 1. *B. f. mollis*, climbing mountain ebony. *Tobum*. Lingue, Rumph. *Amb.* 5. t. 1. *Chamaetis Indica*. Ray *Suppl.* 328. n. 13 & 14. *Naga-mu-valla*, Rheed. *Mal.* 8. 57. t. 30, 31. "Stem cirriferous." Rising with many slender stalks, which put out tendrils and fasten themselves to the neighbouring trees; leaves alternate, heart-shaped, on long foot stalks, six inches long, three and a half broad in the middle, deeply cut into two-pointed lobes, each having three prominent longitudinal ribs; flowers at first whitish, turning to a yellowish colour; fruit slender and flat, containing six or eight flat bony seeds, black with a silvery border. A native of both Indies, not producing flowers in England. The seeds were sent to Mr. Miller from Cayenne, probably before the year 1752.—2. *B. aculeata*, prickly, stalked mountain E. "Stem prickly." An erect elegant shrub, about a man's height; trunk and branches prickly, leaves roundish, with two roundish blunt lobes; cloven to one-third of their depth, smooth with nine nerves; petiole thicker and callous at both ends, from the base of which proceeds on each side a sharp short prickle, distilling when young nectareous drops; flowers large, white, and having an unpleasant scent; rising, in Jamaica, to the height of sixteen or eighteen feet, and plentiful there and in the other sugar islands of America; the flowers are succeeded by pods, about three inches long, containing two or three swelling seeds; the pods are glutinous, and these, as well as the bruised leaves, have a strong balsamic scent; called in America the Indian favin-tree, from its strong odour, which somewhat resembles the common favin. It is frequent about Carthagena in woods; cultivated by Mr. Miller in 1752.—3. *B. divaricata*, dwarf mountain E. "Leaves smooth, lobes divaricated, acute, two-nerved; petals lanceolate." A low shrub, seldom rising more than five or six feet high, dividing into several branches; corolla, white, and flowers in a simple upright raceme; having an agreeable scent, appearing during the greatest part of summer, and exhibiting one of the chief beauties of the hot-house: the pods are taper, about four inches long, and contain four or five dark-coloured seeds. A native of the north side of Jamaica, where it grows plentifully; cultivated by R. J. Lord Petre, before 1742; flowering from June to September.—4. *B. angustata*, "leaves ovate, lobes parallel," differing from the others in its more oblong leaves, entire at the base, cloven to the middle into two straight parallel lobes, and having nine nerves. The calyx is long, streaked, and of a grey colour; the petals are subulate, flowers alternate, short; legume very long, pendulous. It rises to the height of twenty feet, with a smooth stem, dividing into many small branches, terminated by loose bunches of white flowers, which are succeeded by very long, narrow, compressed pods, each including eight or ten seeds. A native of America; the seeds were received by Mr. Miller from Cayenne.—5. *B. variegata*, variegated mountain E. *Arbor S. Thoma*, Zucc. *H. B.* 26. t. 15. *Chovanna-Mandaru*; 1. *Rheed. Mal.* 1. 57. t. 32. "Calyx one-lobed, long; petals five, ovate; lobes of the leaves ovate-obtuse." Petioles with a strong stem, upward of twenty feet high, dividing into many strong branches; flowers large, in double panicles, at the extremity of the branches, of a purplish red colour, marked with white, and the bottom yellow; pods about six inches long, and $\frac{1}{2}$ of an inch broad, each containing three or four compressed seeds. Growing naturally in both Indies, and introduced here by Mr. Bentick in 1692.—6. *B. ferruginea*, purple mountain E. *Chovanna-Mandaru*; 2. *Rheed. Mal.* 1. 59. t. 33. "Leaves subcordate, two-lobed, rounded, tomentose underneath." A tall tree, differing from the foregoing in having larger leaves, more deeply cut, and more

contracted on the sides; the calyx is yellowish green, and red; the corolla of a very red purple, and one petal out of the five streaked with white on the claw within and without; all lanceolate and distant; legumes larger than those of any other sort, being one and half or two spans long, and an inch broad. A native of the East Indies, where it flowers through the year. Introduced here in 1778.—7. *B. cuneata*, downy mountain E. *Mandaru Madagapat-ns.* *Pluk.* *Alm.* 247. t. 44. f. 6. *Caulchea-pou*, *Rheed. Mal.* 1. 63. t. 35. "Leaves cordate, lobes semi-orbiculate tomentose." This grows to the height of two fathoms, with a trunk nearly six inches in diameter, and divides into many branches; leaves smaller than those of the foregoing, rounded, cloven half way, seven-nerved and blunt, with rounded lobes; having a strong scent if rubbed during the night, when the lobes are clapped together; the calyx of the flowers green and bell-shaped, the corolla yellowish white; one of the petals having a dusky red purple spot at the claw; stamens yellowish white; flowers without smell. A native of the East Indies. Cultivated, says Ray, by Compton bishop of London, in 1687.—8. *B. acuminata*, sharp-leaved mountain E. *Velutta-Mandaru*, *Rheed. Mal.* 1. 61. t. 34. "Leaves ovate, lobes acuminate semi-ovate." This rises to a man's height, with a trunk as thick as his arm; leaves more deeply cut, longer, contracted into a cusp or point towards the end, nine-nerved, less divaricated; flowers bell-shaped, pure white, without scent; petals rounded and blunt; stamens white; legumes smaller than in the others, being four or five inches long, an inch broad, smooth, with a round broad back. A native of the East Indies.—9. *B. marginata*, "stem prickly, leaves cordate with round lobes, tomentose underneath;" seldom rising more than ten feet high, dividing into many branches, armed with short crooked spines; leaves alternate, heart-shaped, with two roundish lobes; flowers two or three together at the extremity of the branches, large, of a dirty white colour, and succeeded by flat pods, each containing two or three seeds.—10. *B. rotundata*, "stem prickly, leaves subcordate, two-parted, rounded, flowers scattered;" rising twenty feet high, with a strong upright stem, sending out branches towards the top, armed with spines in pairs, strong and crooked; leaves like the former; flowers large and white, succeeded by long flat pods, narrow, and each including five or six seeds. This and the preceding are natives of Cathay in New Spain.—11. *B. aurita*, long-eared mountain E. "Leaves subtransverse at the base, lobes lanceolate, porrected, three-nerved; petals lanceolate." Cultivated by Mr. Miller, in 1756, and flowering in September.—12. *B. porrecta*, smooth broad leaved mountain E. "Leaves cordate, lobes porrected, acute, three-nerved, petals lanceolate." A tree rising about fifteen feet high, with several straight trunks, thick as a man's leg, covered with a whitish bark, dividing into many branches and twigs; leaves three inches long and two broad, yellowish-green, smooth, with seven or more ribs, and four transverse; the petioles an inch long; the flowers at the end of the twigs, on pedicels half an inch long; petals long, red-white variegated or striped; stamens long and white; legumes five or six inches long, brown. Growing on the hills in Jamaica. The wood very hard, and veined with black, whence the name of ebony. Cultivated by Mr. Miller, in 1739, and flowering in July.—13. *B. emata*, white-leaved mountain E. "Leaves cordate, pubescent underneath, lobes ovate, obtuse; calyx situated upward and elongated." A native of the East Indies, introduced by Dr. P. Russel in 1777; flowering in May and June. There are many other species both from the East and West Indies, not yet sufficiently examined. The whole genus needs farther investigation.

Propagation.—All these plants, being natives of hot countries, will not thrive in England out of the bark-stove. They are propagated by seeds, procured from their native countries, which should be brought over in their pods. These must be sown in pots filled with light fresh earth, and plunged into a moderate hot bed of tanner's bark; and if the seeds be good, they will come up in six weeks, and in a month after they should be carefully shaken out of the seed pot, without injuring their roots, and each of them planted in a separate small pot filled with light loamy earth, and plunged again into the hot-bed, shading them till they have taken fresh root, and then admitting fresh air to them every day in warm weather. In autumn they must be placed in the bark-stove, and treated like other tender exotics, giving them but little water in winter. As these plants frequently flower in winter, they deserve a place in the stove. Martyn's Miller's Dict.

BAVINS, in *War*, faggots made of birch, heath, or other sort of brush-wood, that is both quickly fired and tough, 2½ or 3 feet long, with the brush-ends all laid one way, and the other ends tied with two bands. They are dipped and sprinkled with sulphur, like reeds, excepting only that the brush-ends only are dipped, and should be closed together before they are sprinkled, to keep them more close, in order to give a stronger fire, and to keep the branches from breaking off in shifting and handling them. See FASCINES.

BAULA, in *Ancient Geography*, a district of Italy in Campania, between Baia and the Lucrine lake, formed according to Tacitus, by the sea; and the seat of many country houses.

BAULAS, in *Geography*, a town of Syria, 50 miles east of Damascus.

BAULEM's Kill, a western water of Hudson's river, 8½ miles below Albany.

BAULOT, or BEAULIEU, JAMES, in *Biography*, of mean and obscure parentage, was born in the province of Burgundy, in 1651. Becoming acquainted with Pauloni, an Italian itinerant lithotomist, he travelled with him, as an assistant, for some years; but having at length, from observation, acquired the art of cutting for the stone and of curing ruptures, he separated from him, and soon became celebrated for his skill in both those arts. Though illiterate, and totally unacquainted with anatomy, yet he is said to have considerably improved on the method of operating used by his master; and even to have approached very near the mode now followed by the most celebrated surgeons. Following the steps of Pauloni, he visited in turn all the principal cities on the continent. In 1697, he went to Paris, where he at first operated with success, but failing in some cases, he went to Geneva, Aix-la-Chapelle, and Amsterdam: in each of which places he was much resorted to; for having both improved his instruments, and his mode of using them, he was now generally successful. He next went to Strasburg, where he cut successfully a great number of patients, then to Venice, Padua and Rome, every where acquiring additional fame and reputation. He was of a singular disposition, and wore a sort of monkish habit, whence he became generally known by the title of Friar James. He at length settled in a village near Besançon, where he died, 1720, being sixty-nine years of age. In gratitude for the numerous cures he had performed at Amsterdam, the magistracy of that city caused his portrait to be engraved, and a medal to be struck, bearing for imprefs his bust. Haller Bib. Chirurg. Gen. Biog. Dict.

BAULTE, in *Geography*, a river of Prussia, which runs into the Frisch Haff, a little below Frauenburg.

BAUM, in *Botany*. See MELISSA.

BAUM, *Balsard*. See MELITTIS.

BAUM, *Molucca*. See MOLUCCELLA.

BAUM, *Moldavian* and *Turkey*. See DRACOCEPHALUM.

BAUMA, in *Ancient Geography*, a town of Ethiopia near Egypt. Pliny.

BAUMÆ, an ancient town of Asia, in Mesopotamia, seated, according to Ptolemy, on the Euphrates.

BAUMAN, a remarkable cave in Lower Saxony, about 18 miles from Goslar; which has a narrow entrance, but within is spacious, and has many winding paths. The peasants traverse it in search of bones, which they sell for unicorn's horns. Some say that it extends as far as Goslar; and skeletons have been found in it, supposed to be those of men who have been lost in its devious windings.

BAUMANNIANA, in *Entomology*, a species of PHALÆNA (*Tortrix*) that inhabits Austria. The anterior wings are yellow, with two ferruginous anastomosing bands bordered with silver: posterior one interrupted. *Fabricius*.

BAUME, ANTHONY, in *Biography*, chemist and apothecary, born at Senlis, February 26th, 1728. Applying early and diligently to the study of chemistry and pharmacy, he was soon distinguished for his superior attainments in those arts. In 1752 he was received into the company of apothecaries at Paris, and in 1773 made a member of the Royal Academy of Sciences. He was also several years lecturer in chemistry, an office he filled with distinguished credit to himself, and advantage to his pupils. In 1757 he published, in conjunction with doctor Macquer, "Plan d'un Cours de Chymie experimentale et raisonnée, avec un discours historique sur la Chymie;" 8vo. Paris. "Elemens de Pharmacie theorique et pratique;" Paris 1762, 8vo. "Manuel de Chymie, ou exposé des opérations," &c. Paris, 1763, 8vo. These two works have passed through several editions. He also published "Memoires sur les Argilles, ou recherches et experiences chymiques et physiques sur la nature des terres les plus propres à l'agriculture, et sur les moyens de fertiliser celles qui sont steriles," Paris, 8vo. 1770, which was well received. Eloy. Dict. Hist.

BAUME, *St.* in *Geography*, a mountain of France in the department of Var, between Aix, Marseilles, and Toulon. It is much frequented from a superstitious notion that Mary Magdalen died in this place.

BAUME Bay. See BALSAM Bay.

BAUMER, JOHN WILLIAM, in *Biography*, a German naturalist and physician, was born at Rheweiler in 1719, studied philosophy and medicine at Jena and Halle, and after having been settled as a clergyman, in 1742, at Krautheim, returned to Halle to study medicine, and in 1748, took the degree of doctor in that science. He afterwards became first professor of medicine at Erfurt, where he died August 4, 1788. His principal works are "Natural History of the Mineral Kingdom, particularly in regard to Thuringia." Gotha 1763, 1764, 2 vols. 8vo. "Historia Naturalis lapidum pretiosorum omnium," &c. Frankfurt, 1771, 8vo. "Fundamenta politia medicæ," &c. "Frankfort and Lips." 1777, 8vo. "Fundamenta Geographiæ et Hydrographiæ Subterraneæ." Gif. 1779, 8vo. and "Historia Naturalis Regni Mineralogici, and naturæ ductum tradita." 1780, 8vo. Gen. Biog.

BAUMES, LES DAMES, or BAUMES LES NONES, in *Geography*, a town of France and principal place of a district in the department of Doubs, on the river Doubs, 5 leagues N. E. of Besançon, and 8¼ N. of Pontarlier. The place contains 2300 and the canton 8927 inhabitants; the territory includes 205 kilometres and 33 communes. It derives its origin from an abbey of canonesses, which is said to have been founded in the 5th century, by St. Romain, abbot of Condat. Others assert that it was founded in the 7th century. About 5 miles from this town is shewn a remarkable cavern, in which, after descending 300 paces, is found the gate of a grotto, twice as large as that of a city. The grotto is

is 55 paces deep and 60 wide, and covered with a kind of vaulted roof, from which water continually drops. In this grotto is a small brook, that is said to be frozen in summer and not in winter. When the peasants observe a mild rising from this cavern, they predict rain on the following day.

BAUMGANS, in *Orniologia*, the name of the bernacle goshawk; *ANAS BENICOLA*, in *Frisch. Hist. Birds*.

BAUMGARTEN, ALEXANDER GOTTLIEB, in *Biography*, an eminent philosophical writer, was born at Berlin in 1714, and educated at Halle. Here he distinguished himself by his private lectures in philosophy; and after having officiated for some time as extraordinary professor he was invited in 1740 to be professor of philosophy at Frankfort on the Oder. His constitution, being naturally feeble, was much impaired before the year 1751, by close application to study, and his infirmities were aggravated by the loss of a great part of his property, during the bombardment of the fortrefs of Custrin, whither he had fled for shelter. In 1760, his health being in some degree restored, he resumed his labours with new ardour; but in 1762 he was carried off by a stroke of the apoplexy; having established the character of an acute and sound philosopher, who united to an extensive acquaintance with the sciences, a distinguished accuracy of judgment, and an agreeable cheerfulness of temper. His principal works are "Methophysica;" Halle, 1739, 1743, 8vo, published in German by Meyer, with many alterations, and reprinted by professor Eberhard; "Ethica Philosophica;" Halle, 1740, 1751, 8vo. "Æthetica;" Frankf. on Oder, 1750, 1757, 8vo. and "Instita Philosophiæ Practicæ Primæ;" Frankf. 1760, vo. G. Biog.

BAUMGARTEN, SIEBOLD JACOB, brother of the above, was born in 1706 at Wilmshardt on the Oder, and having studied at Halle became one of the chief of his school. He died in 1757, leaving behind him several Latin subjects, and numerous translations of the best authors into German. G. Biog.

BAUMHOLZ, a town of Germany, in the archduchy of Austria, 6 miles west of Peltsburg.

BAUMGARTE, a town of Bohemia, in the circle of Chrudim, 3 miles west of Peltsburg.

BAUMHOLDER, a town of Germany, in the circle of Upper Rhine, and Duchy of Deux Ponts, 10 miles west of Lauterbeck, and 25 north of Deux Ponts. Since the French revolution, it is the chief place of a canton in the department of Sarre, and district of Barkerfeld. The place contains 665 and the canton 6411 inhabitants: the territory comprehends 33 communes.

BAUMSWALDT, a forest of Prussia, on the borders of Lithuania, about 10 leagues long and 7 wide.

BAUNACH, a town of Germany, in the circle of Franconia, and bishopric of Bamberg, near the river Mayne; 7 miles north of Bamberg. This is also the name of a canton of Swabia, so called from the river Baumach, which runs into the Mayne.

BAVOSA, in *Ichthyology*, a name given by the Italians to a species of Ray, called by modern naturalists *Raja Oxyrinelus*, which see.

BAVOTA, *Pacavita*, in ancient *Geography*, a town of Italy, in Japygia.

BAUR, BAWR, or BOUWER, JOHN WILLIAM, in *Biography*, an eminent painter of landscape and architecture, was born at Strasburg in 1610. After having been the disciple of Frederick Brendel, he went to Rome for improvement; but though he possessed great genius and a fertile imagination, and resided for a considerable time in and about Naples and Rome, where he devoted himself entirely to architecture and landscapes, he retained the German taste in all his figures, and neglected the study of nature or the antique; so that he

never arrived at a grandeur of design. However his pencil was light, his composition good, and his general expression beautiful, though his figures were somewhat heavy. His paintings in water-colours on vellum are held in the highest estimation. For the duke of Bracciano, at whose court he resided for several years, he finished some charming perspective views of gardens, with statues and fountains, and a number of elegant buildings, with many figures, coaches, cattle, and horsemen; and he generally distinguished people of different nations by their appropriate dress. This artist also engraved a great number of plates from his own designs. His engravings from the Metamorphoses of Ovid are generally preferred to the rest. They are slightly etched, and retouched with the graver. The figures are small, and incorrectly drawn. The back grounds are dark and heavy, and the trees are destitute of that lightness and freedom, which would render the effect agreeable. His pieces of architecture are well executed, and the perspective finely preserved. In his style of engraving he seems, in some degree, to have imitated Callot, and the nearer he approaches it, the better are his productions. The Metamorphoses consist of 150 middling-sized plates. Baur died at Vienna in 1640. Pilkington and Strutt.

BAURAC, an ancient name for nitre, but in some places used in a restrained sense, as not signifying every thing that was called by that name, but only one of two different salts that were confusedly called nitre.

The Arabians give the name *baurach* to *tincal* or *tincal*, which when refined is called *borax*, but when it is rough, in little crystalline masses like the small crystals of *sal gem*, mixed with earth or other impurities, it is always distinguished by the name of *tincal*. Neumann, p. 227. See NATRON.

BAURINKEI, in *Geography*, a town of Germany, in the circle of Westphalia, and county of Lingen, 6 miles N. E. of Lingen.

BAUSCH, LEONARD, in *Biography*, a physician of Schweinfurd, in Franconia, acquired considerable reputation by his commentaries on the works of Hippocrates, published 1594, folio, at Madrid. His son, John Laurence Bausch, born at Schweinfurd, September 30th 1605, after the usual school education at home, visited the principal seminaries in Germany, France, and Italy, and was made doctor in medicine at Altdorf in 1630. He had the merit of forming a society of physicians, in 1652, who met at stated periods, and communicated such observations in philosophy and medicine as occurred in their practice, and seemed deserving of being preserved. This, in time, gave birth to the *Academia Naturæ Curiosorum*, of which he was the first president, and in 1671 they began to publish their memoirs, under the title of "Miscellanea Curiosa Medico-Physica, Academiae Naturæ Curiosorum," 4to. The society still continue their meetings, and have published near seventy volumes of the Miscellany. Haller Bib. Med. Pract. Eloy. Dict. Hist.

BAUSCHWITZ, in *Geography*, a town of Silesia, in the principality of Neysze, 8 miles E. N. E. of Neysze.

BAUSK, or BAUTKO, a town of Courland seated on the river Mufa, on the frontiers of Poland. It was taken by the Swedes, under Gustavus Adolphus, in 1625, and by the Russians under Czar Peter, in 1705, after a bloody battle between the Russians and Swedes. N. lat. 56° 30'. E. long. 24° 44'.

BAUSSET, a town of France, and chief place of a canton in the department of the Var, and district of Toulon. The place contains 2980 and the canton 12,285 inhabitants, the territory includes 270 kilometres, and 5 communes.

BAUTSCH, a town in Moravia, in the circle of Prerau, 18 miles N. of Prerau.

BAUTZEN, or BUDISZIN, the capital of Upper Lusatia.

fatia, in Germany, situate in the circle of Budiztu, on the river Spree, subject to the elector of Saxony, and fortified by a citadel, called the Castle of Ortenburg, standing on a high rock, and separated from the town by a ditch and ramparts. This citadel was founded before the town, which had its rise in the 9th century. This town had formerly a considerable manufacture of linen, hats, stockings, and gloves, and also of glazed leather, cloth, fustian, &c. It has frequently suffered much from fire. It was taken by the Prussians in 1757; and after their retreat, taken possession of by the citizens. The Lutherans and Catholics are allowed the free exercise of their religion. N. lat. 51° 10'. E. long. 14° 42'.

BAUX, LES, or BAULX, in Latin *Baltium*, a town of France, in the department of the mouths of the Rhone, and chief place of a canton in the district of Tarascon, seated on a hill, having a strong castle, formerly an independent barony, and afterwards a marquissate. N. lat. 43° 42'. E. long. 5° 0'.

BAUX *Island*, a name given by captain Marchand to a small island of the Pacific ocean; being one of the group called Hergest's islands near the Marquesas, and denominated by Hergest, *Sir Henry MARTIN'S Island*; which see.

BAUZELY, *St.* a town of France, in the department of Aveyron and district of Milka. The place contains 823 and the canton 5850 inhabitants: the territory includes 242½ kilometres and 12 communes.

BAWD, a person who keeps a place of prostitution, or makes a trade of debauching women, and procuring or conducting criminal intrigues. Some think the word is derived from the old French *baude*, bold or impudent; though Verleegan has a conjecture which would carry it higher, viz. from *bathe*, anciently written *bade*. In which sense, bawd originally imported no more than bath-holder, as if bagnios had anciently been the chief scenes of such prostitution. The Romans had their male as well as female bawds; the former denominated *lenones* and *proagogi*, among us *padlers*; the latter, *lena*.

By a law of Constantine, bawds were to be punished by pouring melted lead down their throats.

BAWDER, in *Geography*, a river of England, which runs into the Tees, about 3 miles N. N. W. of Barnard-castle in the county of Durham.

BAWD-MONEY, in *Botany*. See *ÆTHUSA MEUM*.

BAWDSEY HAVEN, in *Geography*, a small bay or anchoring place near the south point of the coast of Suffolk, formed by the ocean, and the mouth of the small river Deben, about a league to the east of Languard fort.

BAWDY-HOUSE, a house of ill-fame, to which lewd persons of both sexes resort for the purpose of licentious and criminal indulgence. Houses of this kind, under the denomination of brothels and stews, are licensed in some countries; and in England they were privileged by patent, regulated by statute, and tolerated as a necessary drain for corruption, from the reign of Henry II. to the last year of Henry VIII. when they were suppressed by found of trumpet; and their suppression was perhaps attended with greater solemnity than that of the convents. Their suppression, however, failed to extirpate lewdness; and Lztimer (Sermons, p. 43.), whose sermons are replete with a barbarous eloquence, inveighs bitterly at its subsequent prevalence. In 1650, the repeated act of keeping a brothel, and also of committing fornication, was upon a second conviction, made felony without benefit of clergy. But at the restoration, when hypocrisy deviated into the extreme of licentiousness, it was not thought proper to renew a law of such unfashionable rigour. The keeping of a bawdy-house is cognizable by the temporal law, as a common nuisance, not only because it endangers the public peace by drawing to-

gether dissolute and debauched persons, and promoting quarrels, but because it tends to corrupt the manners of the people by an open profession of lewdness. (3 Inst. 205. 1 Hawk. P. C. c. 74.) Those who keep bawdy-houses are punished with fine and imprisonment, and also such infamous punishment, as pillory, &c. as the court shall inflict; and a lodger, who keeps only a single room for the use of bawdry, is indictable for keeping a bawdy-house. (1 Salk. 382.) Persons resorting to a bawdy-house are punishable; and they may be bound to their good behaviour. But if a person be indicted for keeping or frequenting a bawdy-house, it must be expressly alleged to be such a house, and that the party knew it, and not by suspicion only. (Poph. 208.) A man may be indicted for keeping bad women in his own house. (1 Hawk. P. C. c. 61. § 2.) A constable, upon information that a man and woman are gone to a lewd house, or about to commit fornication or adultery, may, if he finds them together, carry them before a justice of peace without any warrant, and the justice may bind them over to the sessions. (Dalt. 214.) Constables may enter bawdy-houses, call others to their assistance, and arrest the offenders for a breach of the peace. In London, they may carry them to prison; and by the custom of the city, whores and bawds may be carted. (3 Inst. 206.) By stat. 25 Geo. II. c. 36. made perpetual by stat. 28 Geo. II. c. 19. if two inhabitants, paying scot and lot, shall give notice to a constable of any person keeping a bawdy-house, the constable shall go with them before a justice of peace, and shall, upon the oath of such inhabitants, that they believe the contents of such notice to be true, and their entering into a recognizance of 20l. each, to give material evidence of the offence, enter into a recognizance of 30l. to prosecute with effect such person for such offence at the next sessions. The constable shall be paid his reasonable expenses by the overseers of the poor, ascertainable by two justices; and upon conviction of the offender, the overseers shall pay the two inhabitants 10l. each. A constable, neglecting his duty, forfeits 20l. Any person appearing as master or mistress, or as having the care or management of any bawdy-house, shall be deemed the keeper of it, and liable to be punished as such. A wife may be indicted and set in the pillory with her husband, for keeping a brothel; for this is an offence respecting the domestic economy and government of the house, in which the wife has a principal share; and it is such an offence as the law presumes to be generally conducted by the intrigues of the female sex. 1 Hawk. P. C. 2, 3.

BAWLING, among *Hunters*, is spoken of the dogs, when they are too busy before they find the scent good.

BAWN, or BAN, derived from the Teutonick *baewen*, to construct and secure with branches of trees, in *Antiquity*, an area inclosed with thick ditches of earth square or circular, impaled with wooden stakes or the branches of trees, and surrounded with a deep trench. This was called in Irish *daingean*, a word of Celtic origin. Numerous remains of such fortresses are found not only in various parts of Ireland, but also in Britain, Germany, Sweden, and almost every country of Europe. The Irish gave great trouble to the English for many centuries by fortifying passes between the bogs and mountains in this manner, so that it was a tedious work to cut through them, and make the roads passable. This was called *plashing* a pass, from the Franco-Gallic word *plasser*, which, like *baewen*, signifies to entwine; and it consisted in securing the top of the vallum with sticks interlaced with branches. Before the English invasion, each family of the Irish is supposed by Mr. Ledwich, to have lived in a mud cabin surrounded by a *bawn*. The English introduced castles, in which they were imitated by the natives. In course of time, *bawn* came to signify an inclosure with a wall, instead

of plashed stakes; and we find queen Elizabeth and James I. requiring those to whom grants were made, to construct castles with *bawns*, or courts round them, for the protection of their families and tenants. When the grant was not very considerable, a bawn with a house within it was sufficient. Of the latter kind was *Hamilton's Bawn*, in the county of Armagh, which is mentioned in Dean Swift's works, and which now gives name to a village in that county. This was built of lime and stone, eighty feet square, with two round towers for flankers, and two stories high, vaulted, the wall itself being thirteen feet high. Within the bawn was a house of lime and stone, thirty-six feet long and twenty feet broad. Farther particulars may be found in Ledwich's *Antiquities of Ireland*, p. 185—196.

BAWOROW, in *Geography*, a town of Red Russia, in the palatinate of Lemberg, 64 miles east of Lemberg.

BAWT, a town of Persia, in the province of Irak-Agemi, 80 miles north of Ispahan.

BAWTRY, a market-town in the west riding of Yorkshire, and upon the confines of Nottinghamshire, in England, is seated on the high road to Scotland, and consists principally of one broad street, well furnished with inns. It is 9 miles from Doncaster, and 152 north from London. The river Idle induces a considerable trade from Derbyshire, of mill and grind-stones, as well as of lead and iron ware from Sheffield, which are conveyed hence to Hull and other parts of the country. The market is held on Wednesday and Saturday; and the town has also three annual fairs. Its houses are 174, inhabited by 798 persons. N. lat. 53° 27'. W. long. 1°.

BAXA TERRA, or *Barrer Bay*, lies on the west coast of Africa, 4 leagues south of the river Oro, which is in N. lat. 23° 30'. It is large, and has in several places good anchorage, especially on its northern side.

BAXAS BAHIA, lies on the coast of Brasil, in South America, 50 leagues E. and E. by S. from the sand-bank of Terra de Tortuga, on Turtle harbour. It has good anchorage, hard ground, and deep water; and it is well sheltered by a sand-bank from the north wind, and by the land from all other winds.

BAXAS, PUNTA, denoting a cape of shoals, is a low point, 12 leagues from the former, and 18 from Tortuga.

BAXFADORE, CAPE, is situated in the island of Lucerna or Malabar, in N. lat. 18° 44'. E. long. 120° 35'.

BAXIOS, APAXOS, or *Baxios*, are two clusters of rocks on the S. the east side of the island of Ceylon, called the Great and the Little Baxios. The former is in N. lat. 6° 10'. E. long. 81° 55'; and the latter in N. lat. 6° 25'. E. lat. 82° 15'.

BAXOS DE ABPOLOS. See *ABPOLOS*.

BAXOS de Indina. See *AFRICOS*.

BAXOS de la Cardelina, a shoal or reef of rocks, in the Pacific ocean, so called by Mariana in 1567, and lying, by M. Heuriot's calculation, near S. lat. 64° and E. long. from Paris 157°.

BAXOS, CAPE, or *Levo Cape*, is the east point of the entrance to the river Senegal, on the coast of Africa. It lies west of both cape Lomea and Palma island, 2 leagues distant from the latter. On the east of this cape are several dangerous rocks, some of which are under water, and should therefore be carefully avoided by the trading ships that navigate in those parts.

BAXOS Cape, lies also on the coast of Africa, eastward of the river Volta, 2 leagues from the Quatre Monts, or hills so called that are close together.

BAXTER, RICHARD, in *Bio-graphy*, an eminent divine

among the non-conformists of England, was born at Rowton, a small village in the county of Salop, in 1615. His father was a small freeholder of exemplary character, who, though belonging to the established church, was charged with puritanism on account of his religious demeanour. Under his instruction and example, Baxter manifested early indications of that contemplative and pious disposition for which he was afterwards so distinguished. In his youth he enjoyed few advantages for education; the schoolmasters whom he attended being men of little learning and loose morals. But under the tuition of Mr. Wickstead, chaplain to the council at Ludlow, he had access to an excellent library, of which he availed himself about a year and a half very much to his improvement. At this time his views were directed to the profession of a minister. However, in 1633, Mr. Wickstead prevailed upon him to relinquish this object, and to seek his fortune at court. Accordingly he was recommended to sir Hen. Herbert, master of the revels; but disgusted with the mode of living which this situation presented to him, he soon retired into the country, and resumed his purpose of prosecuting his studies for the ministry. Being appointed master of the free school at Dudley, his health declined; and under the impression produced by the immediate prospect of dissolution, and by the perusal of several practical treatises, he acquired that deep and settled sense of religion which formed the ruling and permanent principle of his future life. Being more than ever determined to engage in the ministerial office and having at this time no scruples against conformity to the church of England, he was ordained in 1638; though he afterwards condemned his precipitance in complying with the laws of subscription without due examination; and he frequently preached at Dudley and in the neighbouring villages, much to the satisfaction of those who heard him. He objected, however, to some of the ceremonies of the church, and he soon began to entertain doubts concerning the lawfulness of conformity. What led him and several others to study the case of episcopacy, and to think unfavourably of the establishment, was the imposition of the "et cætera" oath, which expressed an universal approbation of the doctrine and discipline of the church of England, and a determination never to attempt any alteration in its government. Mr. Baxter demurred against taking this oath; and though he would have submitted to the ecclesiastical jurisdiction that was actually established, he could not conscientiously declare his approbation of it, and his determination to support it to the extent which this oath required. In 1640, he was invited by the principal inhabitants of Kidderminster to reside with them as a preacher; and this place became the scene of his ministerial services for about sixteen years. Such, indeed, was the success which attended them, that he was eminently useful in reforming the morals of the dissolute, and in promoting in the town and its neighbourhood a strict regard to religion. About two years after his settlement at Kidderminster, the civil war commenced; and on this occasion he took part with the parliament, and recommended the protestation prescribed by it, to the people. He was thus reduced to the necessity of leaving this town, and of repeatedly changing his residence, till at length he settled at Coventry, where he preached regularly once a week both to the soldiers of the garrison and to the people of the town. After the battle of Naseby, he became chaplain to the regiment of colonel Whalley, and attended it at several sieges, though he was never present in any engagement; so that the story of his having killed a man in cold blood, and robbed him of a medal, was an unfounded and scandalous fabrication. During these times of confusion, Mr. Baxter was a zealous friend to regular government both in church and state; and it is said that he

took great pains to repress the sectaries. The accidental circumstance of a profuse bleeding at the nose, which reduced him to a state of great languor, was the occasion of his being separated from the army in 1647, and of preventing that service to his country, which might have been expected from a person of his principles and moderation. However, he resisted to the utmost of his power, the measures of those who afterwards usurped the government of the kingdom; he opposed taking the covenant, preached against the engagement, and dissuaded the soldiers from fighting against the Scots troops who came into the kingdom with Charles II.; and therefore the charge alleged against him, of his having been a trumpeter of rebellion, is altogether without foundation. When Cromwell assumed the supreme power, he boldly and openly declared, that he disliked his usurpation; and in a private conference expressly told him, that in his opinion the ancient monarchy was a blessing. To that form of government, Baxter always avowed his attachment; and in a sermon preached before the parliament on the 30th of April 1660, the day preceding that on which they voted the king's return, he maintained, that loyalty to their prince was a thing essential to all true protestants of whatever persuasion. About the same time he preached a thanksgiving sermon at St. Paul's, on occasion of the success of general Monk; and this circumstance refutes the charge of his having dissuaded his excellency from concurring in, or bringing about that change.

After the restoration, Baxter was made one of the king's chaplains, and was always treated by him with peculiar respect. To his majesty he spoke with the same freedom which he had used with the protector Cromwell. He strongly represented the great importance of tolerating those pious men who entertained doubts concerning the ceremonies and discipline of the church; and he observed, that the late usurpers had so well understood their own interest, that they had found the way of doing good to be the most effectual means to promote it; and therefore he besought the king that "he would never suffer himself to be tempted to undo the good which Cromwell or any other had done, because they were usurpers that did it;" and on the contrary, "that he would rather outgo them in doing good." At the Savoy conference he was one of the commissioners, and was employed in compiling the reformed liturgy. Having declined the preferment of the bishopric of Hereford, which was offered him, he wished to retire to his friends at Kidderminster, and to officiate among them in the humble station of a curate, but was not permitted. Disappointed with regard to the object of his wishes, he preached for some time occasionally in London; but the act against conventicles obliged him to retire first to Acton, and then to Totteridge. During the persecution of the non-conformists, he preached, as opportunity offered, and the state of the times allowed, either more openly or more privately; and he was sometimes a sufferer for his zeal, and sometimes unmolested. After the indulgence of 1672, he chiefly resided in London, and exercised his ministry, either occasionally or statedly, but not without interruption and molestation. To the sufferings attendant on his profession were added the infirmities of a feeble constitution, and frequent bodily disorders, together with the loss of the greatest part of his fortune, in consequence of the shutting up of the exchequer in 1671, and by the penalties inflicted upon him for the exercise of his ministry; but he bore all these evils with singular fortitude and patience. In 1684, he was treated with peculiar severity. Although he was so ill as not to be able to stand, a warrant was granted against him, in order to his being bound to his good behaviour; and the constables who were entrusted with its execution, watched him so incessantly,

that they prevented him passing from his study to his bed-chamber; and by thus depriving him both of food and sleep, at length effected their purpose, though they were not empowered to break open doors, and took him away to the Session's-house, where he was bound in the penalty of 400*l.* to keep the peace; and he was brought up twice afterwards, though he kept his bed during the greatest part of the time. In 1685, he was committed to prison by a warrant from lord chief-justice Jeffries, for his paraphrase on the New Testament, which was charged with being hostile to episcopacy, and brought to trial for sedition. In the course of this trial, he was treated with all the brutal insolence and tyranny, to the exercise of which that ruffian of the law, Jeffries, was accustomed; reviled by his judge in the grossest terms, and prevented from obtaining the full defence of his counsel; and at last found guilty on the most frivolous grounds, and sentenced to pay 500 marks, to lie in prison till he paid it, and to be bound to his good behaviour for seven years. From this heavy penalty, however, after a confinement of several months, he was released, in 1686, by king James, and allowed to remain in London, notwithstanding the provisions of the Oxford act. From this time he lived in a retired manner, neither interfering in the concerns of his party, nor taking any part in those addresses which some of his brethren presented to James II. on his indulgence. He perished, however, in the performance of his ministerial duties, till increasing weakness confined him to his chamber. The close of his life corresponded to the uniform tenor of it; the approaches of dissolution were regarded by him with pious resignation; and he died, with the tranquillity and hope appropriate to his exemplary character, on the 8th of December 1691. Urged by extreme pain to wish for a release, he checked himself by saying, "It is not fit for me to prescribe; where thou wilt, when thou wilt, and how thou wilt." To one who asked him in his sickness how he did, he replied, "Almost well." In 1662, Mr. Baxter married the daughter of Francis Charlton, Esq. a distinguished magistrate of the county of Salop; a woman of great piety, who entered thoroughly into his views concerning religion, and cordially approved all the sacrifices which he made from a conscientious regard to duty. She accompanied him in prison, and submitted, without repining, to all the hardships consequent upon the persecution which he suffered. She died 10 years before him.

"Richard Baxter was a man whose whole soul was engaged in his profession. Ardent piety towards God, and zeal for the best interests of his fellow-creatures, were the active springs of his conduct; and few men have ever devoted more time and labour to those objects. He passed a life of much contention and obloquy; but at this cool distance, no candid enquirer can mistake his true character. His early studies in divinity were not, perhaps, the best adapted to form a theologian. They consisted chiefly of the schoolmen and metaphysicians of a dark age, and gave him a turn to subtleties of distinction, which made him stand apart in some theoretical points from all his contemporaries. Yet, in practical religion, the devotional warmth of his temper allied him to the pious of all denominations, and inspired him with an enlargement of mind, which set him above the differences resulting from petty controversies. He was a most voluminous writer, and his works are sufficient to make a library of themselves. Above 145 distinct treatises of his composition have been reckoned up; of which 4 were folios, 73 quartos, and 49 octavos, besides several others of a smaller size. They comprise bodies of theology, practical and theoretical, besides a vast number of tracts on particular topics." His practical works have been collected together in

in 4 vols. in folio. His income, it is said, which was not great, was increased by the profit which he made of his writings, for which he sometimes received 60 or 80 l. a year of the bookellers. But this money he seems to have employed for charitable purposes. Of his numerous works some of the principal were his "Methodus Theologicæ," printed in Latin in 1674, folio; his English body of practical divinity, published in 1673, folio, under the title of "The Christian Directory," &c.; "Cædes Salvianus, or the Reformed Pastor," 8vo. 1676, much esteemed by many divines; "Universal Concord," 12mo. 1658, giving an account of the terms upon which all Christian churches may hold communion; "Reasons for the Christian Religion," 1667; "Catholic Theology," fol. 1675, intended to reconcile the differences between the Arminians and the Calvinists; "A Treatise of Episcopacy," 4to. 1681; "A Treatise of Universal Redemption," 8vo. 1694. The most popular of his practical pieces were his "Saints' Everlasting Rest," and his "Call to the Unconverted," of which latter 20,000 were sold in one year, and it was translated into all the European languages, and into the Indian tongue. To those which we have enumerated, we may add his "Reformed Liturgy," his "Poor Man's Family Book," his "Dying Thoughts," and his "Paraphrase on the New Testament." The first book he published was his "Aphorisms of Justification" and the "Covenants," printed in 1649; and the last in his life-time, "The Certainty of the world of Spirits," printed in 1691; so that he was an author 42 years. One of his works is "A Narrative of his own Life and Times;" "which, though a rhapsody," says Mr. Grainger, "composed in the manner of a diary, contains a great variety of memorable things, and is itself, as far as it goes, a history of non-conformity." Mr. Baxter was distinguished not only as a practical, but also as a controversial writer; and under this latter character, he particularly opposed the Antinomians. Few persons have suffered more rancorous abuse than Mr. Baxter; and few have been more highly respected both by his contemporaries and posterity. Among his friends and admirers we may reckon some of the most distinguished characters of the age in which he lived, of whom many were members of the establishment, such as chief justice Hale, sir John Maynard, Dr. Barrow, bishop Wilkins, bishop Patrick, and bishop Burnet. The great chief justice Hale honoured him with an intimate friendship, gave a high encomium of his piety and learning to all the judges, and when he was in prison, on the Oxford act, left him a legacy in his will, and several large books, in his own hand-writing, on the matter of their conversations. Dr. Barrow has testified concerning his works, that "his practical writings were never mended, his controversial skill confuted." Bishop Wilkins affirms, "that he has cultivated every subject which he has handled;" and he used to say of him, "that if he had lived in the primitive times, he had been one of the fathers of the church. Bishop Burnet's testimony is somewhat qualified. "Baxter," says he, "was a man of great piety, and, if he had not meddled in too many things, would have been esteemed one of the learned men of the age. He had a very raving and pathetical way of writing, and was his whole life long a man of great zeal and much simplicity; but was most unhappily subtle and metaphysical in every thing." Baxter was one of the last divines, whose name has distinguished a particular denomination or description of persons. See BAXTERIANS. Calany's Life of Baxter. Eng. Brit. Gen. Biog.

BAXTER, WILLIAM, an eminent philologist and antiquarian, was the nephew and heir of Richard Baxter, and

born of parents in mean circumstances at Lla'nbyddan, an obscure village of Shropshire, in 1650. He derived his pedigree, like a true Cambro-Briton, through a long line of ancestors from John Baxter, who, in the reign of Henry VI., settled at Surewbury; and he shews, that the name Baxter signifies originally a baker, in Saxon "Brecstler," and that it was given to that family, because they were bakers to the ancient princes of Wales, in which post, according to the custom of the ancient Celtes and Greeks, the noblest persons were employ'd.

In his infancy and youth, his education was so much neglected, that when he was sent to Harrow school in Middlesex at the age of 18, he knew not one letter, nor understood one word of any language but Welsh. But such were his talents and application, that he soon became distinguished by his extensive knowledge. In 1670 he published a Latin grammar, entitled "De Analogia, seu arte Latine lingue commentariolus," &c. 12mo. Thus qualified for the profession of a schoolmaster, to which he devoted himself, he employed the greatest part of his life in this occupation. For some years he kept a boarding school at Tottenham High-croft in Middlesex; and he was afterwards elected master of the Mercers' school in London. Having acquired great celebrity as a scholar, and in the prosecution of antiquarian researches, and distinguished, perhaps, more by his learning than his judgment, he died in 1723. In 1695 he published a new and correct edition of "Anacreon," with notes, which was reprinted with considerable additions and improvements in 1710. His abuse of Tanaquil Faber, a former editor of Anacreon, was amply retorted upon himself by J. Cornelius de Pauw, in his 4to. edition of the same poet, published at Utrecht in 1732, who held his comments in great contempt. His edition of "Horace," printed in 1701, and reprinted with improvements in 1725, has obtained a more lasting reputation. Dr. Harwood pronounces this the best edition ever published, and the learned Gesner has testified his approbation of it, by making it the ground-work of his excellent edition. Bentley, famed for the severity of his criticisms, in speaking of it, calls Baxter "Vir recondite eruditioris." In 1719 Baxter published his dictionary of British antiquities, under the title of "Glossarium Antiquitatum Britannicarum sive syllabus etymologicus antiquitatum veteris Britannicæ atque Iberiæ, temporibus Romanorum," 8vo. By his skill in the British or Welsh tongue, and by means of etymology, he professes to correct Camden, and to add about 200 names of ancient places and rivers omitted in his Britannia; of this work, a second edition was published, after the author's decease, in 1733. His glossary of Roman antiquities, proceeding no farther than the letter A, was published in 1726 by Mr. Moses Williams, under the title of "Reliquiæ Baxterianæ," &c. and republished in 1731, with the title "Glossarium Antiquitatum Romanorum," &c. Lond. 8vo. Baxter also wrote four letters on subjects of antiquity, inserted in the first volume of the "Archæologia." He left behind him notes on Pterius and Juvenal, and was the translator of some of Plutarch's lives "done into English" by several hands. Biog. Brit.

BAXTER, ANDREW, an ingenious metaphysician and philosopher, was the son of a merchant at Aberdeen, and born there in 1686 or 1687. He was educated in King's college in that city, and afterwards undertook the care of private pupils, some of whom were persons of rank and fortune. About the year 1730, he published in 4to. his celebrated work, entitled, "An Enquiry into the Nature of the Human Soul; wherein the Immutability of the

Soul is evinced, from the principles of Reason and Philosophy." This work, which was reprinted in 2 vols. 8vo. in 1737 and in 1745, was much applauded by several persons of eminence, and particularly by bishop Warburton, who, in his "Divine Lyegation," speaks of it as containing "the justest and precise notions of God and the Soul," and "as one of the most finished of the kind, that the present times, greatly advanced in true philosophy, have produced." Of the author's sentiments, see some account under the articles DREAM, SOUL, and *Vis Inertiae*. In 1741 Mr. Baxter went abroad with one of his pupils, and settled for some time at Utrecht, where he became acquainted with several literary persons, and whence he made several excursions into Flanders, France, and Germany. Upon his return to Scotland in 1747, he resided till his death at Whittingham, in the shire of East Lothian. His work entitled "Matho, five Cosmotheoria Puerilis," was drawn up for the use of his pupils, and first printed in Latin, and afterwards greatly enlarged, and published in English, in 2 vols. 8vo. The second edition of this work was published in 1745, and the third in 2 vols. 12mo. in 1765. The design of this work was to deduce the principles of natural religion from the phenomena of the material world. A mistake in the astronomical theory, which the author did not live to rectify, as he had intended, had disgusted some readers; and therefore, in the third edition, the conference that was chiefly affected by that error, was suppressed, and the vacancy supplied by another. In 1750 the author published "an Appendix to the first part of his Enquiry into the Nature of the Soul," vindicating it from some objections, which was dedicated to Mr. Wilkes, with whom he formed an intimate acquaintance abroad. In this year Mr. Baxter, after having endured great sufferings from the gout, and a complication of disorders, with exemplary patience, closed his life about the sixty-third year of his age. He left behind him several unfinished MSS. on philosophical subjects, and one in a complete state, concerning the controversy between the English and foreign philosophers on the subject of the force of bodies moving in free spaces, which however was never published.

Mr. Baxter's learning and talents are sufficiently displayed in his writings. His application was such, that he sometimes sat up whole nights reading and writing: and yet his disposition was cheerful and sociable. In conversation he was modest and unassuming; and in the discharge of the social and relative duties of life, his conduct was exemplary. His mind was possessed with the most reverential sentiments of the Deity, and the general tenor of his life was conformable to the rules of virtue. He was economical without parsimony. Such was his disinterestedness, that he declined considerable offers of preferment, which he might have obtained if he had taken orders in the church of England. His knowledge of the modern languages was extensive; so that he could write and speak in French, German, Dutch, Italian, and Spanish. By his wife, whom he married in 1724, and who survived him ten years, he had one son and three daughters. Biog. Brit.

BAXTERIANS, in *Ecclesiastical History*, derive their appellation from Mr. Richard Baxter, a nonconformist minister; of whom we have already given an account. His theological system has been called Baxterianism; and those who embrace his sentiments in divinity, are called Baxterians. The Baxterians have endeavoured to strike into a middle path between Calvinism and Arminianism; and to unite both these schemes. They profess to believe in the doctrines of election, effectual calling, and other tenets of Calvinism; and consequently, suppose, that a certain number,

determined upon in the divine counsels, will infallibly be saved. This they think necessary to secure the ends of Christ's interposition. But then, on the other hand, they reject the doctrine of reprobation, and admit that our blessed Lord, in a certain sense, died for all; and that such a portion of grace is allotted to every man, as renders it his own fault, if he doth not attain to eternal happiness. If he improves the common grace given to all mankind, this will be followed by that special grace which will terminate in his final acceptance and salvation. Whether the Baxterians are of opinion, that any besides the elect, will *actually* make such a right use of common grace as to obtain the other, and, at length, come to heaven, we cannot assuredly say, there may possibly be a difference of opinion upon the subject, as they approach nearer to Calvinism or Arminianism. Mr. Baxter appears, likewise, to have modelled the doctrine of justification, and the perseverance of the saints, in a manner which was not agreeable to the rigid Calvinists. Some foreign divines in the 17th century struck nearly into the same path; and, particularly, in France, M. le Blanc, Mr. Cameron, and the celebrated Monf. Amyraut. For a considerable time the non-conformist clergy in England were divided into scarcely any but two doctrinal parties, the Calvinists and the Baxterians. Of late the Baxterians have been less numerous. However, they are still a considerable body; and several persons are fond of the name as a creditable one, who probably go farther than Mr. Baxter did. The name, however, like other theological distinctions, will probably, in a course of time, sink into disuse, till it is either wholly forgotten, or preserved merely in the records of history. Biog. Brit. Art. BAXTER.

BAY, in *Botany*. See LAURUS.

BAY, *Loblolly*. See GORGONIA.

BAY, *Rose*. See NERIUM.

BAY, *Dwarf Rose*, and *Mountain Rose*. See RHODODENDRUM.

BAY, *Sweet Flowering*. See MAGNOLIA.

BAY *Plum*. See PSIDIUM.

BAY, in *Building*, denotes any kind of opening in walls; as a door, window, or even chimney.

BAY *windows* are the same with what we otherwise call *bow windows*.

BAY, in *Geography*, denotes a little gulf, or an arm of the sea, stretching up into the land; being larger in the middle within, than at its entrance, which is called the *mouth of the bay*. The largest and most remarkable bays are those of Biscay, Bengal, Hudson's, Panama, &c.

BAY of *All Saints*. See ALL SAINTS.

BAY of *Antngil*. See ANTONGL.

BAY, *Baffin's*. See BAFFIN.

BAY of *Cancalle*. See CANCALE.

BAY, *Chequitan*. See CHEQUITAN.

BAY of *Chesapeake*. See CHESAPEAKE.

BAY of *Fires* lies on the east coast of New South Wales or New Holland, in the Pacific ocean, to the north of St. Patrick's Head. The north point of the bay is called Edystone, and the south point St. Helen's. A small rocky island is near the middle of its entrance, on each side of which is an open passage.

BAY of *Fresh Water*, lies south of Afsension bay in the north part of the gulf of Mexico. N. lat. 30°. W. long. 93°.

BAY of *Fundy*. See FUNDY.

BAY of *Good Fortune*, lies on the north coast of Chaleur bay, which is a large bay of the gulf of St. Lawrence, and on the north east coast of Nova Scotia in North America.

BAY, *Hudson's*. See HUDSON'S.

BAY of *Inlets*, a bay on the south east coast of New Holland,

land, between cape Palmerston and cape Townshend. S. lat. 21° 30'. to 22° 30'. W. long. 209° 36. to 210° 40.

BAY of Islands lies on the coast of Nova Scotia, on the continent of North America, about 6 leagues south-west from cape St. Mary.

BAY of Islands is also a bay on the northern island of New Zealand in the south Pacific ocean, lying on the north-east coast between cape Brett and cape Pocke. This bay is large and deep, and has many small islands in it. The best entrance into the bay is on the west side; within it are several lesser bays. S. Lat. 35 12'. E. long. 174° 57'.

BAY of Islands is also a bay on the south coast of the straits of Magellan, towards the western entrance, W. by N. from Upright bay, and E. by S. from the bay of Disappointment. A cluster of small islands lies in the entrance, and in the east part of the bay; but the best entrance is between the westernmost of the two islands off the point of Cape Upright, and a small island further west, where a ship may have safe passage, and anchor in 20 fathoms in soft mud, near the west coast of the cape, in S. lat. 53° 9'. W. long. 75° 32'.

BAY of Isles is an extensive bay of the gulf of St. Lawrence, on the west coast of Newfoundland, about 8 or 9 leagues to the S. W. from la Belle bay, and 14 or 15 leagues to N. N. E. from Port-a-port. The centre of the bay lies in about N. lat. 49 5. W. long. 58° 15'.

BAY of Isles is also a bay situate towards the west end of the north coast of South Georgia island, in the south Atlantic ocean.

BAY of St. Louis, lies on the Labrador coast, and has cape St. Louis on the north, and cape Charles on the south. It has many small islands; the largest of which is Battle island, in the mouth of the bay. The middle of the bay is in N. lat. 52° 23'. W. long. 55° 23'.

BAY de Roche Fende, lies on the west side of Lake Champlain, and the state of New York, 17 miles above Crown-point.

BAY of Rocks is a spacious bay of the Arabian sea, which forms a part of the Indian ocean, and lies on the south-east coast of Arabia, with good anchorage for ships.

BAY of Seven Islands lies W. N. W. from Moisie river, and about 18 leagues to N. N. E. from Trinity point, on the north shore of the gulf of St. Lawrence.

BAY of Shoals. See *BAXAS Babia*.

BAY of St. Spirit, is a large bay of the Indian ocean, on the south-east coast of Africa, on the north of the island and cape of Ubasia. It is sufficiently spacious to receive a fleet of ships, and is so called from the river St. Spirit, or Mamea, which falls into this bay.

BAY, among *farmers*, is that part of the barn where the snow is laid.

BAY, in *Hydrostatics*, signifies a pen, or pond-head, made up against a height, to keep in a store of water for driving the wheels of a mill, or turning of a non-mill, by the stream that comes thence through a passage, or flood-gate, called the *pen-still*.

BAY colour, in *Metallurgie*. The word *bay* is formed from the *Ind. shans*, or *ladius*, and that from the Greek *bay*, a palm-branch, so that *bay* or *bay* properly denote *dark plumbeous*. Hence called, among the ancient, that colour which the horses were denominated *qui palati*.

The bay is the most ideal colour among horses. It is a strong and perhaps irremovable character in this colour to be attended with a black ear, and tail, which though but or any other colour that approaches it near it. The bay is also most frequently attended with black legs, and feet up to the knee and hock: the feet, however, are often varying to the white in horses of this colour, and is not with us esteemed so handsome as when entirely black. There are

several kinds of bays, as light bay, dark bay, brown bay, golden bay, dappled bay, &c.

BAY à miroir, the same as *DAFFLE bay*.

BAY, among *sportsmen*, is applied to flags, boars, foxes, &c. and also to dogs when they turn head against one another. Thus when a stag has been so long pursued, that he is almost exhausted, he turns round, and facing the hounds, defends himself with his antlers, and keeps the hounds at bay, till the sportsmen come up, draw off the dogs, and save his life. When a stag takes *foit*, that is, takes to the water, he will defend himself, and keep the hounds for a long time at bay, provided that he fathoms the lake or river so well as to keep the hounds swimming, without going out of his own depth, but if he is obliged to swim at the time, he *is up* or quite tired, and being surrounded by the dogs, he is inevitably drowned. In fox hunting, when the fox is supposed to have entered the earth, the place of his retreat is soon discovered by the terriers, "laying well at him," provided he has not *turned* in the earth; but if he has, the terrier and the fox are face to face, and are both baying, or keeping each other at bay; and the contest terminates with *digging out* the fox.

BAY salt. See *SALT*.

BAY yard, is a denomination sometimes used promiscuously with *woollen yarn*. 10 and 11 W. III. c. 10. 5 G. II. c. 21. See *YARN*, &c.

BAYA, in *Geography*. See *BATA*, and *BAYJA*.

BAYA, low, marshy land on the Gold coast of Africa, without any towns or people near the shore; 4 leagues W. S. W. from the river Volta, and 8 leagues E. and E. N. E. from Ningo ground.

BAYA, in *Ornithology*, Indian grosbeak, or *Loxia Indica*, is rather larger than a sparrow, with yellow brown plumage, a yellowish head and feet, a light-coloured breast, and a conic beak, very thick in proportion to his body. This bird is very common in Hindoostan; and is described as surprisingly sensible, faithful, and docile; never voluntarily deserting the place where its young are hatched, not averse from the society of mankind, and easily taught to perch on the hand of his master. In a state of nature the baya builds his nest on the highest tree which he can find; generally on the palmyra or Indian fig-tree, preferring that which overhangs a well or rivulet, forming it of grass in the shape of a large bottle, suspending it on the branches so as to be firm and yet to rock with the wind, and placing it with its entrance downwards, to secure it from birds of prey. This bird is taught with ease to fetch a piece of paper, or any small thing which his master wants. If a ring be dropped into a deep well, and a signal given to the bird, he will fly down with astonishing celerity, and bring it up to his master with apparent exultation; and it is confidently asserted, that if a house or any other place be shewn to him once or twice, he will carry a note thither immediately, on observing a proper signal. They are also trained by the youthful libertines of Bunnars to pluck off the pieces of gold called *ticas*, placed by way of ornament between the eye-brow of their mistress, which they bring in triumph to their lovers. The baya's natural food is grasshoppers and other insects; but it subsists, when tame, on pulle macerated in water. The female lays many beautiful eggs, resembling large pearls: their white, when boiled, is transparent, and the flavour of them is exquisitely delicate. Asiatic Researches, vol. ii. p. 109.

BAYAGARES, in *Geography*, a town on the island of St. Domingo.

BAYAMO, called also *St. Salvador*, a town in the eastern part of the island of Cuba, having the town of Almo to the west, and St. Barbara to the south. It lies on the east side

of Estero river, about 20 miles from the sea; and it gives name to a channel, that runs between the numerous small islands and rocks, called "Jardin de la Reyna, or Queen's gardens," on the north-west, and the shoals and rocks that line the coast on the south-east side of it, from the bold point called Cabo de Cruz.

BAYARD, or BAIARD, in some *Old Writers*, is an appellation for a horse. Hence the phrases, blind bayard, bayard's watering, bayard's green, &c.

BAYDER, in *Geography*, a small town of the Crimea or Taurida, which gives name to the delightful valley, called by the natives the "Tauric Arcadia," the "Crimean Tempe," &c. which is watered by two gentle murmuring streams. It is of an oval form, about 20 miles long, and surrounded by high mountains, covered with beautiful woods, intermixed with odoriferous flowering shrubs. It contains a number of Tartar villages, romantically situated and inhabited by the families of shepherds and husbandmen.

BAYDER, *Cape*. See BAJADOR.

BAYEN, PETER, in *Biography*, a French chemist, was born at Chalons in 1725. In 1749, he served under Charas in pharmacy. He gave analyses of the mineral waters of France; and he wrote memoirs on marbles, serpentine stones, porphyries, granites, jaspers, schists, and iron spar. He doubted the existence of the phlogiston of Stahl; and by operating on mercurial precipitates, he found that what are called metallic oxides owe their state, when obtained by calcining metals, to the absorption of one of the constituent ingredients of atmospheric air. This chemist also discovered the fulminating property of metals, when mixed with a very little sulphur; and he shewed that tin was not necessarily contaminated by arsenic; that what is used by potters contains copper and antimony, by which it is rendered hard; zinc, by which it is whitened; bismuth, by which it is rendered sonorous; and lead, in order to diminish the price. Bayen died at the age of 72 years. *Mem. de l'Institut. National, &c. vol. ii.*

BAYER, GOTTLIEB SIEGFRIED, a celebrated philologist, was born at Konigsberg, in Prussia, in 1694, and studied, chiefly, the languages, first in his native city, and afterwards at Dantzig, Berlin, and Leipsic; at which latter place he took the degree of master of arts in 1717. On his return to Konigsberg in the following year, he was appointed librarian of the public library. In 1726 he removed to Petersburg, became professor of the Greek and Roman antiquities in the Academy of Sciences, and acquired an extensive knowledge of the Chinese and other Asiatic languages. In 1730 he was chosen member of the Academy of Sciences at Berlin; and in 1731 invited to be professor of eloquence at Halle; which he was not allowed to accept, but continued in Russia with a considerable increase of salary. He died at Petersburg in 1738. His numerous dissertations on different subjects are inserted in Lillenthal's "Select. Histor. & Liter." the "Acta Eruditorum," and the "Comment. Acad. Petropol." &c. His "Museum Sincicum," published in 1732, in 2 vols. 8vo. is a work of great learning and ingenuity. *Gen. Biog.*

BAYER, JOHN, a German astronomer, flourished at the close of the 16th and commencement of the 17th centuries; but the time and place of his birth are not ascertained. Some have supposed that he was the grandfather of the subject of the preceding article, and that he was born at Augsburg. It was at Augsburg, however, that he published, in 1603, his excellent and useful work, entitled "Uranometria." This is a large celestial atlas, consisting of folio charts of all the constellations, with a nomenclature, collected from all the tables of astronomy, ancient and modern,

improved by his own useful invention of denoting the stars in each constellation by Greek letters, in alphabetical order according to the magnitude of each. The stars are thus as easily distinguished as if each of them had an appropriate name; and the utility of this mode of classification has been so much approved, that it has been retained, since Bayer's time, in all the atlases, catalogues, and celestial globes through the scientific world. This valuable work was gradually improved and augmented by the author himself. In the year 1627 Julius Schiller, a civilian, projected by the suggestion of Bayer, and published his *Uranographia*, under the title of "Cælum Stellatum Christianum;" in which he rejected the heathen names, characters, and figures of the constellations, and inserted in their stead others taken from the scriptures. Accordingly he placed the twelve apostles in the zodiac; and he deduced the southern constellations from the Old Testament, and the northern ones from the New Testament. This innovation, however, tended to embarrass astronomers, and was never adopted. The ancient names were therefore restored in the later editions of the *Uranometria* of 1654 and 1661. Montucla, *Hist. des Math. tom. ii. p. 333.* See CATALOGUE.

BAYERSDORF, in *Geography*, a town of Germany, in the circle of Franconia, and principality of Bayreuth, seated on the Rednitz, with a tribunal of justice and a large synagogue; 4 miles north of Erlang.

BAYETTE, in *Ichthyology*, a French name of the species of *Silurus* observed by Sonnini in the Nile, and figured pl. 27 of his "Voyage en Egypte." It is the same kind which Forskall calls *Silurus bajad*. It grows to a large size, but its flesh is not much esteemed.

BAYEUX, in *Geography*, a town of France, and principal place of a district, in the department of Calvados. Before the revolution it was the capital of Bessin, in the province of Normandy, the seat of a governor and the see of a bishop, whose diocese included 611 parishes. The cathedral is much admired. The principal commerce is leather. It is seated on the river Aure, about 4 miles from the sea. The place contains 9970 and the canton 15,261 inhabitants, in a territory of 80 kilometres, including 19 communes. N. lat. 49° 16' 30". W. long. 0° 42' 51".

The celebrated tapestry of Bayeux, which still exists, and is publicly exhibited at stated periods in the cathedral of the city, is a very curious monument of the state of the art of embroidering at the time of the Norman conquest. It is a web of linen, nearly two feet in breadth, and 442 in length, embroidered with the history of that memorable expedition, from the embassy of Harold to the Norman court in 1065, till his death in the following year. The scenes of this busy period are successively exhibited, and consist of many hundred figures of men, horses, beasts, birds, trees, houses, castles, and churches, with inscriptions over them explanatory of their meaning and history. This work is understood to have been performed under the direction of Matilda, consort to William I. and was not improbably executed by the hands of English women, whose superiority in performances of this kind was then universally acknowledged. The entire contents of this tapestry are represented in a series of engravings, which may be seen in Montfaucon, tom. 1 & 2; and Ducarel, *Anglo-Norman Antiquities*, App. No. 1.

BAYF, or BAIF, LAZARE DE, in *Biography*, was the son of a gentleman of Anjou, and having studied under Budæus and others, he pursued the profession of the law at Paris; and afterwards travelled into Italy, and learned Greek under Musurus, a Candiote, at Rome. Upon his return he devoted himself to literature, and retired to his own estate at Arjou. In 1531 he was sent by Francis I. as ambassador to Venice;

in 1539 he was deputed on public business to Germany; and after his return was made master of requests, and had also the abbacies of Grenetiere and Charroux. The precise time of his birth and death is unknown. As a writer he seems to have been the first who introduced the Greek tragedy among his countrymen, by his translations of the "Electra," of Sophocles, and the "Hecuba," of Euripides, into French verse. He was also the author of two learned treatises, "De re veterinaria, et de vniculis," Basil, 1526, 4to. and "De re Navali," Par. 1536, 4to.; and he translated some Lives of Plutarch. *MORRI.*

BAFF, *JAN ANTHONY.* See BAIF.

BAYJA, BAJA OR BAIA, in *Geography*, a town of Africa, in the kingdom of Tunis, not far from the frontiers of the Algerines, is supposed to be the ancient "Vacea" of Sallust, the "Oppidum Vagense" of Pliny, and the "BAFA" of Plutarch; and it is at this day, as it was formerly, a place of great trade, being the chief mart of the whole kingdom, particularly for corn, which is supplied in such abundance by the plains of Busdera, along the banks of the Mejerda, that the Tunisiens say proverbially concerning it, that if there was another such town for plenty of corn, it would become as common and cheap as sand. It has also every summer a public fair, to which the most distant Arabian tribes resort with their flocks, their manufactures, and their families. However, the inhabitants, subject to the oppressive exactions of government, and the frequent incursions of the Arabs, who are numerous and powerful in its vicinity, are extremely poor, and a great part of their ground remains uncultivated. It is seated on the declivity of a hill in the road to Constantina, about 10 leagues from the northern coast, and 36 W.S.W. from Tunis; and has the convenience of being well watered. On the summit of the hill is a citadel of no great strength. The walls, which are raised out of the materials of the old Roman Vacea, are still entire, and have some ancient inscriptions. N. lat. 36 42'. E. long. 9 25'. *Shaw's Travels*, p. 92.

BAYLE, *Pierre*, in *Biography*, an eminent critic and philosopher, was the son of a protestant minister at Carla, in the county of Toix in France, where he was born in 1647. Whilst he pursued his studies, first under his father, and afterwards in the protestant academy at Puy-laurens, whither he was sent in 1666, his application was so intense and unintermitting as to injure his health. His reading was very extensive; but his favourite authors were Plutarch and Montaigne. From Puy-laurens he removed in 1669 to the university of Toulouse, with the hope of enjoying superior advantages for improvement, and of making more rapid progress. Here he attended the philosophical lectures that were read in the college of the Jesuits; and his disputes with a parish priest, who lodged in the same house with him, first led to increase the scruple which he had already begun to entertain against the protestant religion, and at length to induce him to avow himself a Roman Catholic. The change of opinion, which seemed to be on his part the result of inquiry and of conviction, although produced by arguments which his more exacting mind would discover to be inadequate, manifested an integrity of mind. However it so grieved and offended his father, that he withdrew from him the necessary means of subsistence. In these destitute circumstances, he was miraculously relieved by the bishop of Rieux, who must unquestionably have been gratified by the accession of such a convert. Upon further inquiry Bayle found, that he had been too precipitate in abandoning his religion; and he therefore determined to leave Toulouse after having continued there about eighteen months, and to renounce the errors into which he had been betrayed. Having made his abjuration in the presence of his eldest

brother and some other ministers, he immediately set out for Geneva, in order to prosecute his studies. Here he soon found reason for relinquishing the philosophy of Aristotle, to which he had been zealously attached, and to adopt that of Descartes. His reputation introduced him to an acquaintance with several persons of eminence at Geneva, and particularly with Mr. James Basnage; between whom and Bayle an intimate friendship subsisted as long as they both lived. At this time Bayle acquired the means of support by private tuition; but dissatisfied with this mode of life, which did not suit the independence of his spirit, nor correspond to his desire of further improvement, he wished to exchange it for some situation better adapted to his genius and views. After a few years employed in this way an opportunity offered for gratifying his wishes. In the spring of 1675 he removed to Paris, and undertook the tuition of Messrs. de Beringhen, brothers to a counsellor in the parliament of Paris. From this city, however, to which his wishes had been directed, he soon removed, at the desire of his friend Mr. Basnage, in order to offer himself as a candidate for the vacant professorship of philosophy in the protestant university of Sedan. His views were favoured by Mr. Jurieu, the professor of divinity, who favoured Bayle, partly because he was anxious to exclude another candidate. Bayle evinced a decided superiority to the other competitors in a public disputation, and having secured his election, began his lectures, Nov. 11, 1675. By the assiduity with which he discharged the duties of his public office, and by the amiable temper which he manifested in private life, he gained great reputation, and many friends at Sedan; and he devoted his hours of leisure to compositions of the critical kind, which habituated him to that accuracy and depth of reasoning, that afterwards constituted his distinguishing excellence. The first work, which he committed to the press, was his Observations on the canon that made its appearance in December 1680; the first edition of which was printed at Rotterdam in 1682, without a name, and under the assumed character of a Roman catholic, under the title of "Lettre a M. L. A. D. C. docteur de Sorbonne," &c. and Cologne was the pretended place of publication. In this treatise, afterwards called "Pensées sur la Comete," &c. many delicate questions are discussed, relative to supposed miracles wrought, and prefaces given among the heathens, to the comparison of the mischiefs of atheism with those of idolatry, and to other points which afforded a range to the author's spirit of free inquiry. In 1681 the university of Sedan was suppressed by an arbitrary edict of Lewis XIV.; and Mr. Bayle, deprived of his professorship, was reduced to the necessity of seeking some new employment. At this time, the magistrates of Rotterdam established a "Schola Illustris;" and Bayle was appointed professor of philosophy and history; and at his recommendation Jurieu was engaged as professor of divinity. In December 1681, Bayle entered on his new office. In the next year he published a criticism on Maimbourg's "History of Calvinism," in the form of letters, under the title of "Critique Generale de l'Histoire du Calvinisme de M. Maimbourg." This work written in a lively manner, and with a vein of railery, was read with pleasure by persons of the reformed religion, and it was particularly agreeable to the prince of Condé, who was no friend to Maimbourg. Although it was publicly condemned at Paris, it became popular in Holland, and a new edition of it, with enlargements, was speedily published. Jurieu had also published a refutation of Maimbourg; but being much less popular than Bayle's, the author began to regard his brother professor with a considerable degree of jealousy.

jealousy. In 1684 Mr. Bayle was induced, by the freedom of the press in Holland, to print several controversial works, that were sent him from France; and particularly "A collection of some curious pieces relative to the philosophy of Descartes," with a preface, giving an account of these pieces, and containing some reflections on the inquisitorial power exercised in France over books on scientific topics. In this year he began his monthly literary journal, entitled "Nouvelles de la Republique des Lettres," which was written in a manner that served not only to support, but to increase the reputation which he had already gained. About this time he declined an offer of the professorship of philosophy at Franeker, though it was proposed very much to augment the salary which he received at Rotterdam. His "Nouvelles Lettres de l'Auteur de la Critique generale de l'Histoire du Calvinisme de M. Maimbourg," which was a continuation or second part of his former work, and printed in 1685, excited much less attention than the first. Having given an opinion in favour of M. Malebranche in his account of Arnauld's book written against him, he was engaged in a dispute with the latter; and in 1686 he had a correspondence with Christina, queen of Sweden, concerning a letter of her majesty's, which he had mentioned in his journal, and which condemned the persecution suffered by the protestants in France. This letter, he had said, was "the remainder of the Protestant religion in her." This expression had given some slight offence to the queen, and Bayle addressed to her a letter of apology. In an ample reply the queen declared her satisfaction with his excuses; and adds, "I will lay a penance upon you which is, that for the future you send me all the curious books, in French, Latin, or Italian, upon all kinds of sciences and all sorts of subjects, provided they be worth reading." Her majesty made no exception of romances or fables, and particularly requested books of chemistry, and the author's journal. Bayle was much affected by the revocation of the edict of Nantes, and the cruelties exercised against the protestants in France for the purpose of inducing them to abjure their religion. Upon this conduct he made some just and pointed reflections in his journal; and in 1686, he published a pamphlet, entitled, "Ce que c'est que la France toute Catholique sous le regne de Louis le grand," or, a character of France, become entirely catholic under Louis the great. It was published without his name; and contained very severe censures on the treatment which the protestants received, as well as on the iniquity and folly of all attempts to procure conversion by force. This was soon followed by his famous work, intitled, "Commentaire Philosophique," &c.; or, a Philosophical Commentary on the words "Compel them to come in." This work was an elaborate defence of toleration, which formed the first part of it; and in the second the author answers all the objections against it. It was followed in the next year by a third part, containing a confutation of St. Augustin's apology for persecution. The free sentiments expressed in this work gave offence to Jurieu; and though he was ignorant of the author, who had taken pains to conceal his name, he wrote a treatise against it. Bayle's health was so much impaired by the application devoted to the composition of his commentary, and probably also by the vexation occasioned by his controversy relating to queen Christina, that he found it necessary to discontinue his literary journal, in the conduct of which he had obtained numerous testimonies of approbation, not only from private persons, but from several societies of learned men, and particularly from the French Academy and the Royal Society of England. His situation also at Rotterdam became unpleasant to him, on account of

the quarrelsome disposition of Jurieu and some other circumstances; and he wished to leave it: but disappointed in his views of a removal to Berlin, he was under a necessity of continuing at Rotterdam. In 1688, Bayle published a fourth part of his philosophical commentary, in which he examined and confuted the persecuting principles maintained by Jurieu in his two treatises intitled "Vrai Systeme de l'Eglise," and "Droits des deux Souverains." Another circumstance also occurred which served to widen the breach between them. Jurieu, in his interpretation of some of the scripture prophecies, had presaged the approaching triumph of the protestants in France, and he had published some free opinions, with a view of preparing the people for this great revolution, on the right of subjects to resist by force of arms the tyranny of sovereigns over their consciences. Among other books that were written in order to counteract the effect of Jurieu's publication, the most remarkable was a treatise, intitled, "Avis aux Refugiez," or Important Advice to the Refugees, concerning their approaching return into France, and printed in 1690. The author personated a catholic, and his name was concealed; but Jurieu, attributing it to Bayle, was much incensed, and took occasion to attack his religious and political character, publicly accused him before the magistrates of Rotterdam, and attempted to get him dismissed from his professorship. Bayle made a spirited defence, and his cause was espoused by several able writers. The magistrates conducted themselves with impartiality and moderation; and the dispute subsided. Although Mr. Bayle denied his having been the author of the above mentioned treatise, there is reason to believe that the suspicions and charges of Jurieu and others were not unfounded. Bayle had been accustomed to write under fictitious characters, and on opposite sides of the same question; and this is a circumstance which has been alleged, and not without reason, against his character. Besides, it is not unlikely that national prejudice and early attachment might have induced him to vindicate the rights and interests of the French monarchy. However this be, he was afterwards suspected of being concerned in an intrigue to bring about a separate peace between France and the United States; and king William, dreading the consequences of this project of peace, gave orders to the magistrates of Rotterdam to deprive him of his professorship and of his pension. This event took place in November 1693; and Mr. Bayle, declining offers that were made him of entering into new engagements, lived in retirement.

The project of his "Critical Dictionary" had been announced in 1690: and in 1692, his plan, under the title of "Projet et Fragmens d'un Dictionnaire Critique;" but as it was disapproved by the public, he commenced the work, as it has since appeared, on a new plan. Accordingly the first volume appeared in August 1695. Such was the favourable expectation entertained concerning this work, that the duke of Shrewsbury, an English nobleman, distinguished by his talents as well as by his high rank and employments, expressed a wish to have it dedicated to him, and by means of Mr. Bafnage offered Bayle 200 guineas as an acknowledgment for this distinction. Mr. Bayle declined the offer, and maintained his independence. The second volume, which completed the first edition, though it has since appeared in a more enlarged form, was printed in 1697; and the sale of the whole was uncommonly rapid and extensive. Whilst Bayle professed to supply the numerous defects of Moreri's dictionary, and to correct its errors, it seems to have been his real purpose "to make his dictionary a kind of common place for all the critical and philosophical knowledge, all the curious information as to fact, and all the subtlety of

argumentation he had spent his life in acquiring." The text is concise; but the notes, which contain much valuable information, are spun out to a tiresome and uninteresting length. This dictionary, generally so well received, and containing a variety of unexceptionable matter, displayed freedoms of several kinds, both as to sentiment and diction, which were not likely to escape censure. Jurieu, the avowed and implacable antagonist of Bayle, attacked it from the press, and endeavoured to procure its condemnation from the ecclesiastical assemblies. The consistory of the Walloon church of Rotterdam contented itself with the detail of several objections against particular articles, for which indeed no satisfactory apology can be offered; but satisfied with Mr. Bayle's promise of amendment in a second edition, they proceeded no further. In 1702, Mr. Bayle published a second edition, with many additions. In the following year he wrote a volume entitled, "Réponse aux Questions d'un Provincial," containing an entertaining and instructive variety of historical, critical, and literary observations, to which he added a second and third volume in 1705, and a fourth in 1706. In 1704, he published "A Vindication of his Thoughts on Comets," which involved him in new disputes, particularly with the ingenious and learned Le Clerc. With his fame his adversaries multiplied; and attempts were made to prejudice lord Sunderland, the English minister of state, against him, and to procure his exclusion from the United States, as a man who was not only an enemy to religion, but chargeable with treason against the government. The storm, however, was diverted by the influence of lord Shaftesbury. He was offered at this time a liberal provision and hospitable refuge by several persons of distinction in England; but he declined all these generous proposals. The decline of his health made him averse from changing his situation; and towards the close of the year 1706, he was reduced by a pulmonary disorder, which was hereditary, to a very weak state. The approaches of death were regarded by him with philosophical firmness, nor did he intermit his literary labours to the last period of his life. In the morning of December 28, 1706, when his landlady entered his chamber, he asked her in a faint voice if his fire was kindled, and immediately expired; having attained the age of somewhat more than 59 years.

By his panegyrists, Mr. Bayle's talents, learning, and powers of reasoning have been unduly extolled; by his adversaries they have been no less unjustly degraded. M. le Clerc, who belongs to the latter class, and whose judgment is evidently biased by prejudice, has not allowed him the merit to which he is unquestionably entitled. He represents him as so ignorant of geometry, that, according to his own confession, he could never understand the demonstration of Euclid's first problem, and as having written in the latter period of his life against the evidence of mathematical demonstration. As a reasoner, he says, he had no settled principle, and he argued only with a design to puzzle the unlearned reader. His arguments, he adds, contain much more froth and empty words than sound reasoning. He was unacquainted with the books written in England upon experimental philosophy, and understood only a little of the philosophy of Des Cartes. He had perused only a few translations of English books upon metaphysical subjects. His knowledge of divinity was derived from his catechism, from sermons, or from a few French books. In ecclesiastical antiquity, and in that of Greece and Rome, he was indifferently skilled; law and physic were to him hidden treasures; and his knowledge of modern history was partial and imperfect. He had collected with great labour a thousand literary trifles and inconsiderable circumstances; and though he wrote in a very agreeable manner, it was only when he

was not in a passion. Saurin says of him, that he was one of those extraordinary men, whose opposite qualities leave room to doubt whether we ought to look upon him as the best or the worst of men. On the one hand, he was a great philosopher, knowing how to distinguish truth from falsehood, and perceiving at one view all the consequences of a principle and their connection; and on the other hand, a great sophist, confounding truth with falsehood, and deducing false inferences from his assumed principles. On the one hand, a man of learning and knowledge, who had read all that can be read, and remembered all that can be remembered; and on the other, ignorant, or feigning ignorance, with regard to the most common subjects, proposing difficulties which have been a thousand times solved, and urging objections which a school-boy could not make without blushing. On the one hand, attacking the most eminent men, opening a large field for their labours, and giving them a great deal of trouble to vanquish him; and on the other, using the worst authors, to whom he was lavish of his praises, and disgracing his works by such names (meaning probably Brantome and Rabelais) as a learned mouth never pronounced. On the one hand, free at least in appearance, from all the passions which are inconsistent with the spirit of Christianity, grave in his discourses, temperate in his diet, austere in his manner of living; and on the other, employing all the strength of his genius to overthrow the foundations of moral virtue, and attacking as much as lay in his power, chastity, modesty, and all the Christian virtues. On the one hand, appealing to the throne of the most severe orthodoxy, going to the purest springs, and borrowing his arguments from the least suspected writers; and on the other, following the paths of heretics, proposing again the objections of the ancient heresiarchs, lending them new arms, and collecting together in one age all the errors of past ages. The eloquent preacher closes this detail with the following benevolent wishes: "May that man, who had been endowed with so many talents, be acquitted before God of the ill use he made of them! May that Jesus, whom he so often attacked, have expiated his sins!"

Voltaire, speaking of his Critical Dictionary, says, "It is the first work of the kind in which a man may learn to think." He censures, however, those articles which contain only a detail of minute facts, as unworthy either of Bayle, an intelligent reader, or posterity. "In placing him," adds this author, "among the writers who do honour to the age of Louis XIV. although a refugee in Holland, I only conform to the decree of the parliament of Toulouse; which, when it declared his will valid in France, notwithstanding the rigour of the laws, expressly said, "that such a man could not be considered as a foreigner." "Without acourtry, or a patron, or a prejudice," says Gibbon in his "Miscellaneous Works," "Bayle claimed the liberty, and subsided by the labours of his pen." The inequality of his voluminous works is explained and excused by his alternately writing for himself, for the bookellers, and for posterity; and if a severe critic would reduce him to a single folio, that relief, like the books of the Sibyl, would become still more valuable. The ancient paradox of Plutarch, continues this writer, that atheism is less pernicious than superstition, acquires a tenfold vigour when it is adorned with the colours of his wit, and pointed with the acuteness of his logic. His "Critical Dictionary" is a vast repository of facts and opinions, and he balances the false religions in his sceptical scales, till the opposite quantities, adopting the language of algebra, annihilate each other. The wonderful power which he so boldly exercised of assembling doubts and objections had tempted him jocosely to assume the title of the *Uranographus*; *Ziv*; the cloud-compelling Jove; and in a conversation with

the ingenious abbé, afterwards cardinal, de Polignac, he freely disclosed his universal Pyrrhonism. "I am truly (said Bayle) a protestant, for I protest indifferently against all systems and all sects."

Upon the whole we may observe, that in private life Mr. Bayle was sober and temperate, modest and unassuming, disinterested and sincere. As a writer, his sentiments were fluctuating and sceptical, and he is not unjustly placed at the head of modern sceptics. Although he often takes pleasure in propagating his doubts, and perplexing his readers with a contrariety of opinions, yet he frequently combats hurtful prejudice and unwarrantable dogmatism. In many articles of his Dictionary, it does not appear to what country, sect, or persuasion he belongs; and this circumstance has been regarded by some persons as constituting a qualification for historical discussion. For the prudence of his ideas, for his notorious want of delicacy, and for his disposition to introduce offensive topics, his most partial advocates will find it difficult to devise an apology. The pernicious tendency of his sceptical system, with regard to religion and society, is well exposed by lord Lyttleton in his "Dialogues of the Dead," Dial. 24. Works, vol. ii. p. 315. "You have endeavoured," says this excellent writer, personating Locke, "and with some degree of success, to shake those foundations, on which the whole moral world, and the great fabric of social happiness, entirely rest; how could you, as a philosopher, in the sober hours of reflection, answer for this to your conscience, even supposing you had doubts of the truth of a system, which gives to virtue its sweetest hope, to impatient vice its greatest fears, and to true penitence its best consolations; which restrains even the least approaches to guilt, and yet makes those allowances for the infirmities of our nature, which the stoic pride denied to it, but which its real imperfection, and the goodness of its infinitely benevolent Creator, so evidently require?" As to his style of writing, it is natural and lively, but not always correct, and inclining to prolixity; and his manner is rather satirical and humorous, than inflammatory. The best editions of his Dictionary are those of 1720 and 1740. The English translation of Mr. de Maizeaux is reckoned a good one. A new and accurate translation of Bayle's dictionary is incorporated in the "General Dictionary, Historical and Critical," with reflections on such passages of Mr. Bayle, as seem to favour scepticism and the Manichee system. Maizeaux's Life of Bayle. Gen. Dict. Gen. Biog.

BAYLE, FRANCIS, many years professor in medicine and philosophy at Toulouse, and author of numerous learned and ingenious works, died September 24th, 1709, aged 87 years. The most esteemed of his productions are, "De Menstruis Mulierum," "Sympathia partium corporis humani cum utero, usu lactis ad tabidos," &c. Tolos. 1670. 4to. He attributes the menstrual flux to a fermentation occurring periodically in the mucous sinuses in the uterus, distending and opening their mouths, which collapse and close as soon as the fermentation subsides; a notion as philosophical as the periodical plethora of Friend. "Dissertationes physicae sex," Tolos. 1677, 12mo. The third dissertation is on physiognomy, in which the author had faith, as well as in the power of the imagination of the mother, in marking and mutilating the foetus in utero. "Discours sur l'expérience et la raison," Paris, 1675, 12mo. He here asserts the superiority of experience over theory in medicine. "Histoire d'un enfant qui a demeuré 25 ans dans le ventre de sa mère," Tolos. 1678, 12mo. The foetus was found uncorrupted, surrounded by a firm crust or shell. For the titles of the remainder of this author's works, which were collected and published in four volumes, 2to. in the year 1701, at Toulouse, see Hall. Bib. Anat. & Floy's Dict. Hist.

BAYLE, in *Fortification*, the space outside the ditch of our ancient fortresses, commonly surrounded by strong palisades, and sometimes by a low embattled wall.

BAYLY, LEWIS, in *Biography*, an English bishop in the reign of James I., was born at Carmarthen, in South Wales, and educated at Oxford. Being an eminent preacher, he was appointed one of the king's chaplains, and promoted to the see of Bangor in 1616. In 1621 he was committed to the Fleet, probably on account of his concern in prince Henry's match with the Infanta of Spain. He died in 1632, and was buried in the church of Bangor. This prelate was the author of a famous piece called "The Practice of Piety," which has been so popular that the edition of 1734 was the 59th. It was translated into Welsh and also into French in 1733; and a complaint was alleged against it, that the common people regarded its authority as equal to that of the Bible. Biog. Brit.

BAYNA, in *Geography*, a town of Hungary, in the Bodok district, the inhabitants of which are principally farmers and husbandmen.

BAYNES, a town of France, in the department of the Calvados, and chief place of a canton, in the district of Bayeux, $3\frac{1}{4}$ leagues W.S.W. of Bayeux.

BAYNET, a town and bay on the south side of the island of St. Domingo, $4\frac{1}{2}$ leagues from Petit Guave, on the north side of the island, and about 8 leagues west of Jackmel. N. lat. $18^{\circ} 17'$.

BAYON, a town of France, in the department of the Meurte, and chief place of a canton in the district of Lunéville, seated on the Moselle. The place contains 793 and the canton 7657 inhabitants, on a territory of 195 kilometres including 25 communes. N. lat. $48^{\circ} 30'$. E. long. $14^{\circ} 42'$.

BAYONA, a sea-port town of Spain in Galicia, situated in a small gulf, near the mouth of the Minho, with a convenient harbour. The coast near it abounds with excellent fish; and the land, watered by many springs, is fertile. N. lat. $42^{\circ} 15'$. W. long. $9^{\circ} 30'$.

BAYONA Bay and Islands, lie on the south part of the great bay of Vigo, and to the east of cape Paffelis, on the west coast of Spain, in the Atlantic ocean. The bay forms the harbour of the town of Bayona. The two islands are situated a little to the west of north from the town. They were anciently called "Insulae Deorum," or the isles of the Gods. A large rock, with many small ones about it, lies at the south end of Bayona islands.

BAYONET, in the *Military Art*, signifies a short broad dagger, used by all modern armies, since the sword has been laid aside, as a necessary appendage to the infantry. The origin of the term is not correctly known; but is most probably derived from having been first manufactured at the city of Bayonne, or originally invented by an engineer of that place.

Bayonets were formerly made with a round handle, adapted to the bore of a firelock, so as to be fixed there after the soldier had discharged his piece. They are now constructed with iron handles and rings which go over the muzzle of the firelock, and are screwed fast; thus enabling the soldier to fire and load with his bayonet fixed, and ready to act, if necessary, against horse. This is particularly of service to dragoons and fusileers, after they have expended all their powder and ball.

The use of the bayonet fastened on the muzzle of the firelock was a great improvement, first introduced by the French, and to which, according to the chevalier de Folard, (Comm. sur Polyb. vol. i. p. 135. edit Paris, 1727), they owed in a great measure their victories obtained in the war of 1689. To its neglect in the next war, the same writer attributes most of the losses they sustained. It is to marshal Catinat, the French are indebted for the great superiority they

they possess in the management of this weapon. During greater part of the seventeenth century, one-half of a battalion was armed with pikes, the other carried muskets; but the feeble effect of these last, and the frequent muzzling fire from the awkward use of matchlocks, suggested the improvement of firelocks with bayonets, which unite the two arms in the most effectual manner.

The battle of Maraglia, in 1693, was the first occasion on which Catinat put this improvement in practice, against the Spaniards and Savoyards. The French infantry marched boldly up to the enemy, received their fire, and without returning a shot, charged furiously with their bayonets. The slaughter was horrible, and the route of the allies complete. The same method was adopted by marshal Tallard at the battle of Spire in 1703: and by the duc de Vendôme at the battle of Calcinato in Italy, in 1705. On both occasions success was the same as in the former instances. Of late the bayonet has come into very general use; and battles of importance have been gained by it without the discharge of a musket. The late king of Prussia, although he relied greatly on the running fire which he taught his troops to practise with such terrible effect, yet highly recommended the charge with the bayonet as the most effectual means of throwing a wavering enemy into irreparable disorder.

But the French, whose natural genius seems particularly adapted to the use of this weapon, have not only invented, but have also employed it with the most astonishing success. In the last war, the favourite maxim of their generals, instead of losing time by cannonading, and firing on the enemy with musquetry, has been to bring the issue of the affair as early as possible to the point of the bayonet. The battles of Jemappe, Hagenau, and Ettingen, in particular, not to mention many others, were almost exclusively gained by it; and the Spaniards, throughout the dreadful contests between their own and the French forces, at the conclusion of the campaign of 1794, were uniformly defeated by the use of the bayonet alone.

BAYONNE, in *Geography*, a pleasant sea port town, on the western coast of France, in a corner of the bay of Biscay. It is the chief place of a district in the department of the lower Pyrenées, and situated at the conflux of the rivers Adour and Nive, about a league from the sea, with a good harbour, and having a narrow and dangerous entrance. The Adour divides the suburb from the citadel, and through the town itself flows the river Nive. A wooden drawbridge, which admits vessels to pass, connects the suburb with the town. The style of the buildings at Bayonne is principally Spanish, with balconies at every window, and arcades before the houses. From the "place de la Liberte," which is surrounded by very neat houses, and appears very gay, a gate leads to a pleasant promenade on the Adour. The trade of this town is very considerable, on account of its vicinity to Spain, and of the great quantity of wines which are brought hither from the adjacent country, and which the Dutch have been accustomed to take in exchange for spices and other commodities. Mails are also brought from the Pyrenées by means of the Nive, the Gave of Oleron, and the Adour, to Bayonne, whence they are shipped to Brest, and other ports. The common people generally speak the old biscayan or basque language. At Bayonne, and in the neighbouring country, the young women are very beautiful, combining with a tall slender shape great symmetry of features, a fair complexion, and black lively eyes. Before the revolution Bayonne was the see of a bishop, suffragan of Auch. In 1784, it was declared a free port. It is divided into the N. E. and N. W. cantons, the former containing 10,088 inhabitants in 5 communes, and the latter 10,750 in 4 communes. Each canton includes 65 kilometres.

The population of the place is said to amount to 13,190 persons. N. lat. $43^{\circ} 29' 21''$. W. long. $1^{\circ} 30' 6''$.

BAYS, in *Commerce*, a kind of coarse, open, woollen stuff, having a long knap; sometimes frized on one side, and sometimes not frized, according to the uses for which it is intended.

This stuff is without wale, being wrought on a loom with two treddles like flannel.—It is chiefly manufactured about Colchester, and Bocking in Essex; and in Flanders, about Lille and Tournay, &c.

This manufacture was first brought into England, together with that of says, ferges, &c. by the Flemings, who fled hither from the persecution of the duke of Alva, about the fifth year of the reign of queen Elizabeth, and had afterwards peculiar privileges granted them by the 12 Car. II. in 1660. The exportation of bays was formerly much more considerable than it is now, as the French manufacturers have learned to imitate them, and have set up manufactures of their own at Nismes, Montpellier, &c. However, a considerable quantity of bays is still exported to Spain, Portugal, and Italy. Their chief use is for the religious, and for linings in the army; the looking-glass makers also use them behind their glasses, to preserve the tin or quicksilver; and the case-makers to line their cases.

The breadth of bays is commonly a yard and half, yard and three quarters, or two yards; by forty-two, or forty-eight in length: those of a yard and three quarters are most proper for the Spanish trade.

BAYS, in *Geography*, a town of France, in the department of the Mayenne, and chief place of a canton, in the district of Mayenne, $3\frac{1}{2}$ leagues E. S. E. of Mayenne. The place contains 2,100, and the canton 14,470 inhabitants; in an extent of 192½ kilometres and 9 communes.

BAZA, or **BAZAR**, in *Commerce*, fine spun cotton, which comes from Jerusalem, whence it is also called Jerusalem cotton.

BAZA, in *Geography*, a town of Germany, in the duchy of Carniola, 7 miles S. S. W. of Feldes.

BAZA, or **Baça**, a town of Spain, in the province of Granada, between Guadix and Huescar, supposed to be the ancient Balthi. N. lat. $37^{\circ} 31'$. W. long. $2^{\circ} 31'$.

BAZADOIS, a district of the province of Guyenne, before the revolution, situated between Agenois, Condomois, and Guyenne. The soil is sandy and unproductive. The capital is Bazas.

BAZAR, or **BASAR**, in *Commerce*, a denomination among the Turks and Persians, given to a kind of exchanges or places where their finest stuffs and other wares are sold. They are also called *bez shins*.

The word bazar seems of Arabic, or rather of Persian and Turkish origin, where it denotes *sale*, or exchange of goods.

Some of the eastern bazars are open, like the market-places in Europe, and serve for the same uses, more particularly for the sale of the more bulky and less valuable commodities. Others are covered with lofty ceilings, or even domes pierced to give light; and it is in these the jewellers, goldsmiths, and other dealers in the richer wares, have their shops.

The bazar or maidan of Isphahan is one of the finest places in all Persia, and even surpasses all the exchanges in Europe; yet, notwithstanding its magnificence, it is excelled by the bazar of Tauris, which is the largest that is known, having several times held thirty thousand men ranged in order of battle.

At Constantinople there are the old and the new bazar, which are large, square buildings, covered with domes, and sustained by arches and pilasters; the former chiefly for arms, harnesses, and the like; the latter for goldsmiths, jewellers, furriers, and all sorts of manufactures. For an account of the bazars of Aleppo, see **ALEPPO**.

BAZAR, or **Bazaar**, a town of Hindoostan, 20 miles N. E.

of Attock, seated near the Indus, Nilab or Sinde river. N. lat. $33^{\circ} 45'$. E. long. $71^{\circ} 18'$.

BAZARUTO, or *Bocica islands*, lie off the south-east coast of Africa, in the Indian ocean, opposite to Asuca bay. S. lat. $21^{\circ} 55'$. E. long. $34^{\circ} 30'$.

BAZAS, a city of France, and principal place of a district, in the department of the Gironde, before the revolution the capital of Bazadois, and see of a bishop. It is seated on a rock. The place contains 4215, and the canton 9,862 inhabitants, in 13 communes and a territorial extent of 210 kilometres. N. lat. $44^{\circ} 26'$. W. long. $0^{\circ} 30'$.

BAZELLE, St., a town of France, in the department of the Lot and Garonne, in the district of Marmande, $\frac{1}{4}$ league N. W. of Marmande.

BAZGENDGES, in *Natural History*, the name of a substance used by the Turks, and other eastern nations, in their scarlet dyeing: they mix it for this purpose with cochineal and tartar, the proportions being two ounces of the bazgendges to one ounce of cochineal.

The bazgendges seem to be no other than the horns of the turpentine tree in the eastern parts of the world; and it is not only in Syria that they are found, but China also affords them. Many things of this kind were sent over to M. Geoffroy at Paris from China, as the substances used in the scarlet dyeing of that country, and they all proved wholly the same with the Syrian and Turkish bazgendges, and with the common turpentine horns. The lentisk or mastic tree is also frequently found producing many horns, of a like kind with these, and of the same origin, all being owing to the *puccerons*, which make their way into the leaves, and breed their young there. Reaumur's Hist. of Insects, vol. vi. p. 37.

BAZIEGE, in *Geography*, a town of France, in the department of the upper Garonne, and chief place of a canton, in the district of Villefranche, $\frac{1}{4}$ leagues S. E. of Toulouse.

BAZIN, NICCOLAS, in *Biography*, a French physician and corresponding Member of the academy of Sciences at Paris, graduated at Strasbourg, where he afterwards resided, and acquired considerable reputation as a practitioner in medicine, though his attention was principally turned to the study of natural history, which he enriched with the following valuable productions. "Observations sur les plantes, et sur leur analogie avec les insectes," Strasbourg, 1741, 8vo. He believed that plants respired, and that the juices absorbed by them for their nourishment were digested, or concocted in the root, prior to their distribution. "Histoire des Abeilles," 2 vols. 12mo. Paris, 1744. "Lettre au sujet des animaux, appellés polypes," 1745, 12mo. He died in March 1754. Hall. Bib. Bot. Eloy. Dict. Hist.

BAZIRA, in *Ancient Geography*, now *Bijore*, a district of a territory adjoining to the country of the Affaceni, or Affacani, corresponding to the present Sewad or Sowhad, between the rivers Bijore and Perjekoreh in Hindoostan. When Alexander had taken Massaga, the capital of the Affaceni, by assault, he summoned Bazira, the capital of the next adjacent territory; and the modern district of Bijore presents itself in a position that answers most unequivocally to that of Bazira; and the similarity of their names is no less striking. See *BIJORE*.

BAZIRGION, a town of Persia, in the province of Laritan, 57 miles east of Lar.

BAZIUM, a promontory of Egypt, on the western coast of the Red Sea. Ptolemy.

BAZOCHE, or *BASOCHE*, in *Law*, formerly a royal kind of jurisdiction exercised among the clerks of the palais, or courts of justice at Paris. It was administered in the name and by the authority of the king of *Bazoché, roi de la Bazoché*, by virtue of an ancient grant of the kings of France;

the elder among the clerks were the officers; and he who presided was the chancellor. This court only took cognizance of causes among the clerks, or between clerks and artificers for goods bought, or work done. The freedom they exercised with regard to private characters in their inquisition and remonstrances, occasioned several arrests to restrain their power, and prohibit their holding pleas without leave.

A collection of statutes, ordonnances, regulations, monuments, and prerogatives of the kingdom of Bazocne, was published at Paris in 1654, 8vo.

BAZOCHE, LA, in *Geography*, a town of France, in the department of the Eure and Loire, and chief place of a canton, in the district of Nogent le Rotrou, 5 miles S. E. of Authon.

BAZOCHE, *les-Gallerands*, a town of France, chief place of a canton, in the department of the Loiret; the place contains 1,046, and the canton 11,289 inhabitants, in 26 communes, and a territory including 305 kilometres.

BAZOCHE, *sur-Hoëfne*, a town of France, in the department of the Orne, and chief place of a canton, in the district of Mortagne, 9 miles N. W. of Argentan. The place contains 1,349 and the canton 7,229 inhabitants, in 14 communes, and on a territory of $122\frac{1}{2}$ kilometres.—Also, a town of France, in the department of the Aisne, and chief place of a canton, in the district of Soissons, 4 leagues E. of Soissons.

BAZOGE, LA, a town of France, in the department of the Sarthe, and chief place of a canton, in the district of le Mans, six miles N. of le Mans.

BAZOUGERS, a town of France, in the department of the Mayenne, and chief place of a canton, in the district of Laval, $2\frac{1}{2}$ leagues S. E. of Laval.

BAZOUGES LA PEROUSE, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Dol, $3\frac{1}{4}$ leagues S. S. E. of Dol.

BDELLIUM, *βδέλλιον*, an aromatic gum, brought from the Levant, of some use, both as a medicine and a perfume.

The word is supposed to have been formed of the Hebrew *בדלה*, *bedollach*, which the English translators render by the appellation *bdellium*. It is also written *bedellium*, *bedello*, *ptellium*, *petallium*, *megalium*, and *telinum*.

There is much uncertainty concerning both the plant and the place of its production, which is supposed to be in Africa. We find mention of the name both among the ancient naturalists, and in Scripture; but it is doubtful whether any of these be the same with the modern kind. As for the Scripture *bdellium*, we know very little of it. Moses describes manna as of the colour of *bdellium*; and Josephus explains the passage, by saying it is the gum of a tree resembling the olive tree; and that the manna wherewith the Jews were fed in the desert resembled this drug.—But Scaliger and others set aside this explication, and own they do not know what the *bdellium* mentioned in Scripture is.

The *bdellium* of the moderns is a gum-resin in irregular brittle masses, of a deep brown when broken, interspersed with more transparent parts; and mixed with small twigs and other accidental impurities. Its external appearance a good deal resembles myrrh. The smell of this gum-resin is somewhat fragrant, and its taste somewhat bitter and pungent. It grows soft and tenacious when chewed. It burns with ease, giving a fragrant smoke and a crackling noise. It is partly soluble in alcohol, and partly in water, or completely (the impurities excepted) in diluted spirit. By Neuman's experiments only about one-sixth is pure resin. The watery solution is sea-green, the spirituous red. Distilled with water it impregnates the liquid with its flavour, but it does not yield any sensible quantity of essential oil, when only a moderate quantity is used.

Bellium was formerly employed as a stimulating remedy, chiefly for external application, and is still retained in some of the warm plasters of the Paris dispensaries. It is entirely disused here, and seldom to be seen in the shops. It resembles myrrh in its properties, but less in degree, and is very deservedly neglected. Murray. Lewis. La Grange Elem. de Pharm.

BEACHY FORK, in Geography, a branch of Salt river, which rises in Nelson county, Kentucky, in America. On this river is found a fine clay, which it is thought might be manufactured into good porcelain.

BEACHY-HEAD, is a bold promontory which projects into the English channel on the Sussex coast, between Hastings and Shoreham. This commanding headland consists of alternate strata of chalk and flint; though the latter is only seen in thin layers or veins. "It is esteemed," says Camden, "the highest cliff of all the south coast of England;" and on its south side is a large semicircular intrenchment. It is divided into seven cliffs, and so called by France. The coast round this head is very dangerous in stormy weather, particularly when the wind sets in from S.S.E. or S.W. From this promontory to Arundel, the country along the coast rises into high hills, which are known by the name of South-downs, and celebrated for their sheep walks. Beachy-head is memorable for the defeat of the English and Dutch fleets near it by a superior force of the French, June 30th, 1690. N. lat. 50° 44' 30". E. long. 0° 19' 40". See EASTBOURNE.

BEACHY-HEAD, lies also on the eastern coast of South America, in Patagonia, about S.S.W. from Port Julian, and N.N.E. from cape Fairweather. S. lat. 50° 21'. W. long. 67° 40'.

BEACON, a signal for the better securing of the kingdom against foreign invasion.

Different methods have been taken in different countries, both anciently and of later ages, to convey the notice of any impending danger to distant places with the greatest expedition. But no kind of signals has more generally prevailed than that of fires in the night. That this was practised among the Jews we learn from the sacred writers. Hence the prophet Isaiah, in allusion to that custom, threatens them that they should be left "as a Beacon upon the top of a mountain, and as a sign on a hill." (chap. xxx. 17.) And in the like manner Jeremiah alarms them by saying, "Set up a sign of fire in Beth-haecem, for evil appeareth out of the north, and great destruction;" (chap. vi. 1.) And as to other countries, Aristotle de Mundo informs us, that these signals were so disposed on towers through all the territories of the kings of Persia, that in the space of twenty-four hours he could receive advice at Susa and Ecbatana, his two capital cities, of any contrivance or disturbance that might be raised in the most distant parts of his dominions. But the Greeks, as Theophrastus relates, made use of torches for fire, which by a different management served either to give notice of the approach of an enemy, or the arrival of a friend to their assistance. For as the scholiast says, in the former case "the torches were struck by those who held them, and in the latter they were kept steady." (lib. xi. c. v. lib. ii. c. xxii.) Among the Greeks they were called *πύρα*; and their use is particularly described in the Agamemnon of Æschylus. The like custom of nocturnal fires obtained also among the Romans, as appears from Cicero, when, speaking of the misfortune of Verres, when governor of Sicily, he says, "Non enim facta antea consuetudo erat prædiorum ad certum ignem, sed ignis e specula sublatum; sed statim ex ipso incendio navium, et calamitatem accipiant, et periculum iniqui-

um nuntiabat: (lib. v. in Verrem, § 91.) Wherefore signals of this sort are called by Pliny "ignes prænuntiativi" Nat. Hist. lib. xi. § 73.) which he distinguishes from the Phari, or light houses, that were placed upon the coasts for the direction of ships; the latter of which were constant, but the former only occasional.

Established signals were repeated, says Charnock, in his "Mine Architecture," by means of beacons or light-houses erected in proper positions, from mountain to mountain, through a chain of stations, which are said to have commanded an extent of more than 500 miles: so that even the inhabitants of Constantinople were capable of being informed, within the short space of a few hours, of any motions that might be attempted by their Saracen enemies in Parus.

In our own country, the name of beacon is derived from the Anglo-Saxon *becman*, to shew by sign or beckon. It was usually placed upon a high ground, and sometimes on a tumulus. From lord Coke we learn (Fourth Instit. c. xxv. p. 184.) that before the reign of Edward the third, beacons were but stacks of wood set up on high places, which were fired when the coming of an enemy was desiered; but in his reign pitched boxes were set up instead of them. In time of danger a watch was kept at them, and horsemen called hobbelars were stationed by most of them to give notice of an enemy's approach.

BEACONS are also marks and signs erected on the coasts, for the guidance and preservation of mariners at sea by night as well as by day. The erection of beacons, light-houses, and sea-marks, both for alarming the country in case of the approach of an enemy, and for the direction and safety of ships, is a branch of the royal prerogative. For this purpose the king hath the exclusive power, by commission under his great seal, to cause them to be erected in fit and convenient places, as well as upon the lands of the subject as upon the demesnes of the crown; which power is usually vested by letters patent in the office of lord high admiral.

Nevertheless it must be understood that the power of erecting beacons was occasionally given to individuals, and limited by grants from the crown, whence, or for some achievements performed in times of danger, the beacon is worn as a crest in the arms of several families, as Belknap, Butler, Mountford, Sudley, and Shelly of Michell Grove, one or two of whom obtained especial grants which empowered them to erect and maintain beacons at their own expence.

The care of these, when erected by the crown, was committed to one or more of the adjacent hundreds; and the money due or payable for their maintenance, called *beconagium*, was levied by the Sheriff of the county upon each hundred. (Archæologia, vol. i. part 1. Hutches's, Hist. of Dorset. vol. i. p. lix. Camd. Brit. Edit. 1609. p. 196.)

By stat. 8 Eliz. c. 13. the corporation of the Trinity house are empowered to set up any beacons or sea-marks wherever they shall think them necessary; and if the owner of the land or any other person shall destroy them, or shall take down any steeple, tree, or other known sea-mark, he shall be at 100*l.* or in case of inability to pay it, shall be ipso facto outlawed.

BEACONAGE, money paid towards the maintenance of a *beacon*. A suit for the recovery of a beacon standing on a rock in the sea may be brought in the court of admiralty, the admiral having an original jurisdiction over beacons. 1 Sid. 158.

BEACON HILL, in Geography. See HARWICH.
BEACONFIELD, a small market town of Buckinghamshire, in England, at the distance of 23 miles N.W. from London. The town is built on high ground, whence some antiquaries have observed, that it derived its name from a beacon formerly occupying the spot. The *lobstratum* no

which it stands is chiefly gravel, and the houses are built with flints or brick, there being no stone quarries in this part of the county. Beaconsfield has little claim to popular attention, there being no particular historical events or antiquities attached to it. Here are a small weekly market on Wednesdays, and two annual fairs. Seated on the great public road between London and Oxford, it derives some advantages from travellers; but it has been particularly noted in the literary annals of this country, by the contiguous residences of Edmund Waller the poet, and Edmund Burke the politician, both of whom possessed estates near Beaconsfield, and the memories of both are commemorated by inscriptions at the parish church. See WALLER, and BURKE.

About three miles east of Beaconsfield is *Bulstrode*, a seat of the duke of Portland. This ducal residence was formerly in the possession of the Bullstrode family, but reverting to the crown, was given by king William III. to William Bentinck, who had long been the constant attendant and faithful servant of that monarch, and who was created by him earl of Portland in 1689. From him it descended to the present nobleman, who has made considerable additions and improvements to the house and grounds. The former is a large irregular brick building, seated on a high knoll, in the centre of a fine park which abounds with venerable trees, and is diversified with that variety of surface, which constitutes the foundation of the picturesque. This park contains about 800 acres, and in the eastern part of it is a large circular entrenchment enclosing an area of twenty acres. See Beauties of England and Wales, vol. i. 1801.

BEAD, BAGUETTE, Fr. in *Architecture*, a little round moulding, the diminutive, or rather the vulgar name of astragal. This moulding is generally found in the cornices of antique buildings, where it is uniformly carved with ornaments, sometimes in the shape of a string of beads, sometimes a twisted ribbon or a rope. See *Plate XXI.* of *Architecture*. Plain beads are very much used in modern joiners' and plasterers' work, as the mouldings of doors, shutters, skirtings, imposts, and cornices.

BEAD, in *Assaying*, the small lump or mass of pure metal separated from the *scoria*, and seen distinct and pure in the middle of the coppel while in the fire.

Thus, in separating silver from its ore by means of lead, the silver remains in form of a bead, when the lead, that had before assisted in the operation, is reduced to *scoria*. In this process, the bead of silver must be taken out of the coppel as soon as it is seen pure and fine, lest growing cold, it should be conglutinated to the coppel or litharge. This bead, when rightly made, is always porous underneath. Cramer.

BEADS are more particularly used among us for a sort of glass necklace, made in imitation of the colour and figure of pearl.

BEADS are also used in speaking of those glass globules vended to the savages on the coast of Africa, thus denominated, because they are strung together for the convenience of traffic.

The common black glass of which beads are made for necklaces, &c. is coloured with manganese only; one part of manganese is sufficient to give a black colour to near twenty of glass. Lewis's Comm. Phil. p. 422. See **ARTIFICIAL PEARLS**.

BEADS, in a religious sense. See **CHAPLET**.

BEAD-ROLL, among the Romish priests, a list or catalogue of such persons, for the rest of whose souls they are obliged to rehearse a certain number of prayers, &c. which are told by means of their beads.

BEAD-MAKERS, called by the French *paternostriers*, are those employed in the making, stringing, and selling of beads. At Paris there are three companies of *paternostriers*,

or *bead-makers*; one who make them of glass or crystal; another in wood and horn; and a third in amber, coral, jet, &c.

BEAD PROOF, or *Double Proof*, terms used by our distillers, to express that sort of proof of the standard strength of spirituous liquors, which consists in their having, when shaken in a phial, or poured from on high into a glass, a crown of bubbles, which stand on the surface some time after. This is esteemed a proof that the spirit consists of equal parts of rectified spirits and phlegm.

This is a fallacious rule as to the degree of strength in the liquor; because any thing that will increase the tenacity of the spirit, will give it this proof though it be under the due strength. Our malt distillers spoil the greater part of their goods, by leaving too much of the stinking oil of the malt in their spirit, in order to give it this proof, when somewhat under the standard strength. But this is a great deceit on the purchasers of malt spirits, as they have them by this means not only weaker than they ought to be, but stinking with an oil, which they are not easily cleared of afterwards.

On the other hand, the dealers in brandy, who usually have the art of sophisticating it to a great nicety, are in the right when they buy it by the strongest bead proof, as the grand mark of the best; for being a proof of the brandy containing a large quantity of its oil, it is, at the same time, a token of its high flavour, and of its being capable of bearing a very large addition of the common spirits of our own produce, without betraying their flavour or losing its own.

We value the French brandy for the quantity of this essential oil of the grape which it contains, and that with good reason; as it is with us principally used for drinking as an agreeably flavoured cordial: but the French themselves, when they want it for any curious purposes, are as careful in the rectification of it, and take as much pains to clear it from this oil, as we do to free our malt spirit from that nauseous and fetid oil, which it originally contains.

No judgment can be formed of brandies by the bead proof as to their mixed or adulterated, or their pure state, farther than that they are likely to be most pure when they have the greatest proportion of this oil, in regard to mixtures of other spirits. There are many occasions where we want spirit, merely as spirit, and where any oil, whether sweet or stinking, must be equally improper. Shaw's Ess. on Distillery.

BEAD TREE, in *Botany*. See **MELIA**.

BEADLE, or **BEDELL**, *Bedellus*, signifies a messenger or apparitor of a court, who cites men to appear and answer in the court to what is alledged against them.

BEADLE is also used for an officer in universities, whose place it is to walk before the masters at all public processions, &c. with a mace. The office of church and parish beadles is well known.

Spelman, Vossius, and Somner, derive *beadle* from the Saxon *bidel*, a public crier; in which sense bishops, in some ancient Saxon manuscripts, are called *beadles of God*, *Dei bedelli*. The translator of the Saxon New Testament renders *exactor* by *bidele*; and the word is used in the same sense in the laws of Scotland.

BEADLE of the Forest, is an officer, that warns all the comits of the forests, and executes process, makes all proclamations, &c. 4 Inst. 313.

BEAGLE, in *Zoology*. See **CANIS FAMILIARIS**, and **DOG**.

Beagles are of divers kinds; as the *southern beagle*, something less and shorter, but thicker than the deep-mouthed hound; the *fleet northern*, or *cat beagle*, small and of a finer shape than the southern, and a harder runner. From the

two, by crossing the strains, is bred a third sort held preferable to either.

To these may be added a still smaller sort of beagles scarce bigger than lap-dogs, which make pretty diversion in hunting the coney, or even small hare in dry weather: but otherwise unserviceable, by reason of their size. Beagles, both rough and smooth, have their admirers among sportsmen: their tongues are musical, and they go faster than the southern hounds; they run so close to the ground, as to enjoy the scent better than taller dogs, especially when the atmosphere is low. In an inclosed country they are said to do best, as they are good at trailing or default, and for hedge-rows; but they require a clever huntsman, for out of eighty couple in the field, during a winter's sport, scarcely so many are to be depended upon. Of the two sorts, the wire-haired, as having good shoulders and being well filleted, are preferred. Smooth haired beagles are commonly deep hung, thick-lipped, with large nostrils, but often so fat and bad quartered, as to be shoulder-shook and crippled the first season they hunt; among them are frequently seen crooked legs, like the Bathturnspit; and after two hours running many of them are disabled. Their form and shape sufficiently denote them not designed for hard exercise. Daniel's Rural Sports, vol. i. p. 378.

BEAK, *Rostrum*, in Ornithology, the bill of a bird; from the form and structure of which, Linnæus divides this whole family or general class of animals into six orders. See BIRD and ORNITHOLOGY.

BEAK, in Architecture, a little fillet left on the edge of a lannier, which forms a canal, and makes a kind of pendant chin, answering to what Vitruvius calls the *mentum*.

BEAK, or Beak-Head of a Ship, is that part without the ship before the fore-castle, which is fastened to the stem, and is supported by the main knee: this is usually carved and painted, and, besides its use, makes the becoming part, or grace of a ship.

The beak was anciently made of wood, but fortified with brass, and fastened to the prow, serving to annoy the enemies' vessels. Its invention is attributed to Pifæus, an Italian. The first beaks were made long and high; but afterwards a Corinthian, named Aristo, contrived to make them short and strong, and placed so low as to pierce the enemies' vessels under water. By the help of these, great havoc was made by the Syracusans in the Athenian fleet. Pett. Archæol. lib. iii. c. 17.

BEAK was also used for one of the ancient battalia, or forms of ranging an army for battle, particularly used by the Macedonians.

BEAK is also applied to the slender crooked prominences of divers bodies, bearing some analogy or resemblance to the beaks of birds.

In this sense we meet with beaks of shoes, *rostra calceorum*, for long peaked toes, in use of old. Du-Cange.

Among *Farrriers* beak denotes a little horse-shoe, turned up, and fastened in upon the forepart of the hoof.

It is usual to keep the shoes fast, and not liable to be struck off by the horse, when by reason of any itch, or being much disturbed by the flies in hot weather, he stamps his feet violently on the ground.

BEAKED, *Bequé*, in Heraldry, is used when the beak or bill of a fowl is of a different tincture from the body.

In this case, they say *beaked* and membered of such a tincture.

BEAKING, in Cock-fighting, expresses the fighting of these birds with their bills, or holding with the bill, and striking with the heels.

BEAL, in Geography, a river of Ireland, which runs into the Shannon near Aikeaton, in the county of Limerick.

BEALE, MARY, in Biography, a female portrait painter in the reign of king Charles II., was the daughter of Mr. Cradock, minister of Walton upon Thames, and was born in Suffolk in 1632. Although she was not instructed in the rudiments of painting by sir Peter Lely, as some have supposed, she diligently copied the works of that great master, as well as those of Vandyke. She painted in oil, water-colours and crayons; and by copying some pictures of Italian masters, improved her taste and pencil, and acquired much of their air and style, which appear in her portraits. She was little inferior to any of her contemporaries with respect to colouring, strength, force, or life; and she worked with a great body of colours. Her performances were held in high estimation by sir Peter Lely. Amiable in her conduct, and assiduous in her profession, she was very much encouraged and employed, both by the clergy and by several persons of rank, whose portraits she painted. It appears, that in one year she received for pictures 429 l., and that she and her husband devoted about two shillings in the pound of their income to charitable purposes. In the MSS. of Mr. Oldys, Mrs. Beale is celebrated for her poetry as well as her painting. She died Dec. 28, 1697; and left two sons, Charles and Bartholomew, both of whom exercised the art of painting; but the latter relinquished painting, and studied physic under Dr. Sydenham, and practised at Coventry, where he and his father died. Walpole's Anecdotes of Painting, vol. iii. Biog. Brit. Pilkington.

BEALNABRUCII, in Geography, the name of a river in the county of Galway, province of Connaught, Ireland, which rises in Joyces country near the Killeries, north of the mountain of Beannebola or the twelve pins, and flows through a mountainous country into Lough Corrib, near the base of the stupendous Ben Levagh. The valley through which it runs is pretty well peopled. A great error is committed in Roque's and all the old maps, in representing this river as flowing into Roundstone bay, and affording a second outlet to Lough Corrib, instead of carrying into it a large supply of water. Dr. Beaufort's Map and Memoirs.

BEALSTURG, a small town of America, in Nelson county, Kentucky, on the east bank of Rolling fork, containing twenty houses, and also a tobacco warehouse: 15 miles W.S.W. from Bairdstown, and 890 from Philadelphia. N. lat 37 42'. W. long. 85 50'.

BEALT. See BUILTH.

BEAM, in Architecture, is any piece of timber of a rectangular section of equal depth and thickness throughout its length, applied in an horizontal position in various situations in a building, for the purpose of resisting some strain either in a longitudinal or transverse direction, such as to prevent the rafters of roofs from pushing out adjacent walls upon which they rest, or to sustain a superincumbent part of a wall instead of an arch. This word, however, is not much used technically, and only in combination with other words, which denote its position or use. When a beam is placed at the bottom of a pair of rafters it is called "a Tie-beam;" but if placed in a higher situation it is called "a Collar-beam." When a beam is placed over piers of masonry or wooden posts to support a superincumbent wall, it is called a "breast-lummer," or "summer-beam." When a beam is placed across a floor to support the ends of joists and shorten their bearings, it is called a "girder," or "girding-beam." See CARPENTRY.

Some of the best authors have considered the force or strength of beams, and brought their resistance to a precise calculation; particularly M. Varignon and M. Parent. See STRENGTH of TIMBER.

BEAM of a Plough, in Agriculture, a name given by our farmers

farmers to the great timber of the plough, in which all the other parts of the plough-tail are fixed.

This is usually made of ash, and is straight, and eight feet long in the common plough: but in the four-coultured plough, it is ten feet long, and its upper part arched. The head of this beam lies on the pillow of the plough, and is raised higher, or sunk lower, as that pillow is elevated or depressed by being slipped along the crow-staves. Near the middle, it has an iron collar, which receives the tow-chain from the box, and the bridle-chain from the stake or gallows of the plough is fixed in it a little below the collar. Some inches below this, there is a hole, which lets through the counter; and below that there are two other small ones, through which the heads of the retches pass. These are the irons which support the sheat, and with it the share. Farther backward still is a larger perforation, through which the body of the sheat passes; and behind that, very near the extremity, is another hole through which the piece called the hinder-sheat passes. See PLOUGH.

BEAMS of a ship, are the large, main, cross timbers, stretching from side to side, which hold the sides of a ship from falling together, and which also support the decks and orlops of the ship.

The main beam is that next the main mast; and from it they are reckoned by *first, second, and third beam*. The great beam of all is called the *midship-beam*.

There are usually twenty-four beams on the lower deck of a ship of 74 guns, and on the other decks additional ones in proportion, as the ship lengthens above.

BEAM, *on the*, in *Sea Language*, denotes any distance from the ship on a line with the beams, or at right angles with the keel. Any object that lies east or west, when the ship steers northward, is said to be on the starboard or larboard beam.

BEAM, *before the*, signifies an arch of the horizon comprehended between the line of the beam, and that point of the compass which she stems. See ABAFT.

BEAM, *on the Weather*, signifies on the weather side of the ship.

BEAM, *Camber*. See CAMBER-BEAM.

BEAM of an Anchor. See ANCHOR.

BEAM of a balance, is that piece of iron or wood, somewhat bigger towards the middle than at the ends, where there are holes through which run the ropes or strings which hold the scales: the beam is divided into two equal parts, by a needle placed over it perpendicularly: and the centre of motion must be placed a little above the centre of gravity, that the beam may rest exactly in an horizontal position. See BALANCE.

BEAM, or Roller, among Weavers, is a long and thick wooden cylinder placed lengthways on the back part of the loom of those who work with the shuttle. The threads of the warp, of linen or woollen cloth, serges, on other woollen stuffs, are rolled upon the beam, and unrolled as the work goes on. That cylinder on which the stuff is rolled as it is weaved is also called the beam or roller, and is placed on the fore part of the loom.

BEAM, in *Heraldry*, is used to express the main horn of a hart or buck.

BEAM, among Hunters, denotes the main stem of a deer's head; or that part which bears the antlers, royals, and tops; the little streaks of which are called circles.

BEAM is also used for a fiery meteor in the shape of a pillar; and for a ray of the sun.

BEAM compasses. See COMPASSES.

BEAM feathers, in *Falconry*, the longest feathers of a hawk's wing.

BEAM-filling, in *Building*, the filling up the vacant space

between the rising plate and roof, with stones, or bricks, laid between the rafters on the raising plate, and plaistered on with loam; this is frequent where the garrets are not partitioned, or plaistered.

BEAM tree. See CRATÆGUS *Aria*.

BEAMINSTER. See BEMINSTER.

BEAN, in *Botany*. See VICIA *Faba*.

BEAN, *fabā*. The medicinal and dietetic qualities of beans are said to be nutritive, but flatulent: the pods yield a water held good against the gripes in children. Some have used the horse bean as a succedaneum to coffee; which in principles it much resembles; only that it contains but half the quantity of oil. Mr. Boyle has several experiments of beans treated pneumatically to shew the great plenty of air they afford, on which their flatulency depends. This air, which beans contain in a fixed state, is extricated during their digestion in the stomach, in greater quantity than can be again absorbed, and upon that account these, and other legumina, have been at all times noted for occasioning flatulency, and sometimes colic pains. The expansion of beans in growing, Mr. Boyle also found so considerable that it would raise a plug clogged with above a hundred pounds weight. Boyle's Works abr. tom. i. p. 285. tom. ii. p. 615, &c.

Beans with proper management make one of the finest of all baits for fish. The method of preparing them for this purpose is this: take a new earthen pot glazed on the inside; boil some beans in it, suppose a quarter of a peck: they must be boiled in river water, and should be previously steeped in some warm water for six or seven hours. When they are about half boiled, put in three or four ounces of honey, and two or three grains of musk: let them boil a little on, then take them off the fire, and use them in this manner: seek out a clean place, where there are no weeds, that the fish may see and take the beans at the bottom of the water. Throw in some beans at five or six in the morning, and in the evening for some days. This will draw them together, and they may be taken in a casting net in great numbers.

The ancients made use of beans in gathering the votes of the people, and for the election of magistrates. A white bean signified absolution, and a black one condemnation. Beans had a mysterious use in the *lemuralia* and *parentalia*; where the master of the family, after washing, was to throw a sort of black beans over his head, still repeating the words, "I redeem myself and family by these beans." Ovid gives a lively description of the whole ceremony in his *Fasts*, lib. v. ver. 435. Abstinence from beans is said to have been enjoined by Pythagoras, for which prohibition various reasons have been assigned. Some have supposed that it was intended to restrain his disciples from intermeddling in trials and verdicts which were decided by throwing beans into an urn. Others founding their opinion on the double sense of the word *vovus*, which signified both a bean and the common testicle, explain it by abstaining from venery. Clemens Alexandrinus grounds the abstinence from beans on their tendency to render women barren; which property is confirmed by Theophrastus, who extends the same effect even to plants. Cicero suggests another reason; viz. that beans are very injurious to mental tranquillity. Hence Amphiaras is said to have forborne the use of beans, before Pythagoras, that he might be better prepared for divining by dreams. The Egyptian priests held it a crime to look at beans, judging the very sight unclean. The *flamen dialis* was not permitted even to mention the name. Lucian introduces the same philosopher in hell, saying, that to eat beans, and to eat our father's head, were equal crimes. After all, both the genuineness of the precept, and the reality of any such abstinence among the ancient

cient Pythagoreans have been disputed. Some attribute the precept to Empedocles, a disciple of Pythagoras. Ariloxenus, an ancient writer cited by A. Gellius, (l. iv. c. 11.) introduces Pythagoras saying, that he eat more frequently of beans than of any other pulse, on account of their gentle loosening the belly. Accordingly he is said to have permitted the use of them, because he believed them to be wholesome, but his disciples have forbidden them, because they thought them, as Hippocrates also did, productive of flatulency, and otherwise prejudicial to health. Thus, a prohibition, which was at first a civil regulation, or salutary advice, assumed the authority of a sacred law.

BEAN, *Bog*. See MENYANTHES.

BEAN-*caper*. See ZYGOPHYLLUM.

BEAN-*cod*, in *Navigation*, a small fishing vessel or pilot boat, used by the Portuguese, which rigs with one mast, similar to the *Tartan*; which see.

BEAN-*flour*, in *Antiquity*, called by the Romans *lomentum*, was of some repute among the ancient ladies as a cosmetic, wherewith to smooth the skin, and take away wrinkles.

BEAN-*fly*, in *Natural History*, the name given by authors to a very beautiful fly, of a very beautiful purple colour, frequently found on bean-flowers. It is produced from the worm or maggot called by authors *mida*.

BEAN, in *Agriculture*, a sort of pulse, of which there are several kinds: but those best adapted to field culture are the small sorts, such as the common *horse-bean*, and the *tick-bean*. The large sorts, or garden-beans, as the *Windfor*, *Long-pod*, and *Mazagon*, have also been occasionally employed in the field, with success, in some of the southern districts.

Beans constantly prefer a strong moist soil, and on such, where proper culture is given, they mostly afford an abundant produce. Tick-beans are supposed by some farmers to be more productive than horse beans; but the latter grow higher in the stem, and produce a more stagnated state of the air, or smother the land more, consequently are the most suitable for the stronger sorts of soil.

The author of the *Agricultural Survey of Middlesex* observes, that beans are a crop which thrive well in almost any soil that is rather strong, such as medium-loams, sandy-loams, clayey-loam, and chalky-loams; on clay, marl, chalk, and such like cool subsoils. And the author of the *Synopsis of Husbandry* remarks that the proper time for planting beans is towards the latter end of January, or early in the following month; though this business may be continued to advantage till the middle or latter end of March, if the weather had prevented their being got in at an earlier season; but in general it is best to embrace the first opportunity of sowing them after Candlemas, as they often miscarry if the season be procrastinated beyond that time, especially if a dry summer should succeed. In purchasing beans for seed, care should be taken to choose such as are hard and bright, without being shrivelled in their appearance.

Mr. Donaldson, in his view of the present state of husbandry, observes, that the ordinary mode of preparing land for a crop of beans, is to give one ploughing only, which is generally performed in the spring, immediately before the seed is sown.

Beans are for the most part sown broad-cast, either on the stubble, before ploughing, or on the new turned-up furrow. Sometimes beans are sown or planted in the bottom of every second or third furrow, and afterwards horse and hand-hoed. In a few districts they are sown with a drill machine, and at such distances in the rows as to have sufficient space, either for hand-hoeing, when that only is intended, or for horse and hand-hoeing, when it is purposed that both these operations should be performed. It will at once appear obvious,

he thinks, that either of these last-mentioned methods is preferable to sowing the seeds broad-cast, as a better opportunity is not only afforded of cleaning the ground properly, but a more abundant return, and a produce of superior quality insured.

The spring seed time in general commences with the sowing of beans. In the southern districts, they are sown in ordinary seasons so early as the middle or towards the end of February; and in the northern parts of Scotland so late as the beginning of April. The month of March may, however, as has been observed, be considered as the general bean seed season.

The first of the above writers thinks, that on land which is inclined to moisture the preparation for this crop should be as follows: Early in autumn lay on the manure, and immediately plough the land into ridglets of two feet six inches wide; in which state let it lie until the season for planting, when the seed may be dibbled in, one row of beans into the middle of each ridglet, at the distance of about three inches from bean to bean. They should be immediately covered; which may be done by children, with a garden rake or hoe, or, should the surface of the land be dry and crumbly, a horse and a bush harrow would do as well. In most places, he observes, it is adviseable to set a boy with a rattle to frighten away the rooks until the beans have attained some growth. The distance between the rows will not prevent the crop from completely covering the ground, especially if the land was manured for them, as they will branch out sideways, three or four stout stems from each root. They should be early planted, in order to their getting sufficient root-hold of the land, and procuring shade against the hot weather sets in. It is also some security against the *black-dolphin*, which is the greatest enemy the bean is ever attacked by. They require a soil that can seldom be worked without damage during the winter and spring; consequently it ought to be manured and gathered into one bout ridges in the autumn. The shape of these ridges keeps the land more dry through the winter than any other, and prevents excessive rains from washing away the manure, which had been previously folded by the plough into the centre of such ridges; in which state it should lie, as has been already observed, until the season for sowing; when the land thus prepared will be so dry as to admit of dibbling every fair day; which secures to the farmer the advantage of choosing his season. He dunged, he says, about ten acres in September 1793, and ploughed the land into ridges of two feet and a half wide, burying the dung in the middle of them. The land lay dry through the winter, and he dibbled one row of beans into the middle of each ridge during the first week of February 1794. My neighbours, says he, on a similar soil, who ploughed into flat ridges of about fifteen feet wide, could not get their feed in till March. The ensuing summer was uncommonly dry: my beans being so unusually wide apart, admitted the plough and hoe to work as freely between the rows as a stubborn soil would allow. The plants tillered or branched till they completely covered the intervals, and the field appeared as completely cropped as though it had been sown broad-cast. When my neighbours' plants, says he, were beginning to pod, mine were half set. The whole were alike attacked by the black-fly, which reduced their crops to a bushel or two per acre, while I had twenty.

Mr. Young, however, remarks in the *Survey of Suffolk*, that it is there uncommon to give more than one earth for beans, and generally improper, as they love a whole firm furrow, and never thrive better than on a layer.

There are many different methods, Mr. Bannister says, of raising crops of beans. In some counties they sow this pulse by broad-cast, which is by no means an eligible way, since

much of the seed will be left above ground, and a great part of that which is covered by the harrow will not be covered to a proper depth; and many other objections might, he thinks, be urged against this method of sowing beans at random, of which it is not one of the least, that such irregular sown crops are in great danger of being injured by weeds, which cannot so easily be extricated when the beans are sown at random as when they are planted regularly in drills.

In some districts, as Middlesex, Surrey, &c. the method is, to plant this pulse in rows stricken out by a line, by which a great saving is made in the article of seed, a circumstance which is thought to compensate for the extraordinary charge of this mode of husbandry; and thus far it may be fairly acknowledged, that the method of planting beans by the dibble is greatly to be preferred to that of sowing the seed at random. The economy of this agricultural process he thus explains: the rows are marked out one foot asunder, and the seed planted in holes made two inches apart; the lines are stretched across the lands, which are formed about six feet over, so that when one row is planted, the sticks to which the line is fastened are moved by a regular measurement to the distance required, and the same method pursued till the field is completed. The usual price for this work is 9d. per peck, and the allowance two bushels per acre. Great confidence must necessarily be reposed in the people who transact the business of planting beans by the dibble, who, if inclined to fraud, have it in their power to deceive their employer by throwing great part of the seed into the hedge, from which their daily profits are considerably enhanced, their own labour spared, and every discovery effectually precluded, till the appearance of the crop, when the frequent chafms in the rows will give sufficient indications of the fraud; and by this time perhaps the villainous authors of the mischief may have escaped all possibility of detection, by having conveyed themselves from the scene of their iniquity. Such is the method of planting beans by the dibble; but the neatest and most expeditious way of sowing this pulse, especially the field bean, is, he observes, that pursued by the Kentish farmers. The usual course in that county, is to plough up the oat or barley grattens, which are designed for beans, soon after the wheat season is finished, in which condition the fallows are to lie till towards Candlemas, or later, as the state of the weather, or the farmer's occasion may require, and then to strike out the furrows.

About eleven furrows to a row's breadth is the usual width of setting out the rows, though some prefer a wider space, whilst others strike them still narrower; and this difference in the width of the rows is the cause why the farmers vary so essentially in respect to the quantity of seed to be sown on the same given space of ground; for, whilst some will content themselves with an allowance of two bushels per acre, others will throw a sack of beans upon the same compass of land. When the furrows are struck at the distance mentioned before, two bushels and a half of middle-sized tick-beans are sufficient to seed an acre, and on good land (for if the ground be not either rich in itself, or rendered fertile by art, it is of little consequence to attempt the cultivation of this crop,) a person, in his opinion, stands a much fairer chance for a crop when the beans are thinly planted, than when a more liberal quantity of seed is allowed; for, when beans stand so very thick in the rows, they never pod so kindly as when the stalks are less crowded; and although the crop of haulm may be more abundant, the increase will not be adequate to the large bulk of straw.

In Suffolk, according to Mr. Young, beans have been dibbled by some a row on every flag; by others, on every other flag. He has found it more advantageous to plant in clusters four or five beans in every hole; and eight or nine

inches from hole to hole, which admits of much better hoeing than when more thickly set. Dibbling, says he, is the best and most effective method of cultivating beans. In the Synopsis of Husbandry it is further observed, that in Kent some people make use of a drill plough at bean seed time; but as this pulse, especially the larger ticks, are very unequal in size, they cannot be let out of the hopper with sufficient regularity; for by this inequality in size, many yards of ground in the length of a furrow will be left vacant from the casual obstruction of a large bean, and when this is removed, numbers of a smaller size crowd to the chasm, and shoot out of the hopper for a considerable space, till another large bean intervenes to obstruct the passage, and thus the crop makes a very unsightly appearance in the rows, and at the time of harvest is very unequal; the injury in large fields being not inconsiderable: for, in those parts of the furrows, where no beans had been sown, an increase cannot be expected; and those which are huddled together by a quart or more in a spot, will, from the thickness of their growth, in course come to little. Some farmers are so nice as to pick and cull their seed before it goes into the hopper, in order to render the beans more even, and prevent the injury above mentioned: but this is a very tedious practice, and after all, he believes, very seldom answers the expence. The best method of sowing this crop, according to this writer, is from an instrument called a box, which is held by a man who follows the striking plough, and who, by shaking the box filled with beans, drops them with regularity in the furrow, keeping even pace with it; so that by two men, and two or three horses to the striking plough, a man to box, and a boy and two horses to harrow down the ground after the plough, three acres may be finished off in a day, and the whole conducted with regularity.

The writer of the Agricultural Survey of Middlesex thinks that beans should be manured for, and kept perfectly clean while growing, by ploughing, horse or hand-hoeing, and hand-weeding; and that where they are so managed, they are an excellent preparation for either wheat or oats. They have a tap root, and hence they are more likely to succeed after crops that have fibrous roots; though he never heard that they would not grow after any crop. They are generally sown after wheat, barley, or oats; and ought, as has been already observed, to be planted on ridglets, especially on wet and thin-skinned soils.

In the Synopsis of Husbandry it is recommended as a good method to roll and harrow beans in the latter end of March. By the roll, says this writer, the clods are broken so as to afford fresh nourishment to the roots; and the harrows following this operation pulverize and loosen the surface, which had been flattened and baked down by the rains in the preceding month, by which the beans are considerably assisted in the future progress of their growth. Soon after this the crop should be edge-hoed, and afterwards braked; which method of braking is a piece of husbandry peculiar to the county of Kent, and in every respect claims the preference to that of hoeing the whole space between the rows; not only because the braking is performed at an inferior expence, but it is likewise more efficacious, as well for extirpating the weeds that may have sprung up between the rows, as in furthering the advances of the beans in growth, by loosening the soil, and conveying fresh earth to the stalks. This operation of braking may be continued at the interval of three weeks or a month, from the beginning of May till the crop becomes in bloom. When it is proposed to earth up the beans, this may be effected with great facility by fixing a small block of wood on the *brig* of the brake; the manner of doing which is familiar to every Kentish ploughman; and according to the diameter of this block, the earth may be thrown

thrown to different heights on the bean stalks, as they advance in growth.

In dry summers when easterly winds prevail, beans are very apt to be stricken with the *Dolphin* fly, an insect which in a very short space of time will destroy the produce of a whole field. In this case it has been found very beneficial to take off the tops with a scythe, as the dolphin generally effects its first lodgment in the upper part of the stalk. Where this pulse is sown broad-cast, there remains no other way of cleaning the field, than by cutting up the weeds with a hook, or by turning in a flock of sheep in May, where the ground is very foul, as this animal will devour the weeds, and leave the beans untouched. From this very partial method of weeding, it may fairly be concluded that the best method is to graze, and that the gratten will be abundantly stocked with weeds at harvest, and the ground be totally unfit for sowing with wheat: and, indeed, the practice of sowing bean grattens with wheat is now attempted in those countries where this method of sowing beans at random prevails; and here, therefore, the bean and pea grattens generally come in course the next year for a fallow. This is a practice that cannot be recommended.

It is remarked in the Survey of Middlesex, that beans are seldom ripe enough to cut till the latter end of August, and the proper time is when the *kids* are turning black, about ten days before they would begin to open at the ends. Though in some parts of the field the kids may not be so black as in others, this should not prevent their being cut; for they will ripen and harden after that is done, by setting the sheaves upright, and leaving them in the field for a week or ten days. If they are cut long before they are ripe, they will shrink and shrivel; and if too ripe, they will shed considerably; though there is much less danger in reaping them too early, than in letting them stand too long. Those that are over-ripe should be cut with the dew on them, and carried to the barn in the same state; the green parts of the crop being cut in the middle of the day. When the intention is to sow wheat or tares after beans, they ought to be set up so as to occupy as little space as possible, that the vacant ground may be immediately prepared for the next crop. The writer of the Synopsis of Husbandry asserts, that after a growing summer, and on land which is in good heart, there will be many green pods when the crop is upon the whole fit for the hook; for the stalks having run to a great length, and being very replete with moisture, the upper part of the leaves, pods, and stalks, will appear to be in a growing state long after the pods on the lower part of the stalk are fully ripened. To wait the ripening of these upper pods would be very ill-judged, as by this delay great part of the crop would be lost, from the shedding of those which were already come to maturity. The best method, therefore, is to cut the beans when the major part have ripened, and by suffering the stalks to remain in the field, the upper part of the stalks will be sufficiently withered, so as to prevent any ill effects from their humidity, when laid in the barn or stack; nor will the beans from those unripened pods be of any injury to the sward. At harvest time, the same author informs us, that in Kent those beans which were sown broad-cast are mown with a scythe, and carried loose into the barn; a practice which is fraught with many inconveniences; but that in Middlesex, where the beans are planted in rows with a dibbler, as before mentioned, the intervals are carefully cleaned during their growth by means of a hoe; and to this purpose the farmers are under the necessity of employing a number of hands; the Kentish method of cleaning the intervals by the brake not having yet been introduced into that county;

since the whole ground between the rows must be flat-hoed. At harvest, the stalks are cut with a hook, bound into sheaves, and set up four together; and as a substitute for strings, it is usual to sow the headlands with pease, the haulm of which answers the purpose of bands to tie up the sheaves. The Kentish mode of husbandry is greatly to be preferred, he thinks, to that of the Middlesex farmers, as is evident from the consideration of the comparative disadvantages which attend a crop raised and managed according to the latter method, with the superior benefits of the former. At seed-time the planting by a dibbler is infinitely more tedious and expensive than that of dropping the seed into the furrow after the striking plough; and in the course of husbandry required to cleanse the intervals, the several flat-hoings cause a far heavier charge than what attends the braking and edge-hoing; and after all, the ground is not so well prepared for a wheat season at Michaelmas, a method of husbandry generally pursued by the Middlesex farmers. One reason may be assigned, he says, why the Kentish husbandry has not yet been adopted by the Middlesex farmers; and this is from the nature of the land in that county, which in many parts is a deep heavy clay, so that on these adhesive soils the *swing-plough* is generally used, and the ground divided into partitions, or (as they are termed) lands, to guard against the contingency of a wet season. But surely, says he, this soil might be worked with a turn-rest-foot plough, and by proper drains be secured from the ill effects of a moist time; and the field being thus laid on a level, the rows might easily be struck out, and the subsequent brakings be executed to advantage during the summer, as usual with the Kentish farmers. It is added, that in those parts of Kent where the round tith husbandry is pursued, the farmers are particularly attentive to the several operations of hoeing and braking the ground during the growth of the beans; for, as the land in that county is of a nature so fertile as not to require the intervention of a summer fallow, they spare no pains in the cultivation of their bean and pea grounds, in order to render it as clean and well pulverized as possible by means of the hoe and brake, so that this latter instrument is scarcely ever out of the field, from the beginning of May till the time when the beans are advanced to that height, as to obstruct the working of it; by which the ground becomes so intimately divided, that every particle of soil in the interspace is exposed to the beneficial influence of the sun and air, and at harvest scarcely a weed is perceptible throughout the crop. In order to destroy what few weeds may remain in the rows, and to give that part of the ground its due share of pulverization, and to cleanse it from the bean haulm, a plough is set to work soon after harvest to spuddle the gratten; and for this purpose a plate of iron is fixed across the share at about four or five inches from the point, and the same axle-tree and wheels are made use of that were before employed for striking out the furrows; and with this plough and two horses three acres of ground may be spuddled in a day, by setting the share point in the interval, so that the iron or lin may embrace a row on each side; and when the whole field is thus spuddled, the harrows and roller are to succeed, by which the haulm and weeds will be completely extricated at a trilling charge, and the ground be laid in readiness for ploughing the seed furrows, at which time those beans or pease which may have been shed will have vegetated, and are destroyed by the plough; so that the farmer may, from this mode of husbandry, be not less confident of growing a clean sward of wheat, than if his ground had been summer fallowed.

On thin, chalky, or gravelly grounds, notwithstanding what has just been urged of the good effects of spudding, he

observes that it would perhaps be more prudent to omit that work, lest it might contribute towards loosening the soil beyond a due medium; for on these soils the chief aim should be to clothe them as much as possible, that at wheat seed-time the surface may be perfectly tight; and therefore to roll and harrow the bean and pea ground on such soils, in order to rid the field of the haulm, &c. and when it has lain some time, to plough the feed furrows, are the whole process necessary to prepare it for the succeeding crop of wheat: and this shows, he thinks, the necessity of sowing with this grain or with pease that part of the farm which is most free from weeds, and in the best heart; not only that these pulses, both of them (especially beans) require to be sown on good land, and on such as has been improved by art, but likewise that the grattens may be so perfectly clean, as not to require the operation of spuddling. In Kent, they cut their beans with a hook, and bind them into sheaves with rope-yarns. These sheaves are set up in shocks of various forms, either five on each side, in the manner of wheat shocks, or in a circular form, four sheaves to the shock. The expence of cutting, binding, and setting up is from 4s. to 6s. or 7s. per acre, according to the degree of goodness in the crop. Some farmers, in such years when the hops have failed, cut up the bind, and reserve it as a substitute for rope yarns to tie up their bean sheaves. But though this practice may at first sight bear the appearance of frugality, it will be found eventually to be the most expensive: as the cutting the hopvines at that season will be apt to cause them to bleed, to the infinite prejudice of the stocks; and thus the future crops may be hazarded by a premature removal of the binding those years when, from the failure of the hops, it should seem to be of no further use. Mr. Marshall, however, recommends the pulling beans in preference to cutting; for, he says, the benefit the soil receives will more than pay for the extra labour in clearing. Another advantage arising from their being pulled, is the stubbornness of the roots keeping the mow open, and admitting a circulation of air. And he says in another place, that by experience he found pulling up by hand far preferable to cutting with sickles; as they may be pulled up not only much faster, but much cleaner from weeds and grass than when cut, besides leaving the land in a state greatly superior. The waste is also less, so much so as to lose scarcely a bean: and the bean stalks are immediately ready to bind and set up; and by the roots lifting them from the ground, the air acquires a free circulation. The work is also easier to the labourer, who stands more upright, and the power required is much less, especially in dry weather. By striking the roots of each handful against the foot, the mould is almost wholly disengaged from the fibres. The soil in the drills, instead of being bound by the roots, and encumbered by the stubble, is left as loose as a garden, and the surface free from obstructions; and if thoroughly hoed, is as fit as a fallow to be sowed with wheat on one ploughing.

Beans are every where an uncertain crop, consequently the average produce difficult to estimate. In Kent, Mr. Young thinks, they probably exceed four quarters; but in Suffolk he should not estimate them at more than three; yet five or six are not uncommon. According to Mr. Donaldson, a crop of beans, taking the island at large, may be supposed to vary from sixteen to forty bushels; but that a good average crop cannot be reckoned to exceed twenty. And in Middlesex, Mr. Middleton tells us, that bean crops vary from ten to eighty bushels per acre. They are rendered a very precarious crop by the ravages of myriads of small black insects of the same species. The *lady-ticks* are supposed either to generate or feed on them, as they are observed to be much among them. Mr. Foot says,

the average produce is from three and a half to four quarters per acre.

It is asserted, by the author of the Synopsis of Husbandry, that bean straw, if well harvested, forms a very hearty and nutritious diet for cattle in the winter-time; and that both oxen and horses, when not worked, will thrive on it. Sheep are also very fond of browsing on the pods; and the *cavings* are very nutritious manger meat for horses. But in Middlesex the straw is generally employed in bedding the farmer's horses and other cattle, and in littering the farm yards, where it is picked over by young stock; though sometimes a load is sold for 20s. or 25s. delivered in. When the bean-straw and the *caving-chaff* are made use of as a fodder for cattle, they should always be newly threshed, as in that state they are much more nutritious than when they have been kept some length of time.

Crops of this kind are for the most part applied to the purpose of feeding horses, hogs, and other domestic animals. In the county of Middlesex all are given to horses, except what are preserved for seed, and such as are podded while green, and sent to the London markets. When pigs are fed with beans, it is observed that the meat becomes so hard as to make very ordinary pork, but good bacon. It is also supposed that the mealmen grind many horse-beans among wheat, to be manufactured into bread. And Dr. Darwin remarks in his *Phytologia*, that a strike or bushel of oats weighs perhaps forty pounds, and a strike or bushel of peas and beans sixty pounds; and that as the skin of peas and beans is much less in quantity than that of oats, he supposes there may be at least fifteen pounds of flour more in a strike of peas and beans than in a strike of oats. There is also reason to believe, he says, that the flour of beans is more nutritive than that of oats, as appears in the fattening of hogs; whence, according to the respective prices of these two articles, he suspects that peas and beans generally supply a cheaper provender for horses than oats, as well as for other domestic animals. But as the flour of peas and beans is more oily, he believes, than that of oats, it may in general be somewhat more difficult of digestion; hence, when a horse has taken a stomach full of peas and beans alone, he will be less active for an hour or two, as his strength will be more employed in the digestion of them, than when he has taken a stomach full of oats. Hence it may be found advisable to mix the bran of wheat with the peas and beans, a food of less nutriment but of easier digestion; or to let the horses eat before or after them the coarse tustocks of four grass, which remain in moist pastures in the winter; or lastly, to mix finely cut straw with them.

BEAN, in *Gardening*. See VICIA.

BEAN-Goose. See ANAS.

BEAN, *Ignatius's*. See IGNATIUS'S BEAN.

BEAN, *Kidney, or French*, in *Botany*. See PHASEOLUS.

BEAN, *Kidney, Tree*. See GLYCINE.

BEAN, *Malucca*, the *anacardium orientale*, is a fruit of a shining black colour, of the shape of a heart flattened, with a very thick pedicle occupying almost the whole basis. For the characters of the plant that produces it, see AVICENNIA *Tomentosa*; and for its qualities, see ANACARDIUM.

BEAN, *Molucca*, a name given by sir Robert Sibbald in his *Prodromus*, and by Mr. Wallace in his description of the Orkney islands to a sort of fruit frequently cast on shore in the north-west islands of Scotland, especially on the coasts most exposed to the waves of the great ocean. They are called by some Orkney beans, and are not the produce of that island, or indeed of any other part of Europe, but of America. Sir Hans Sloane procured four species of them

little injured by the sea, and found on examination that three of them were the common produce of the island of Jamaica; where he had himself gathered them, and described them in his catalogue and history.

The first sort was a kind of kidney bean, and the plant which produces it is described by sir Hans under the name of the great perential kidney bean, with a great crooked lobe. It is also figured in the Hortus Malabaricus by the name of *perin kalvoni*, and sir Robert Sibbald also calls it *pus Inca ex qua pyxides pro pedale sernario parant*. This is a native of the East and West Indies, and is sometimes found thrown on shore in the county of Kerry in Ireland, and in some other places. A second kind of fruit thrown on shore in the Orkneys, is a very common fruit in Jamaica, known there by the name of the horse-eye bean; it has this name from its resembling the eye of some large animal, by reason of a *hilus* or welt which surrounds it. This is described by many authors, and among the rest by sir Hans Sloane, in his catalogue of Jamaica plants; and is found in many other of the hotter parts, both of the East and West Indies. A third kind of fruit found on these shores, is that called by the people of Jamaica the ash-coloured nickar nut; it has this name from its colour, and from its being perfectly round, of the shape of a nickar, or marble, such as boys play with. This is also common in the East and West Indies. A fourth kind is also a Jamaica fruit, with the history of which we are not yet well acquainted; nobody has seen it growing, but the fruit itself is preserved in many of the collections of the curious, and has been figured and described by Clusius and others under the name of a round exotic fruit rigid with four rising nerves.

These are the principal kinds of fruits thus tossed on shore with us; but how the products of Jamaica, or other parts of America, should be brought to the shores of Scotland and Ireland, seems difficult to determine on any certain foundation. It is easy to conceive, that when they grow by the sides of rivers, they may fall off from the trees into them, and be thence conveyed into the sea. It is likewise easy to see, that when they are thus floating on the surface of the sea, they may be carried about by the winds and currents to a considerable distance; but their motion this way must naturally be stopped by the main continent of America, and they must be forced through the gulf of Florida, or the canal of Bahama, going thence constantly east, and into the North American sea. This is easily conceived by a similar fact which happens every day; which is, that a kind of sea lentil, called *jirgasso*, which grows very plentifully on the rocks about Jamaica, is washed off from thence, and carried by the winds and currents, which for the most part go impetuously the same way, toward the coast of Florida, and thence into the North American ocean, and is there found floating on the surface. Thus far it is easy to trace our fruits from their native soil: but how after this they should be forwarded to us is unaccountable, unless we suppose, that as ships when they go south expect a trade easterly wind, and when they come north expect and generally had a westerly wind, for at least two parts in three of the year; so these fruits being brought north by the current from the gulf of Florida, are put into the way of these westerly winds, and by them conveyed to the coasts of Scotland and Ireland. Philosoph. Transact. N^o 222. p. 300.

By the same means that these beans came to Scotland, it is reasonable to believe that the same winds and currents brought from America those several things towards the Azores and Porto Santo, which are recorded by Ferdinand Columbus in the life of his father; which gave this bold adventurer the first notion that there was such a place as Ame-

rica. Among the things he mentions as washed ashore in this manner, was a piece of wood very ingeniously wrought, but evidently without the help of iron tools. This was taken up by a Portuguese pilot, four hundred and fifty leagues from shore, off cape St. Vincent, after a west wind which had blown violently for many days; after this such another piece of wood was taken up on the shore of Porto Santo, after such another long and violent west wind. Large canes, vastly superior to any of the growth of the then known parts of the world, were also found thrown on the same shores, and the fruits of pines which did not grow in any known part of the world; and finally the bodies of two men appearing to be of a different nation from any of the known people, and two of the canoes, were driven on shore on the island Flores, one of the Azores. All these things having been found only after strong and continued west winds, it appeared very evident, that there must be land somewhere to the west, where fruits and men were to be found; and that these men had no knowledge of our arts, by their want of iron. From these conjectural conclusions sprung the greatest discovery of modern times.

BEAN Stalks. The ashes of bean stalks make good and clear glass.

BEAN Tree, Erythrina. See CORALLODENDRON.

BEAN Tree, linding. See MIMOSA.

BEAN Trefoil. See ANAGYRIS, and CYTISUS.

BEAN is also used by some *Anatomists* to denote the *glans of the penis*, on account of its figure and resemblance to that pulse.

BEAN is also improperly used for a weight, containing the third part of a scruple.

BEANA, in *Ancient Geography*, a town of Asia, placed by Ptolemy in Babylonia.

BEAR, in *Astronomy*, a name given to two constellations called *the Greater* and *the Lesser Bear*, or *Ursa major* and *minor*.

The pole star is said to be in the tail of the *Lesser Bear*; this star is never above two degrees distant from the north pole of the world. See URSA.

BEAR, or **BERE**, in *Agriculture*, is a species of barley cultivated in Scotland and Ireland, and the northern parts of England. It yields a large return, but is not esteemed so good for malting as the common barley.

BEAR, in *Zoology*. See URSUS.

BEAR, Ant. See TAPIR, and ANT-EATER.

BEAR, Polar. See POLAR Bear and URSUS.

BEAR, Sand, is supposed to be a variety of the badger, or URSUS *Meles*, and the same animal which naturalists have described under the name of the "sow-badger." Its colour is a yellowish white; its eyes are small, and its head thicker than that of the common badger; its legs are short, and on each foot are four toes, armed with sharp white claws. It is almost without hair, very sensible of cold, and burrows in the ground.

BEAR, Sea. See SEA-Bear.

BEAR'S Flesh, was much esteemed by the ancients: even at this day the paw of a bear salted and smoked is served up at the tables of princes.

Bear's flesh is reckoned one of the greatest rarities among the Chinese; insomuch that, as Du-Hakle informs us, the emperor will send fifty or a hundred leagues into Tartary, to procure them for a great entertainment. The flesh is reckoned such a dainty among the inhabitants of Kamtschatka, that they seldom eat it alone, but usually invite a number of guests to partake of the delicious repast. The intestines also, when cleansed and properly scraped, are worn by the fair-sex as masks to guard their faces from the sun-beams,

which being reflected from the snow, are generally found to blacken the skin; by which means the Kamtshadale ladies preserve a fine complexion. The Russians of Kamtshatka make window-panes of these intellines, which are as clear and transparent as those made of Muscovy glass. Of the shoulder blades of the bear are made sickles for cutting grass; and the heads and the haunches are hung up by the Kamtshadales, as ornaments or trophies, on the trees about their dwellings.

BEAR's *Grease*, is esteemed by some a sovereign remedy against cold disorders, especially rheumatifins. Some have also employed it with success in the gout, and against tumors and ulcers. To be good, it must be newly melted, greyish, glutinous, of a strong disagreeable smell, and a moderate consistence. That which is too white is adulterated with common tallow. It is now much used by hair-dressers, and is said to be of service in thickening the hair, and for other purposes.

The inhabitants of Kamtshatka hold in high estimation the fat of the bear, as a very savoury and wholesome nourishment; and when melted and thus rendered fluid, it supplies the use of oil.

BEAR's *Skin*, makes a fur in great esteem, and on which depends a considerable article of commerce, being used in housings, on coach-boxes, &c. In some countries, cloaths are made of it, more especially bags wherein to keep the feet warm in severe colds. Of the skins of bears' cubs are made gloves, muffs, and the like. It is used in Russia for beds, covertures, caps, gloves, and collars for their sledge-dogs. Those who traverse the ice for the capture of marine animals make their shoe-soles of bears' skin, which prevents the danger of slipping. A light black bear skin is one of the most comfortable and costly articles of the winter wardrobe of a man of fashion at Petersburg or Moscow; and even the small white hand of a belle is slipped into the large bear muff, which covers the half of her elegant shape. The exportation of bear-skins forms a very considerable article of Russian commerce, independently of those that are used for home consumption.

BEAR *Garden*, a place where bears and other beasts are exposed as a public spectacle to be baited. See BAITING.

BEAR, *hunting and killing of the*. The bear is in a variety of respects so useful an animal in Russia and northern countries, that the inhabitants have devised several ingenious methods of taking and destroying them. The most usual way of killing this animal is with fire arms, and spears or darts. The Laplanders knock them down with clubs, as they can easily overtake them in running with their snow-shoes; but they are generally first shot, and then dispatched with spears. In some parts of Siberia, the hunters erect a scaffold of several balks laid on one another, which falling down, crushes the bear, on his slipping upon the trap placed under it. Another method is to dig pits, in which is fixed a smooth, solid, and very sharp-pointed post, which rises about a foot above the bottom. The pit is carefully covered with sods, and across the track of the bear is stretched a thin rope with an elastic bug-bear. As soon as the bear touches the rope, the wooden bug-bear starts loose; and the scared animal, endeavouring to save himself by flight, falls with violence into the pit, and is killed by the pointed post. If he escape this snare, at a small distance, perhaps, several caltrops (see CALTROP) and other instruments of annoyance await him, amongst which a similar terrific log is erected, and where the persecuted beast, the more he strives to get free, fixes himself more firmly to the spot at which the blood-thirsty hunter lies in ambush for him. The Koriaks find out a crooked tree, which is grown up in the form of a gibbet, and at the

bent summit of it they attach a noose, with a bait suspended to it. The hungry bear, thus allured, eagerly climbs up the tree, and on his moving the branch, the noose draws to gether, and the animal remains suspended to the tree. But the method adopted by the inhabitants of the mountainous parts of Siberia to make this ferocious animal kill himself is more singular and ingenious. They fasten a very heavy block to a rope, terminating at the other end with a loop. This is laid near a steep precipice on the path which the bear usually takes. On having his neck in the noose, and finding that he cannot proceed on account of the clog, he takes it up in a rage, and to free himself from it, throws it down the precipice, which of course pulls him after it, and he is commonly killed by the fall. Should this accidentally not be the case, he drags the block again up the acclivity, and renews his efforts, till with increasing fury he either sinks to the ground, or kills himself by a decisive plunge.

The white or polar bear (*Ursus Maritimus*) lives on the coast of the Frozen ocean, and in some of the eastern and northern isles, where the chase of him is a collateral occupation of the mariners who visit these coasts for the capture of the morie. Black bears are so numerous in Kamtshatka, that they are seen roaming about the plains in troops, and must long since have been exterminated, if they were not here more tame and gentle than in any other part of the world. In spring, they descend from the mountains where they have wintered, to the mouths of the rivers for catching fish, which swarm in all the streams of that peninsula. If the fish are plentiful, they eat only the heads; and when they find nets laid in any place, they dexterously drag them out of the water, and empty them of the fish. Towards autumn, when the fish go up the rivers, they advance with them gradually to the mountains. When a Kamtshadale espies a bear, he endeavours to conciliate his friendship at a distance, accompanying his gestures by courteous words. Indeed they are so familiar, that the women and girls, when they are gathering roots and herbs, or turf for fuel, are never disturbed in their employment, even in the midst of a whole drove of bears; and if one of these animals comes up to one of them, it is merely to take something out of their hands. They have never been known to attack a man, except when they are roused from their sleep, and they seldom turn upon the marksmen whether they be hit or not. Notwithstanding this gentleness of the bear, its utility renders it a valuable object of prey. When the hunter and the bear meet, the contest is generally bloody, but it generally terminates to the advantage of the artful huntsman. Armed with spears and clubs, the Kamtshadale goes in quest of the peaceful bear in his calm retreat; who, thinking only of his defence, takes the faggots brought by his pursuer, and choaks with them the entrance into his den. The mouth of the cavern being closed, the hunter bores a hole through the top, and then with the greatest security spears his defenceless foe. Tooke's View of Russia, vol. ii. p. 442, &c.

Dr. Barton, in his "Fragments of the Natural History of Pennsylvania," informs us, that the bears migrate in great numbers, every autumn across the Mississippi, proceeding south, perhaps to the mountains of New Mexico, in search of a milder climate. In the spring they return again by the same route. This migration of the bears is particularly observed at Manchar, on the Mississippi.

BEAR *leading*, to shew tricks, is an ancient practice, which we find prohibited in the canons of the church. Du-Cange.

BEAR *wards ursarii*, were a kind of servants in great families among the Romans, who had the care of breeding and feeding those animals. Pitisc. Lex. Ant. tom. ii.

p. 1110. Our nobility had formerly officers of this kind. The annual salary of one of them belonging to the fifth earl of Northumberland was twenty shillings. Northumb. Household Book.

BEAR-Tribe, in *Geography*, one of the tribes into which the American Indians of the Six Nations are distributed. See SIX-NATIONS.

BEAR, *Order of the*, was a military order in Switzerland, erected by the emperor Frederic II. in 1213, by way of acknowledgment for the service the Swifs had done him, and in favour of the abbey of St. Gal. To the collar of the order, which was a gold chain interlaced with a chaplet of oak-leaves, hung a medal of gold, on which was represented a bear raised on an eminence of earth; or a bear fable on a ground vert.

BEAR-berry, in *Botany*. See ARBUTUS.

BEAR-blind. See CONVULVUS.

BEAR'S breech. See ACANTHUS.

BEAR'S ears. See PRIMULA *Auricula*.

BEAR'S ears fanile. See VERBASCUM.

BEAR'S foot. See HELLEBORUS.

BEAR-a-hand, a naval term, synonymous with make haste, or dispatch. See BEARING.

BEAR'S Bay, in *Geography*, or *Little Port*, lies at the east end of Anticosti island, at the mouth of the river St. Lawrence, in North America.

BEAR'S Bay, or *Whit-Bear Bay*, is a very deep bay on the south coast of the island of Newfoundland, towards its west end.

BEAR'S Cape, the south-east point of St. John's island, near Nova Scotia, in North America. N. lat. 45° 53'. W. long. 62° 40'.

BEAR Cove, lies on the east side of the south-eastern corner of the island of Newfoundland, at the head of which is the settlement of Formose. It is a good fishing-place for boats. Reneau's rocks are situated between Bear-Cove and Fresh-water bay on the south, 32 miles northerly from cape Race.

BEAR Creek, a water of Tennessee river. See OCCO-CHAPPO.

BEAR'S Graf-Creek, a small creek on the eastern side of Ohio river, north of the town of Louisville, in Kentucky, and near it. A canal is proposed to be cut from this creek to the rapids of the Ohio, which would render the navigation of this river safe and easy. The country on the side of this creek, between Salt river and Kentucky river, is rich and beautiful.

BEAR Island, an island near the entrance of Bantry bay, in the county of Cork, Ireland. It is about six miles long, and is very craggy, mountainous, and rugged, but is of great use in defending the noble bay from the fury of the south-west winds, so that vessels within the land may ride secure. N. lat. 51° 35'. W. long. 9° 45'. The whole bay was formerly called *Bearlawn*; but this name is now confined to that part between the island and the peninsula of *Bear*, on which is the small town of Castleton. South-Cork. Beaufrt. See BANTRY.

BEAR, and BANTRY, the name of a barony in the western part of the county of Cork, Ireland, which is very mountainous, and with the adjacent parts of Carbery and Muskerry, is the forest and best improved part of the county.

BEAR, North, a small island in St. John's bay, Hulfon's bay. N. lat. 54° 40'. W. long. 80°. — Another small island in the same bay is called *South Bear*. N. lat. 54° 35'. W. long. 80°.

BEAR, or Cherry Island, lies on the coast of Greenland, N. lat. 74° 28'. E. long. 17° 53'.

BEAR Lake, Great, is situated in the north-west part of North America, near the Arctic circle, in N. lat. 65°, and W. long. 121°; and a river flows from it in a W. N. W. course, called Great Bear river, which runs into Mackenzie's river.

BEAR Lake, Black, lies in New South Wales, North-west from Cumberland house. N. lat. 53° 30'. W. long. 107° 30'.

BEAR Lake, White, lies due west from another small lake called Bear lake, both in N. lat. 48° 15'; and the former in W. long. 98° 30'. These lakes are said to give rise to the river Mississippi.

BEARS, White, Point of, the east point of St. Peter's river, on the coast of Labrador, in North America, so called from the great number of bears that were seen there. N. lat. 51° 55'. W. long. 55° 30'.

BEAR'S Port, one of the ports on the coast of Nova Scotia, in North America, between port and cape de l'Heve to the north-east, and cape Sable, the south-west point of Nova Scotia.

BEAR River, a river of the north-west part of North America, which runs into the Unjigah, or Peace river, in N. lat. 56° 12'. W. long. 119° 28'.

Great BEAR River. See BEAR Lake.

BEAR Rocks, New, are situated about south by west from the extreme west point of the island of Jamaica. N. lat. 16° 20'. W. long. 78° 55'.

BEAR Sound, or *Barfund*, lies on the west coast of West Greenland. N. lat. 62° 20'. W. long. 49°.

BEAR Town, a town of America, in Caroline county, Maryland, about 7 miles north of Greensburg, and about 15 south-east from Chester-town.

BEAR, to, denotes to bring forth young, or to produce fruit.

BEARALSTON, in *Geography*. See BEERALSTON.

BEARD, JOHN, in *Biography*, an energetic English singer, and an excellent actor, was brought up in the king's chapel. He knew as much of music as was necessary to sing a single part at sight; and with a voice that was more powerful than sweet, he became the most useful and favourite singer of his time, on the stage, at Ranelagh, at all concerts; and in Handel's oratorios he had always a capital part; being by his knowledge of music the most steady support of the chorusses, not only of Handel, but in the odes of Green and Boyce. Having married for his second wife a daughter of Rich, the patentee of Covent-garden theatre, upon the death of his father-in-law, he became manager of that play-house, and discontinued all public singing; which a deafness that had been long increasing rendered necessary. His first marriage was with a lady of quality, a sister of the late Earl of Walgrave, to whom he was a very indulgent and tender husband; and he proved himself to be a man of honour and principle in every transaction of his life. There were so much intelligence and humour in his acting and singing comic parts on the stage, and Scots and Irish ballads in private, as well compensated for deficiencies of voice. He was closely united by friendship to Dr. Boyce, in the performance of whose music he manifested a zeal and even a partiality which were not discoverable for that of any other composer. He died in 1791.

BEARD, in *Geography*, a town of France, in the département of Nièvre, and chief place of a canton in the district of Decize, on the Loire; 10 miles S. E. of Nevers.

BEARD, in *Physiology*, the hair growing on the chin, and adjacent parts of the face; chiefly of adults and males.

Various have been and still are the ceremonies and customs of different nations with regard to the beard: Kingdon assures us, that a considerable branch of the religion of the Tartars consists in the management of their beards; and that they waged

waged a long and bloody war with the Persians, and declared them infidels, though, in other respects, of the same faith with themselves, merely because they would not cut their whiskers after the mode or rite of the Tartars. The Spartans, from the age of 20 years, suffered their hair and beards to grow: the hair being deemed an ornament, which became the freeman and warrior. A Spartan being once asked why he wore so long a beard, replied, "Since it is grown white it incessantly reminds me not to dishonour my old age." Nevertheless, as they were accustomed to obedience, even in things the most indifferent, the ephori, when they entered on office, proclaimed, by sound of trumpet, a decree, commanding the people to shave their upper lips, and to submit to the laws. The Egyptian priests shaved the head, chin, and whole body. Accordingly, most of the Egyptian figures are without beard. However, Herodotus informs us, that in time of calamity, they suffered their beard and hair to grow. The Assyrians had long beards; and Chrysofom observes, that the kings of Persia had their beards woven or matted together with gold thread; and some of the first kings of France had, in the same manner, their beards matted and knotted with gold. The Africans wore long beards, as may be seen on the medals of Juba. The Greeks, if tradition may be credited, wore long beards from their heroic times. Cedrenus informs us, that at Constantinople, in the thermæ of Zeuxippus, there was a statue of Homer with a long beard.

Athenæus, from Chrysofom, observes, that the Greeks always wore their beards till the time of Alexander; and that the first who cut it at Athens ever after bore the addition of *νοστις*, *shaven*, on medals. Plutarch adds, that Alexander commanded the Macedonians to be shaven, lest the length of their beards should give a handle to their enemies: however this be, we find Philip, his father, as well as Amyntas and Archelaus, his predecessors, represented on medals without beards. The Greeks continued to shave the beard till the time of Justinian, under whose empire long beards came again into fashion, and so continued till Constantinople was taken by the Turks. The Greek philosophers distinguished themselves from the vulgar by their long beards. According to Laertius (l. vi.) Antisthenes was the first of the philosophers who suffered his beard to grow. This custom, however, among the philosophers, was not invariable, for the scholiast of Aristophanes (Nub. 120.) pretends, that the ancient philosophers shaved their beards. The Roman philosophers affected to preserve the same distinctive characters of the mantle and long beard.

Thus Horace describes them :

———"Tempore quo me
Solatus jussit sapientem pascere barbam."

Sermon. l. ii. sat. iii. v. 34.

Aulus Gellius and Lucian express themselves in a similar manner. Persius seems to have been so convinced of the beard's being the symbol of wisdom that he thought he could not bestow a greater encomium on Socrates than calling him "Magistrum barbatum." The Sicilians, and the Etruscans, adopted the customs of the Greeks. The latter exhibited all their deities with a beard, except Vulcan, but on the medals of the former their kings appear without a beard.

The Romans for a long time wore beards and long hair. Cicero in his oration for Cælius, (c. 14.) mentions the "barba horrida, quam in statuis antiquis & imaginibus videmus." Livy (v. 51.) speaking of the senators, who remained in Rome, after the entrance of the Gauls, says that they wore a very long beard: "barbam, ut tum omnibus promissa erat." Scipio Africanus appeared with a long beard in his interview with Masinissa. Hence Ovid calls the ancient Romans "intonfi;" thus,

"Hoc apud intonfos nomen habebat avos." Fæst. ii. 26. Juvenal also (Sat. xvi.) describes them in the same manner.

"Et credam dignum barbâ, dignumque capillis
Majorum."

Pliny observes, that the Romans did not begin to shave till the year of Rome 454, when P. Ticinius brought over a number of barbers from Sicily; he adds, that Scipio Africanus was the first who introduced the mode of shaving every day. The philosophers, however, retained the beard; and the military men wore it short and frizzled, as we see it upon the triumphal arches, and other monuments. In time of grief and affliction they suffered their beard and hair to grow, as was the case with M. Livius in his retirement from Rome, and with Augustus after the defeat of Varus. The Greeks, on the contrary, in time of grief, cut their hair and shaved their beards, (Seneca Benef. v. 6.) which was also the custom among some barbarian nations. Accordingly, the custom of letting the beard grow is a token of mourning in some countries, and of shaving it in others. The first fourteen Roman emperors shaved, till the time of the emperor Adrian, who retained the mode of wearing the beard. Plutarch tells us he did it to hide the scars in his face.

Antoninus Pius and Marcus Aurelius wore a beard under the character of philosophers. The successors of Justinian resumed the habit of wearing beards, and the latter Greek emperors had them of an extraordinary length. The ancient Britons in the time of Cæsar shaved the rest of the body, except the head and upper lip: "Capillos ac barbam radere præter caput, et labrum superius." Bell. Gall. l. v. c. 14. Diodorus Siculus and Tacitus inform us, that the ancient Germans shaved the beard, except that on the upper lips; and, among the Catti, a nation of Germany, a young man was not allowed to shave or cut his hair till he had slain an enemy. Tac. de Mem. Germ. 31. Among the Jews it was reckoned ignominious to shave a person's beard. 2 Sam. x. 4. Strabo relates, that the Indian philosophers, the Gymnosophists, took great pains to attract the veneration of the people by the length of their beards. The Goths and Franks wore only a mustache, called by Plutarch *μυστακα*, and by the Latins "crisla." While the Gauls were under their sovereignty, none but the nobles and Christian priests were allowed to wear long beards. When the Franks made themselves masters of Gaul, they assumed the same authority as the Romans; the bondsmen were expressly ordered to shave their chins; and this law continued in force till the entire abolition of servitude in France. In the time of the first race of kings, a long beard was a sign of nobility and freedom; and the kings were emulous to have the largest beards. Eginard, secretary to Charlemagne, speaking of the last kings of the first race, says, they came to the assemblies in the field of Mars, in a carriage drawn by oxen, and sat on the throne with their hair dishevelled, and a very long beard.

It is not easy to fix with precision the time when the beard was first shaven among the young Romans. It was sometimes when the toga virilis was assumed, according to Suetonius (Calig. 10.) Macrobius (Somn. Scip. i. 6.) says, it was about the age of 21. Augustus did not shave before the age of 25. Hence young men with a long down, or "lanugo," upon the chin, were called "juvenes barbati," or "benè barbati." The first growth of the beard was consecrated to some god, usually to the Lares. Nero consecrated his in a golden box, set with pearls, to Jupiter Capitolinus. The day on which the young men, among the Greeks and Romans first shaved the beard, was a festival; visits of ceremony were paid them; and they received presents from their friends. To this purpose, Juvenal says, Sat. iii. 186.

"Ille

"Ille metit barbam, crinem hie deponit amari:
 "Plena domus libis genialibus."

Slaves, among the Romans, wore their beard and hair long; when manumitted they shaved the head in the temple of Teronina, and put on a cap, or "pileus," as a badge of liberty. Those who escaped from shipwreck, shaved their heads; and persons acquitted of capital crime, cut their hair and shaved, and went to the capitol to return thanks to Jupiter.

Persons of quality had their children shaved the first time by one of the same, or greater quality, who by this means became their fathers, or adoptive fathers of the children. Anciently, indeed, a person became god-father of the child by touching his beard; thus historians relate, that one of the articles of the treaty between Alaric and Clovis was, that Alaric should touch the beard of Clovis to become his god-father.

As to ecclesiastics, the discipline has been very different on the article of beards: sometimes they have been enjoined to wear them from a notion of too much effeminacy in shaving, and that a long beard was more suitable to the ecclesiastical gravity; and sometimes again they were forbid it, as imagining pride to lurk beneath a venerable beard. The Greek and Romish churches have long disputed together about their beards; since the time of their separation, the Romanists seem to have given more into the practice of shaving, by way of opposition to the Greeks; and have even made some express constitutions "de radendis barbis." The Greeks, on the contrary, espouse very zealously the cause of long beards, and are extremely scandalized at the beardless images of saints in the Roman churches.

By the statutes of some monasteries, it appears, that the lay-monks were to let their beards grow, and that the priests among them to shave; and that the beards of all that were received into the monasteries were blessed with a great deal of ceremony; and there are still extant the prayers used in the solemnity of consecrating the beard to God, when an ecclesiastic was shaven.

Le Comte observes, that the Chinese affect long beards extravagantly; but nature has balked them, and only give them very little ones, which, however, they cultivate with great care; the Europeans are strangely envied by them on this account.

The Russians wore their beards till within these few years, when the czar Peter enjoined them all to shave; but, notwithstanding his injunction, he was obliged to keep on foot a number of officers to cut off by violence the beard of such as would not otherwise part with them. For enforcing his regulations, which was violently opposed, he laid a tax on long beards, and many submitted to it rather than part with their beard, which was universally held to be an ornament to the person. Superstitious Russians even thought it to be an external characteristic of the orthodox faith; and those who were too poor, or too parsimonious, to pay the tax for retaining the beard, religiously preserved the beard that was shorn off, and had it deposited in the coffin with them on their decease, that they might present it to St. Nicholas, on his refusing to admit them as beardless christians, into the kingdom of heaven. As a proof of the high estimation in which the beard was held in Russia in early times, it is a law in the Novgorod an code, that whoever plucks hair from another's beard shall be indicted four times as much as for cutting off a finger.

In the 10th century, king Robert of France, the rival of Charle the simple, was not more famous for his exploits than for his long white beard, which he suffered to hang down on the outside of his surcoat, to encourage the troops in battle, and to rally them when defeated. Upon the death of the

great Henry IV. of France, who was succeeded by a beardless youth, the beard was proscribed. Louis XIII. ascended the throne of his glorious ancestor without a beard; and his courtiers immediately reduced their beards to whiskers, and a small tuft of hair under the lower lip. The duke of Sully, however, though he encountered ridicule, would never adopt this effeminate custom. Whiskers continued in fashion in the commencement of the reign of Louis XIV. who, as well as his courtiers, were proud of wearing them; so that they were the ornament of Turenne, Coadé, Colbert, Corneille, Moliere, &c.

In Spain, Philip V. ascended the throne with a shaved chin; and the courtiers imitated the prince, and their example was followed by the people. The change, however, produced lamentations and murmur. Hence arose the Spanish proverb, denoting, "Since we have lost our beards, we have lost our souls." The Portuguese, whose national character is much the same, have imitated them in this respect. Accordingly we read, that in the reign of Catherine queen of Portugal, when the brave John de Castro had taken the Calle of Din, in India, he was under the necessity of borrowing from the inhabitants of Goa a thousand pistoles for the maintenance of his fleet; and that as a security for the loan, he left them one of his whiskers, telling them "all the gold in the world cannot equal the value of this national ornament of my valour; and I deposit it in your hands as a security for the money." The inhabitants of Goa, it is said, generously returned both the money and his whiskers.

We have already observed, that the ancient Britons, in the time of Cæsar, shaved the body, except the beard and the upper lip; the hair of which they, as well as the Gauls, allowed to grow to a very inconvenient length. The Anglo-Saxons, on their arrival in Britain, and for a considerable time after, allowed their beards to grow, as well as their near neighbours the Longobards, to whom in every respect they bore a near resemblance. After the introduction of Christianity, their clergy were obliged to shave their beards, in obedience to the laws, and in imitation of all the western churches. This distinction between the clergy and the laity subsisted for some time; and a writer of the seventh century complains, that the manners of the clergy were so corrupted that they could not be distinguished from the laity by their actions, but only by their want of beards. By degrees the English laity began to imitate the clergy so far as to shave all their beards except their upper lips, on each of which they left a lock of hair; by which they were distinguished from the French and Normans, who shaved their whole beards. The Normans had as great an aversion to beards as they had a fondness for long hair. Among them, to allow the beard to grow, was an indication of the deepest distress and misery. They not only shaved their beards themselves, but when they had authority, they obliged others to imitate their example. It is mentioned by some of our ancient historians, as one of the most wanton acts of tyranny in William the Conqueror, that he compelled the English, who had been accustomed to allow the hair of their upper lips to grow, to shave their whole beard. This was to disagreeable to some of that people, that they chose rather to abandon their country than resign their whiskers. In the fourteenth century long beards were in fashion, and continued to the sixteenth century; so that in the reign of Mary I. the beards of bishop Gardiner and cardinal Pole, appear in their portraits to be of a most uncommon size. The lawyers, however, had a regulation imposed upon this important feature. Toward the close of the sixteenth century, the beard was much lessened, and gradually divided into mutton-chin or whiskers; and in process of time the practice of shaving the whole face became universal.

Among

Among the Turks, it is more infamous for any one to have his beard cut off, than among us to be publicly whipt, or branded with a hot iron. They who serve in the seraglio have their beards shaven as a token of servitude; and when they are set at liberty, they permit it to grow. With them and the Persians the beard is a mark of authority and liberty; and the want of mustachios and beards discriminates slaves and women. Hence, it is said, arises the unfavourable idea which they form on the first sight of an European. There are many in that country who would prefer death to this kind of punishment. The Arabs make the preservation of the beard a capital article of religion, because Mahomet never cut his. The Moors of Africa hold by their beards while they swear, in order to give validity to their oath, which after this formality they rarely violate.

The Turkish wives kiss their husbands' beards, and children their fathers', as often as they come to salute them. The men kiss one another's beards reciprocally on both sides, when they salute one another in the streets, or come off from a journey.

The Jews wear a beard on the chin, but not on the upper lip or cheeks. Moses forbids them to cut off entirely the angle or extremity of their beard; that is, to imitate the Egyptian fashion, who left only a small tuft at the extremity of the chin; whence the Jews to this day suffer a little fillet of hair to grow from the lower end of their ears to their chins, where, as well as on their lower lips, their beards form a pretty long bunch. In time of mourning the Jews neglected to trim their beards, that is, to cut off what was superfluous on the upper lips and cheeks. In time of great affliction they also plucked off the hair of their beards.

It has been advanced by several historians and travellers, that the Indians of America differed from other males of the human species in the want of one very characteristic mark of the sex, viz. that of a beard. From this general observation, the Esquimaux have been excepted; and hence it has been supposed, that they had an origin different from that of the other natives of America. Mr. Causland, after ten years residence at Niagara, in the midst of the Six Nations, with frequent opportunities of seeing other nations of Indians, affirms, that they do not differ from the rest of men in this particular more than one European differs from another; and as this imperfection has been attributed to the Indians of North America, equally with those of the rest of the continent, he inclines to think, that the assertion is as void of foundation in one region as it is in the other. All the Indians of North America, says this writer, except a very small number, who, from living among white people, have adopted their custom, pluck out the hairs of the beard; and as they addict themselves to this practice from its first appearance, it may be supposed, that to a superficial observer, their faces will seem smooth and beardless. As farther proofs that they have beards, he alleges that all of them have an instrument which they use for plucking out the hairs; that when they neglect this for some time, hairs sprout up, and are seen upon the chin and face; that many Indians allow tufts of hair to grow upon their chins or upper lip; and that several of the Mohocks, Delawareans, and others, who live among white people, sometimes shave with razors, and sometimes pluck their beards out. Accordingly, colonel Butler affirms, that the men of the Six-Nation Indians have all beards naturally, which is also the case with respect to all other nations of North America, which he has had an opportunity of seeing; but that it is the general practice of the Indians to pluck out the beard by the roots from its earliest appearance; and hence their faces appear smooth. The same fact is confirmed by Captain Brent. Phil. Transf. vol. lxxxvi. p. 229. &c.

BEARD, *anointing the*, with unguents, is an ancient practice both among the Jews and Romans, and still continues in use among the Turks; where one of the principal ceremonies observed in serious visits, is to throw sweet-scented water on the beard of the visitant, and to perfume it afterwards with aloes wood, which sticks to this moisture, and gives it an agreeable smell, &c.

In *Middle age Writers* we meet with *adlentare barbam*, used for stroking and combing it to render it soft and flexible.

The Turks, when they comb their beards, hold a handkerchief on their knees, and gather very carefully the hairs that fall; and when they have got together a certain quantity, they fold them up in a paper, and carry them to the place where they bury the dead.

BEARD, *plucking the*, was practised to Cynics by way of contempt. The Stoics, as well as Cynics, affected to be insensible to injury, and their patience was tried by this practice. Socrates was not exempt from this species of insult and persecution, as we are informed by Diogenes Laertius. Horace says to a person of this description:

“———Vellunt tibi barbam

Laseivi pueri.”

Sermon. Sat. 3, 133.

And Persius (Sat. i. 133.)

“Si Cynico barbam petulans Nonaria vellat.”

The same satyrist represents Jupiter as offering his beard to be plucked by Dionysius the tyrant:

“Idcirco flodiam præbet tibi vellere barbam
Jupiter.”

Some authors also speak of *mortgaging the beard*, *barbam hypothecare*. Du-Cange.

BEARD, *touching the*, was an action anciently used by supplicants, and by those who made vows. An instance of this is found in Homer (Il. κ. 454.): and Pliny (ii. 45.) says, that the ancient Greeks had a custom of touching the chin of a person, whose compassion they wished to excite; the chin being substituted for the beard. Instances of a singular kind occur in the Orestes and Hecuba of Euripides. To touch any one's beard, or cut off a small part of it, was among the ancient French, the most sacred pledge of protection and confidence. For a long time all letters, issuing from the sovereign, had, for greater satisfaction, three hairs of his beard in the seal. A charter of 1121, still extant, concludes with the following words: “Quod ut ratum et stabile perseveret in posterum, presentis scripto sigilli mei robur apposui cum tribus pilis barbæ meæ.”

BEARD, *false*, *barba falsa*, was an artificial one. In a general court of Catalonia, held in 1351, it is expressly enjoined, “Ne quis barbam falsam seu fictam audeat deferre vel fabricare.” Du-Cange.

Hottoman has given an elegant dialogue *de barba*, first printed by Plantin in 1586.

BEARD, or *under-beard*, called also *chuck*, of a horse, is that part under the lower mandible on the outside, and above the chin, which bears the curb of the bridle.

BEARD, *old-man's*, in *Botany*. See CLEMATIS.

BEARD of a Comet, denotes the rays which the comet emits towards that part of the heavens to which its proper motion seems to direct it. Thus, the beard of the comet is distinguished from the *tail*, which is understood of the rays emitted towards that part from which its motion seems to carry it. It is called beard from some fancied resemblance it bears to the beard of a man; or because it is projected before the comet.

BEARD, in *Conchology*, the byssus of the *pinna*, the *muscle*, &c. an assemblage of threads or hairs of a stout texture that hangs from the body of the animal, and by means of which

it fastens itself to stones, or any other heavy substance; the hairs of the beard terminating in a spongy substance, that adheres very tenaciously to the smoothest surfaces. The thread of this kind of byssus is sometimes woven as an object of curiosity into gloves, stockings, &c. and in point of durability at least, cannot be inferior to any other material that could be employed for that purpose. Some notice is taken of this among ancient writers, who speak of it as a kind of silk. See SILK.

BEARDED, *barbutus*, denotes a person or thing with a beard, or some resemblance thereof.

In *Middle Age Writers*, this is sometimes expressed by *malibarbis*, q. d. *barba in malis seu genis*.

The faces on ancient Greek and Roman medals are generally bearded. Some are denominated *pogonati*, as having long beards, e. gr. the Parthian kings. Others have only a *lanugo* about the chin, as the Seleucide family. Adrian was the first of the Roman emperors who nourished his beard: hence all imperial medals before him are beardless: after him, bearded.

The medals of gods, and heroes, in vigorous youth, represent them beardless, except Jupiter, and a few others.

The Romans paid their worship to a bearded Venus, *Terreri barbata*, supposed to have been of both sexes; a statue of whom was also found in the isle of Cyprus. The reason of representing the goddess of beauty with a beard is variously guessed at by the learned.

BEARDED women have been all observed to want the menstrual discharge; and several instances are given by Hippocrates, and other physicians, of grown women, especially widows, in whom, the menses being stopped, beards appeared. Eusebius Nieuembergius mentions a woman, who had a beard reaching to her navel. Bartholin speaks of a bearded woman at Copenhagen, who partly, in virtue thereof, passed for an hermaphrodite.

BEARDED brothers, fratres barbati, in *Ecclesiastical Writers*, are those otherwise called *fratres conversi* in the order of Grammont and the Cistercians. They took this denomination because they were allowed to wear their beards contrary to the rule of the professed monks.

BEARDED hulk, among *Florists*, a hulk which is hairy on the edge, as is that of the rose, &c.

BEARDING, in *Carpentry*, denotes diminishing any piece of timber from a given line on its surface, to make the thickness less on the edge.

BEARDING of wool, in the *Manufacture*. See WOOL.

BEARDSTOWN, in *Geography*. See BAIRDSTOWN.

BEARER, in *Architecture*, any subsidiary or intermediate support in aid of the principal supports, as the small joists or brackets which bear a gutter or the covering board of a cornice, the piers and blockings under the joints of a ground floor: or the joists, &c. which bear any thing independent of or unconnected with the building, as the bearers of a colon, of a vat, of a platform.

BEARERS, gestantes, in *Middle Age Writers*, are sometimes used for a child's godfathers, because they hold the infant in their arms, and present him to the priests in the ceremony of baptism. Du-Cange.

BEARERS of a bill of exchange, denote the persons in whose hands it is, and in favour of whom the last order or indorsement was made. See BILL OF EXCHANGE.

When a bill is said to be payable to bearer, it is understood to be payable to him who first offers himself after it becomes due. To be paid a bill of this kind, there needs neither order nor transfer; yet it is good to know to whom it is paid.

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BEARERS are more particularly used for those who carry the dead to their graves.

In a sense somewhat different from this, we also say *pull-bearers*, &c.

The ancients had peculiar orders or officers of bearers, called by the Greeks *νεπιταται*; by the Romans, *lecticarii*. The *vespillones*, or *bajuli*, were a lower sort of bearers, appointed for persons of inferior rank.

BEARERS, in *Horticulture*, denote the fruit branches, or such as bear fruit.

The bearers, or bearing branches of an apple-tree, and the like, are found to be rougher, and fuller of asperities in their bark, than the other branches.

BEARERS, in *Heraldry*, see SUPPORTERS.

BEARER, Cross. See CROSS.

BEARERS, in *Law*, denote such as bear down and oppress others, and are said to be the same with maintainers. By stat. 4 Edw. III. c. 11. justices of assize shall enquire of, hear, and determine maintainers, bearers, and conspirators, &c.

BEAR-HAVEN, in *Geography* a commodious harbour formed by the island of Bear, near the mouth of Bantry bay in the county of Cork, Ireland, into which ships of war and merchantmen often put for shelter; but the adjoining village of Castletown affords them few resources, and no accommodation. Beaufort's Memoir.

BEARING, in *Geography* and *Navigation*, the situation of one place from another, with regard to the points of the compass; or the arc of the horizon, that lies between the meridian of a place and a line passing from that place to another; or the angle which a line drawn through the two places makes with the meridians of each.

In other words, the bearing of an object in navigation, is the rhumb on which it is seen; and the bearing of one place from another is reckoned by the name of the rhumb passing through those two places. In every figure relating to any case of plain sailing, the bearing of the line not proceeding from the centre of the circle or horizon, is found by drawing a line parallel to it from the centre and towards the same quarter.

To find the bearing of any two places, e. g. cape Clear, and the island of Saint Michael's, one of the Azores, by the plain chart; lay a ruler by the two places, take the nearest distance between the centre of the compass, and the edge of the ruler; and in this position, slide one point of the compass along the ruler, and the other point will run along the point of the compass, shewing the bearing, which in this case is S.W.; that is, St. Michael's lies to the S.W. of cape Clear, or cape Clear to the N.E. of St. Michael's. See SAILING.

To find the bearing of any two given places on the globe; lay the graduated edge of the quadrant of altitude over both places, the beginning, or 0; being on one of them, and observe, while the quadrant lies in this position, what rhumb of the nearest fly, or compass, runs most parallel to the edge of the quadrant, and that rhumb shews the bearing sought, nearly.

The bearings of places on the ground are usually determined from the magnetic needle: in the managing of these lies the principal part of surveying; since the bearing and distance of a second point from the first being found, the place of that second is determined; or the bearings of a third point from two others, whose distance from each other is known, being found, the place of the third is determined: instrumentally we mean; for to calculate trigonometrically, there must be more data. Mr. Collins gives the solution of a problem in the Philosophical Transactions, where the distances of three objects on the same plane being given, and the bearings from a fourth place in the same plane observed,

I served,

ferred, the distances from the place of observation to the respective objects are required. See SURVEYING.

BEARING, in the *Sea Language*.—When a ship sails towards the shore, she is said to *bear in with the land*.—When a ship that was to windward, comes under another ship's stern, and so gives her the wind, she is said to *bear under her lee*.—If a ship sails into a harbour with the wind large, or before the wind, she is said to *bear in with the harbour*, &c.

In conding they say, *bear up the helm*, that is, let the ship go more large before the wind—*bear up round*, that is, let the ship go between her two sheets, directly before the wind—*bear a hand*, i. e. make haste.

They also say a ship *bears* when, having two slender a quarter, she will sink too deep into the water with an over light freight, and therefore can carry but a small quantity of goods.

BEAR sail well, to, is said of a ship when she is a stiff-guided ship, and will not couch down on a side, with a great deal of sail.

When a ship is said to *bear out her ordnance*, it is meant, that her ordnance lies so high, and she will go so upright, that in reasonable fighting weather, she will be able to keep out her lower tier, and not be forced to shut in her ports.

A ship is said to *overbear* another, when it is able, in a great gale of wind, to carry out more sails, viz. a top-sail, more, or the like.

BEARING off is also used by *Seamen* generally in business belonging to the shipping, for *thrust off*.

Thus, in hoisting any thing into the ship, if it hath hold by any part of the ship or ordnance, or the like, they say, *bear it off from the ship's side*.—So if they would have the breech or mouth of a piece of ordnance, or the like, put from one, they say, *bear off* or *bear about* the breech.

BEARING up, or *bearing away*, is improperly used to denote the act of changing the course of a ship, in order to make her sail before the wind, after she had sailed some time with a side wind or close-hauled.

BEARING also expresses the situation of any distant object, estimated from some part of the ship, according to her position. In this sense, the object must be either a-head, a-stern, on the beam, before the beam, abaft the beam, on the lee or weather bow, and on the lee or weather quarters.

BEARING of a piece of timber, in *Carpentry*, denotes the space either between the two fixed extremes thereof, when it has no other support; which is called *bearing at length*: or between one extreme, and a post, brick wall, or the like, trimmed up between the ends to shorten its bearing.

Joists are not to bear above ten feet length; nor single rafters more than nine feet. 19 Car. II. c. 3.

BEARING of an arch or vault, denotes the effort which the stones make to burst open the piers, or *piedroits*.

This amounts to the same with what the French call *pouffée*.

BEARINGS, in *Heraldry*, a term used to express a coat of arms, or the figures of armories, by which the nobility and gentry are distinguished from the vulgar, and from one another. See ARMS.

BEARING of an organ pipe, denotes an error or variation from the just sound it ought to yield. See TEMPERATURE.

BEARING pains, in *Midwifery*. The pains in labour or child birth are said to be bearing pains when they force the child downward.

BEARING down of the womb, vagina or anus. When the uterus descends from the upper part of the pelvis, and presses upon or passes through the os externum, it is called a bearing down (*procentia*) of the womb. In this case the uterus is included in a duplicature of the vagina, to the

upper part of which it is attached. Women who are troubled with the whites (*fluor albus*) or who have borne children, particularly if the perinaeum was injured, or torn, at the time of the birth of any of them, are most subject to this complaint. It manifests itself at first by a sense of dragging or bearing down of the part; some time after, there is a difficulty in making water, the uterus lying on, and covering the meatus urinarius. In this stage of the complaint, on passing a finger into the vagina, it meets the os uteri, immediately on getting through the os externum. If not now remedied, the uterus continues descending, until it frees the os externum, and hangs down between the thighs; and if still neglected, the part protruded goes on increasing, from the size of a nut to that of a large pear, and in some cases the uterus, covered with the vagina, has been found hanging down beyond the middle of the thighs, and of the size of the body of a Florence flask. When a fold of the vagina only descends, and passes through the os externum, it is called a bearing down (*procentia*) of the vagina. A similar indisposition affects the rectum, a fold of the gut being forced through the sphincter ani, whenever the feces are voided. This complaint is particularly incident to weakly children, though adults are not unfrequently affected with it. As in all these cases there is a relaxed tone of the fibres, the cure is to be effected by the exhibition of such things as strengthen and increase the tone and elasticity of them, by the Peruvian bark and chalybeats, the use of the cold bath, exercise, air, astrigent applications to the parts, as decoctions of oak bark, pomgranate shells, ballastine flowers, red rose leaves, &c. to which a portion of red port wine is to be added, and the medicine so prepared is to be injected into the vagina or rectum, and compressed, soaked in it, applied to the parts externally, taking care in the mean while that the body be kept moderately open. When the womb is the part bearing down, in addition to these remedies, after returning the womb to its proper situation, a pessary is to be introduced into the vagina and worn there to prevent its descending again. See PESSARY; see also PROCENTIA Uteri, *Vaginae, et Ani*.

BEARING claws, among *cock fighters*, denote the foremost toes, on which the bird goes; and if they be hurt or gravelled, he cannot fight.

BEARING of a stag, is used in respect of the state of his head, or the croches which he bears on his horns.

If you be asked what a stag *bears*, you are only to reckon the croches, and never to express an odd number: as, if he have four croches on his near-horn, and five on his far, you must say he bears ten; a false right on his near horn: if but four on the near horn, and six on the far horn, you must say he bears twelve; a double false right on the near horn.

BEARN STONE, see PHOSPHORUS.

BEARN, in *Geography*, was a province of France, before the revolution, at the foot of the Pyrenées, about 16 leagues long and 12 broad; bounded on the east by Bigorre, on the north by Armagnac, Turfan, and Chalosse, on the west by Dax, a part of Soule, and lower Navarre, and on the south by the Pyrenées. The plain country is very fertile, producing flax and Indian corn, and the mountains are covered with fir-trees, and within them are mines of copper, lead, and iron, and the lesser hills are planted with vines, which yield good wine. The Spaniards are supplied from hence with horses and cattle, and also with linen, of which there is in this province a considerable manufactory. The principal rivers which bear the name of Gaves, are the Gave-Bearnais, and the Gave d'Oleron. Bearn forms now the department of the Lower Pyrenées; and its capital is Pau.

BEAST, in *Zoology*, an appellation given to all four-footed

footed animals, fit for food, labour, or sport. See BRUTE, and ZOOLOGY.

Authors make this difference between "beasts of the forest" and "of chase," that the first are "silvestres tantum," the latter "campestres tantum." "Beasts of the forest" make their abode all the day time in the great coverts and secret places of the woods; and in the night season they repair into the lawns, meadows, pastures, and pleasant feeding-places: whence their denomination "silvestres," q. d. beasts of the wood.

"Beasts of the chase" reside all the day time in the fields, and on the mountains afar off, to prevent surprize: but on night's approach, they feed, as the rest, in meadows, &c. whence their appellation "campestres," q. d. beasts of the field.

In our Statute books, "beasts of chase" are five; the buck, doe, fox, martin, and roe. "Beasts of the forest," called beasts of venery, are the black, hind, bear, and wolf; and "beasts and fowls of the warren" are, the hare, coney, pheasant, and partridge. See GAME.

No other, according to MARWOOD, are accounted beasts or fowls of warren, than hares, coney, pheasants, and partridge. Lord Coke is of another opinion, distinguishing birds of the warren, from fowls of the warren. Under the former he includes hares, coney, and roe; the latter he divides into *silvestres*, *campestres*, and *aquaticæ*. To the first belong the pheasant, woodcock, &c. to the second the partridge, quail, rail, &c. to the third the mallard, hern, &c. Coke on Littleton, p. 233.

BEAST *of burden* is understood of all quadrupeds employed in carrying goods on their back. To this class belong elephants, dromedaries, camels, horses, mules, asses, and the sheep of Mexico and Peru.

BEAST, in *Games of Chance*, a game at cards, played thus; the best cards are the king, queen, &c. of which are formed three heaps, denominated the king, the play, and the troilet. Three, four, or five may play; and to every one are dealt five cards. Before the play every one stakes to the three heaps. He that wins most tricks takes up the heap called the play; he that has the king takes up the heap, so called; and he that has three of any sort, as three fours, three fives, three sixes, &c. takes up the troilet heap.

BEAST *at ombre*, is where the player or person that undertakes the game, loses it to the other two; the penalty of which is a forfeiture equal to the stake played for.

BEASTAN, in *Geography*, a town of Persia, in the province of Segestan, 20 miles S.W. of Kin.

BEASTS, *rotter*, see ROTTER.

BEAT, in *Fencing*, denotes a blow or stroke given with the sword. There are two kinds of beats, the first performed with the foible of a man's sword on the foible of his adversary's, which in the school is commonly called *baterie*, from the French *batre*, and is chiefly used in a pursuit, to make an open upon the adversary. The second and best kind of beat is performed with the fort of a man's sword upon the foible of his adversary's, not with a spring, as in boxing, but with a jerk, or dry beat; and is therefore most proper for the parades without or within the sword, because of the rebound a man's sword has thereby from his adversary's, whereby he proceeds to himself the better and surer opportunity of spoiling.

BEAT, *St.*, in *Geography*, a town of France, in the department of the upper Garonne, and chief place of a canton, in the district of St. Gaudes, on the Garonne. All the houses are built of marble, the height thereof supplying no other materials. It is seated between two mountains, close to the town on each side. The place contains 1056 and the canton 958 inhabitants; the territory includes 247½ kilometres and 25 communes. N. lat. 42° 50'. W. long. 1° 6'.

BEAT, *St.*, *mountains of*, are mountains of Switzerland in the canton of Berne, near the lake Thun; the rocks of which are calcareous and rugged, and containing in a few places broken petrifications. Some of these rocks are perpendicular, and even impending, and are marked at different elevations with furrows, occasioned by the waters of the lake, which in former periods was probably several hundred feet above its present level.

BEAT, in *Horology*. See BEATS.

BEAT, in the *Manege*. A horse is said to beat the dust, when, at each stroke or motion, he does not take in ground or way enough with his fore-legs. He is more particularly said to beat the dust at *terra à terra*, when he does not take in ground enough with his shoulders, making his strokes or motions too short, as if he made them all in one place. He beats the dust at curvets, when he does them too precipitantly and too low. He beats upon a walk, when he walks too short, and thus treads but little ground, whether it be in straight lines, rounds, or passages.

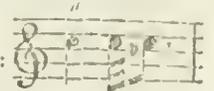
BEAT *upon the hand*, see CHACK.

BEAT *of the Drum*, in the *Military Art*, is differently performed, according to the purposes designed by it. Notice is hereby given of any sudden change; soldiers are summoned to repair to their arms and quarters; and the various movements before and after, and during the engagement, are denoted by different beats of the drum.

The chief beats or beatings on the drum are, the *general*, the *assembly*, the *chamade*, the *march*, the *reveille*, the *retreat*, &c. See DRUM.

BEAT, in *Music*, is a grace marked thus: " or thus . Its effect is just the contrary of a transient shake in rapid movements, where it can neither be prepared nor turn-

ed. It consists merely of three notes:



Beat. Effect.

transient shakes:



Explained.

BEATA, in *Church History*. See MASSES of the *Beata*. BEATA, *Cape*, is at the south point of the island of St. Domingo or Hispaniola. N. lat. 17° 42'. W. long. 72° 2'.

BEATA *Island*, is about 14 leagues S.W. by W. from the cape.

BEATER is applied, in *Matters of Commerce*, to divers sorts of workmen, whose business is to hammer or flatten certain matters, particularly metals. In this case we meet with *plaster-beater*, *cannon-beater*, *millar-beater*, &c.

BEATERS, *gold*, are artificers, who, by beating gold and silver with a hammer on a marble, in moulds of vulcan and bullocks' gut, reduce them to thin leaves fit for gilding or silvering of copper, iron, steel, wood, &c.

Gold-beater differs from flatterer of gold and silver, as the former bring their metals into leaves by the hammer; whereas the latter only flatten it by pressing it through a mill, preparatory to beating. See GOLD-BEATING.

There are also tin-beaters employed in the looking-glass trade, whose business it is to beat tin on large blocks of marble, till it be reduced to thin leaves, fit to be applied with quicksilver behind looking-glasses. See FOLIATING.

BEATER is also used for an instrument wherewith to gravel walks and alleys in gardens even. It is a piece of wood half a yard long, six inches thick, and eight or nine broad, having a handle fixed obliquely in the middle.

BEATIA, in *Ancient Geography*, a town of Spain, in Bætica, south-east of Castulo, and near it.

BEATIFIC VISION. See **VISION**.

BEATIFICATION, in *Electricity*, a term used by professor Boze to denote an electrical experiment, by which he incircled the head of a person strongly electrified, and standing on a large cake of pitch, with a luminous glory, resembling that with which painters ornament the heads of saints. The secret of this experiment, which occasioned many fruitless and expensive trials to the first electricians in Europe, consisted in the use of a suit of armour decked with steel, in various figures; and the glory was produced by rays issuing from the edges of the helmet.

BEATIFICATION, in the *Romish Church*, the act by which the pope declares a person happy after death.

Beatification differs from canonization; in the former, the pope does not act as a judge in determining the state of the beatified, but only grants a privilege to certain persons to honour him by a particular religious worship, without incurring the penalty of superstitious worshippers; but in canonization, the pope speaks as a judge, and determines "*ex cathedra*" upon the state of the canonized.

Beatification was introduced when it was thought proper to delay the canonization of saints, for the greater assurance of the truth and manifestation of the rigorous steps taken in the procedure.

The ceremony of beatification is a previous one to that of canonization; and cannot be performed till 50 years after the death of the person thus honoured. On this occasion, certificates or attestations of the character and miracles of the person for whom this honour is intended, are produced and examined by the congregation of rites. An advocate, called by the people the devil's advocate, is employed to contest the claims of the candidate; and it is the business of an advocate, engaged on the other side, to obviate and refute the cavils of the adversary. As soon as the saint's claim is confirmed, he is admitted into all the privileges of beatification by the pope's decree. His relics, if any such are found, become henceforth entitled to the veneration of all good Christians; his images are crowned with rays, and a particular office is set apart for him; and the day of his beatification is distinguished by the grant of indulgences and remission of sins.

It is remarkable, that particular orders of monks assume to themselves the power of beatification. Thus Octavia Melchiorica was beatified with extraordinary ceremonies by the Dominicans, for a legacy of 7000 dollars to the order.

BEATING, among *Sportsmen*, denotes the noise which hares make in *Rutting-time*.

The hare is said to *beat*, the hart to *bell*, &c.

BEATING, PULSATION, in *Medicine*, is applied to the reciprocal agitation or palpitation of the heart and pulse. See **PULSATION**.

BEATING of the heart. See **PALPITATION**.

BEATING Flax, or Hemp, is an operation in the dressing of these matters, contrived to render them more soft and pliant.

When hemp has been swungled a second time, and the hards laid by, they take the strikes, and dividing them into dozens and half dozens, make them up into large thick rolls, which being broached on long strokes, are set in the chimney corner to dry; after which they lay them in a round trough made for the purpose, and there with beetles, beat them well, till they handle, both without and within, as pliant as possible, without any hardness or roughness to be felt; that done, they take them from the trough, open and divide the strikes as before, and if any be found not suf-

ficiently beaten, they roll them up, and beat them over as before.

Beating hemp is a punishment inflicted on loose and disorderly persons.

BEATING, in *Book-Binding*, denotes the knocking a book in quires on a marble block, with a heavy broad-faced hammer, after folding, and before binding or stitching. On the beating of it properly, the elegance and excellence of the binding, and the easy opening of the book principally depend.

BEATING, in the *Paper Works*, signifies the beating of paper on a stone with a heavy hammer with a large smooth head and short handle, in order to render it more smooth and uniform, and fit for writing.

BEATING the Wind, was a practice in use in the ancient method of trial by combat. If either of the combatants did not appear in the field at the time appointed, the other was to beat the wind, or to make so many flourishes with his weapon; by which he was intitled to all the advantages of a conqueror. Du-Cange.

BEATING the Hands or Feet, by way of praise or approbation. See **APPLAUSE**.

BEATING Time, in *Musick*. See **BATTRE LA MESURE**.

BEATING, in *Navigation*, the operation of making a progress at sea against the wind, in a zig-zag line or traverse, by steering alternately close-hauled on the larboard and starboard tacks. See **TACKING**.

BEATING, Drubbing, or Stripes, make one of the most ancient as well as universal species of punishment. Among the Romans it obtained, under the denomination of *verberare, fustigare, flagellare, pulsare, &c.* In the East it still prevails under the name of *bastinado*.

Some distinguish between *pulsation* and *verberation*, as if the latter imported a beating with pain, the former without; but this distinction is not always observed.

BEATING, in the *English Laws*. See **BATTERY**.

BEATING in the Flanks, a distemper to which black cattle are subject, and is an indication of a great inflammation in the bowels.

BEATING, in *Husbandry*. See **BURNING of Land**.

BEATITUDE, imports the supreme good, or the highest degree of happiness human nature is susceptible of.

In which sense, it amounts to the same with what we otherwise called *blestness* and *sovereign felicity*; by the Greeks called *εὐδαιμονία*; and by the Latins *summum bonum, beatitudo, and beatitas*.

BEATITUDE, among *Divines*, denotes the beatific vision, or the fruition of God in a future life to all eternity.

BEATITUDE is also used in speaking of the *ishes* contained in Christ's sermon on the mount, whereby he pronounces *blest* the poor in spirit, those that mourn, the meek, &c.

BEATITUDE was also a title anciently given to all bishops; but of later days restrained to the pope.

It appears to have been sometimes also given to laymen.

BEATON, BELTON, or BETHUNE, DAVID, in *Biography*, primate of Scotland, and cardinal of Rome, was descended from a family originally of France, and the nephew of archbishop James Beaton, his predecessor in the primacy. He was born in 1494; and having passed through the ordinary discipline of the schools, and of the university of St. Andrew's, he was sent to France by his uncle, for the completion of his education. In the university of Paris he applied with diligence to the study of the civil and canon laws, and also of divinity, in order to qualify himself for the service of the church. At the proper age, he entered into holy orders; but, notwithstanding his clerical character, he

was employed in several affairs of importance by John duke of Albany, regent of Scotland, and appointed resident at the court of France in 1519. In 1523 his uncle, being promoted to the archbishopric of St. Andrew's, resigned the rich abbacy of Arbroath in his favour, and having obtained from the pope a dispensation for holding it two years without taking the habit, he returned to Scotland in 1525, and took his seat in parliament as abbot. Having ingratiated himself with the young king, whom he had served in France during his minority, he was promoted in 1528 to the high office of lord privy-seal. In this capacity he obtained the king's confidence; and in 1533 he was entrusted with an important commission which required his return to France, where he was eminently instrumental in maintaining the attachment of James to the French interest, and where he was employed in negotiating several important concerns between the two courts, and in demanding for his master, Magdalen, the king's daughter, in marriage. During his stay at the French court, he gained the esteem of king Francis I. to such a degree, that he granted him several singular favours; investing him, in 1537, with all the privileges of a native of France, and conferring upon him, in the same year, the valuable bishopric of Mirepoix. King James having espoused the princess Magdalen at Paris in 1537, the abbot of Arbroath accompanied them to Scotland; and after her death, in the same year, he was deputed to negotiate a second marriage for the king with Mary, daughter of the duke of Guise, whom he conducted to Scotland in 1538, where their nuptials were celebrated at St. Andrew's. In this year he was advanced by pope Paul III. who wished to attach the clergy of Scotland and England to the see of Rome, to the dignity of cardinal. Upon the death of his uncle soon after, he succeeded to the primacy, and exercised the singular powers with which he was invested in evincing his attachment to the religion and interests of Rome, in conducting a very severe inquisition into heretical doctrines, and in causing prosecutions to be instituted against several persons, of whom some were men of family and distinction. It is said, that he had presented to the king a roll of 360 of the chief nobility and barons, as suspected of heresy, and if the king's death had not prevented the execution of his sanguinary purposes, these, and perhaps many more, must have fallen sacrifices to his persecuting power, which his ministry did not seem disposed to control. At the dissolution of the cardinal, James undertook the invasion of England, and at Solway Moss the royal army was totally defeated in 1542; but this unexpected disaster proved fatal to the king, and he died soon afterwards. The cardinal was the only person of authority who was present with him in his last moment; and he is accused of having forged a will, in which the king appointed him together with three other noblemen, to the regency of the kingdom, during the minority of queen Mary. This fact is considered as unquestionable by the generality of moderns, as well as the more early historians. But the English interest prevailed, and the earl of Arran was declared to be regent. Upon this Cardinal Beaton was apprehended and confined; but in a little while, he contrived by his political ability and influence not only to be liberated, but to be appointed high-chancellor of the kingdom. The commission of legate "a latere," which he soon afterwards obtained from the court of Rome, empowered him to proceed in his favourite design of extirpating heretics. In the execution of this design, he caused several persons to be condemned and executed; and among the rest, Mr. George Wishart, the most famous protestant preacher in Scotland, who was burnt at St. Andrew's in 1546; the cardinal himself, as it has been related on the authority of Buchanan, being seated at a window as a spectator of the tragedy. This

execution produced great discontent and murmur amongst the adherents of the protestant religion; and as the forms of law had not been duly regarded, they meditated a revenge. The cardinal, himself, however, apprehended no danger; and so prevalent was his interest at this time, that the earl of Crawford was gratified by marrying his eldest son to the cardinal's natural daughter; for notwithstanding his profession and high rank in the church, Beaton, without disguise, kept a concubine, by whom he had several children. In less than three months after the death of Wishart, the event which this good man denounced, and as some have said, without sufficient reasons, predicted, happened to the cardinal. A conspiracy was formed against his life by some persons whom he had disobliged; and they, accompanied by a small number of attendants, surpris'd the castle of St. Andrew's, in which the cardinal lodged, rushed into his chamber, and dispatched him with their swords. One of the conspirators, James Melville, expressly imputed his revenge to the cardinal's persecution of Wishart. This event happened in the latter end of May 1546, and proved fatal to the ancient religion, and to the French interest in Scotland.

Beaton's character is sufficiently marked in the history of his life. Possessed of talents, which qualified him for the high rank to which his ambition aspired, and which he occupied both in the church and the state, he espoused and promoted the interest of Rome, as the most effectual method of securing his advancement. Dr. Robertson, indeed, ascribes his support of the Romish superstition, and his enmity to the reformers, merely to political motives; but there is reason to imagine, more especially when we consider the period in which he lived, that a real bigotry in favour of popery might blend itself with the principles and views of ambition and policy. It is certain, however, that his ambition was unbounded, that he was haughty and violent in his temper, that his insolence was carried to the highest pitch, and that his character, upon the whole, was extremely detestable. His violence, as a persecutor, must ever cause his memory to be held in abhorrence, by those who have any feelings of humanity, or any regard for religious liberty. He appears to have had little learning, being prevented from acquiring it by his early and continued application to public business; and his morals were unbecoming his station. Biog. Brit. Robertson's Hill. of Scotland, vol. i. p. 97, &c.

BEATORUM, INSULA, in *Ancient Geography*, a name given to one of the Oases (See OASIS) of Africa, called an *Island*, because it was surrounded with sand, like an island in the sea, and denominated "insula Beatorum," because, according to Strabo, it abounded with water, wine, and other necessaries of life, though encompassed by vast sandy deserts. Some have supposed that this Oasis was a district of the "Orbite noni," about seven days' journey west of Thebes. Others suppose that it was situated in the "Regno Ammoniacæ," and that it was the site of the temple of Ammon, which was amply supplied with fountains and vegetation, and afforded a very pleasant habitation. Ulpian says, that it was a place of banishment for real or pretended criminals, whence, as it was surrounded by sand, there was no probability of escape.

BEATS, in *Horology*, are the audible strokes which a tooth of the last wheel in a clock or watch movement makes against its pallet, to maintain the vibration of a pendulum, or oscillation of a balance. The interval between two successive beats, in a clock or watch with an ordinary escapement, is equal to one vibration or oscillation, but is not exactly contemporary with it, because the latter is counted as commencing at one of the extremities of its arc; where, as the former begins at such other degree of it, as the nature

nature of the escapement determines. a vibration here implies either one direct or one retrograde passage through the whole arc of a pendulum, and an oscillation one direct or one retrograde motion of a balance through its whole arc. Hence, in a common clock or watch, the words beat, vibration, and oscillation, are synonymous terms, when applied as the measure of the smallest subdivision of time; there being a stroke of the last wheel at some part of every vibration or oscillation: but in those astronomical and marine time-pieces which have detached escapements, there is but one beat in two vibrations or oscillations, the alternate stroke of the piece which unlocks the detent being usually silent; in these machines, therefore, the beats are slower by one half than in ordinary ones, notwithstanding the movements, or mechanism of wheels and pinions, may be the same in both, and the vibrations or oscillations similar. In any horological machine, the number of vibrations or oscillations which it makes in an hour, is the value of its train, which may be thus determined, viz. "Divide double the product of all the wheels, by the exact product of all the pinions, and the quotient will be the train universally;" the great wheel and its pinion, however, being used only to regulate the period of going after winding up, and to communicate motion, are left out of the calculation. The reason why the product of all the wheels is required to be *doubled*, is, that one tooth of the last wheel does not completely escape its pallet in less than two successive vibrations or oscillations in any escapement. The beats of a pocket watch are a very convenient measure of small portions of time, and might be applied to many useful purposes with advantage, particularly if they were each an exact fraction, such as $\frac{1}{4}$ or $\frac{1}{8}$ of the second, which they might as easily be as otherwise. (Vid. Nicholson's Journal, vol. iii. p. 49—and 189. and vol. v. p. 46, 4to. Series.) In the best time-pieces or chronometers for determining the longitude, this circumstance is attended to, and the trains are usually either 14,400 or 18,000, namely, either four or five oscillations; i. e. either two, or two and a half beats per second, by reason of their escapements being detached. If the same attention were paid to the trains of common pocket watches, the frequency of their beats would fit them for nice observations in some of the departments of philosophy, and give them, in this respect, a preference even over more accurate instruments with less frequent beats: but at present, the only attention that is paid by the makers to the value of the train of a common watch is, that, for a small balance, it may be a quick one, and for a large balance a slow one; or, in other words, that the momentum of the balance shall not be too much controlled by the maintaining power, which necessary provision might be equally attended to, if the beat were made an exact fractional portion of a second. In any watch the whole train or vibrations in an hour divided by 3600, the seconds in an hour, will give the vibrations per second of that watch. See CLOCK-MOVEMENT, DEAD-BEAT, ESCAPEMENT, &c.

BEATS, in *Music*, are certain pulsations of two continued sounds, as in an organ, that are out of tune, occasioned by warring vibrations that prevent coincidence in any two concords. This phenomenon, which was first discovered by M. Sauveur, has not only been described by Dr. Smith in his "Harmonics" but made the foundation of a system of temperament. "In tuning musical instruments, (says he, Sect. IV. Prop. X.) especially organs, it is a known thing, that while a consonance is imperfect, it is not smooth and uniform as when perfect, but interrupted with very sensible undulations or *beats*; which, while the two sounds continue at the same pitch, succeed one another in equal times, and in longer and longer times, while either of the sounds approaches gradually to a perfect consonance with

the other; till at last the undulations vanish, and have a smooth, uniform, consonance."

These beats, the same author observes, are of use in tuning an organ to any desired degree of exactness.

The work of Dr. Smith, though excellent, is far too profound for the persons most in want of it; the organ and harpsichord tuners are seldom mathematicians; and to comprehend the doctrines laid down in this book, would require as much science as Newton's "Principia".

The beats of two dissonant organ pipes, resemble the beating of the pulse to the touch: and, like the human pulse in a fever, the more dissonant are the sounds, the quicker they beat, and the slower as they become better in tune; till at length they are lost in the coincident vibrations of the two sounds. See VIBRATION, TEMPERAMENT, and TUNING.

BEATTIE, JAMES, L. L. D., in *Biography*, a celebrated moral philosopher and poet, was born Nov. 5, 1735, in the county of Kincardine, in North-Britain. His father was in a station of life no higher than that of a little farmer, a class of men subject to much hardship and indigence in Scotland. He was, however, possessed with that laudable spirit which so frequently in that country raises native genius from obscurity; and he bestowed upon his son a literary education, first in the parochial school of his neighbourhood, and then in the college of New Aberdeen. The youth was assisted in his progress through the studies of the latter, by the liberality of a brother, (his father having died when he was 7 years of age,) and by one of those small exhibitions which have been annexed to it for the encouragement of learning; and it is supposed that he supported himself in the intervals of the sessions by teaching at a country school. For some considerable portion of his early life, it is known that he acted as a schoolmaster, in Kincardineshire. At length he removed to Aberdeen, and engaged as assistant to the master of the principal grammar-school, whose daughter he married.

The talent which first made him known to the world was that of poetry, which he had cultivated from his youth. In 1761, he published a volume of "Original Poems and Translations," which in 1765 was followed by "The Judgment of Paris." These performances were characterised by richness and elegance of language and melody of versification; but rather denoted a refined taste in poetry, than a powerful and inventive genius. They probably brought the author into notice at the place of his residence, but seem to have excited little attention among readers in general.

One of the fruits of his rising reputation was to obtain for him the patronage of the earl of Errol, who resided in the neighbourhood of Aberdeen. Besides other benefits, the influence of this nobleman acquired for Mr. Beattie the honourable situation of professor of moral philosophy and logic in the marischal college of Aberdeen. In this capacity he next appeared before the public as the author of a philosophical work, entitled "An Essay on the Nature and Immutability of Truth, in Opposition to Sophistry and Scepticism," 8vo. 1760. The progress made about this time by Mr. Hume's principles, especially among his countrymen, could not fail of exciting alarm among the friends of revealed religion. How long Beattie had ranked among these, does not clearly appear. An admired poem of his, "The Hermit," in its first form strongly expresses that doubt of a future existence which could not be banished from heathen philosophy; and in a poem hereafter to be mentioned, he warmly congratulates himself on having *escaped* "From Pyrrho's maze and Epicurus' sty." There is a vein of acrimony and exasperation in all his allusions to the sceptical philosophy, which renders not improbable the report of a personal offence received by him from Hume; though there is

no reason to doubt that when he wrote his book, he was very sincerely impressed with the danger of the tenets he opposed, and that he ever after remained zealously attached to the cause of revelation. The author in this work is regarded as a philosophical disciple of Dr. Reid, admitting an instinctive principle of the perception of truth, and founding it upon that faculty of *common sense*, which acts in a similar manner upon all, or a great majority, of mankind. As he wrote with more eloquence and a more popular manner than Dr. Reid, his performance was much read, and gained him a number of very respectable friends and admirers. It is allowed, that he has successfully detected many of the sophisms of Hume, and has brought together many ingenious and useful thoughts on this subject; but the foundation of its philosophy has by some, especially by Dr. Priestley, been treated as shallow and superficial; and he has been censured for the arrogance which he has displayed towards those of opposite opinions, and for the readiness with which he has imputed to them consequences subversive of morality. Indeed, many parts of his book favour more of the rhetorician than the philosopher. These defects, however, did not render less acceptable an attempt from a layman to serve the cause of religion; and among the friends Beattie acquired on the occasion, were lords Mansfield and Lyttelton, bishops Hurd and Porteus, Dr. Johnson, and Mrs. Montague. The influence of lord Mansfield obtained for him a pension of 200*l.* from his majesty's privy-purse.

In the year 1771, his fame as a poet was extended throughout the Kingdom by the publication of the first part of "The Minstrel." The subject of this piece, is the feigned birth and education of a poet. The term *minstrel* is not very happily applied to the character described; nor are the famed "Gothic days" in which he is placed to be recognized in real history: but there is great beauty in the delineation of the native poetical disposition assigned to him, and in the invention of circumstances by which it is nourished. The stanza is that of Spenser, which is managed with singular dexterity, and made to produce a melody of versification scarcely exceeded in the range of English poetry. The second part of this poem, which appeared in 1774, contains the mature education of the young bard, and enlightens his mind with the lessons of history, philosophy, and science. There are many fine stanzas in this part, which, however, deviates from the original conception; and the work is left a fragment, probably because it was found to involve unavoidable incongruities. The "Minstrel," whatever be its defects, is probably the performance on which Beattie's future fame will chiefly depend; and it may be regarded as having taken the possession of a place and the most approved poetry in the language.

Mr. Beattie visited London in 1771, and was received with great cordiality by his admirers. The degree of L.L.D. was conferred upon him by the college at Aberdeen in 1772, and he departed for London journey in 1773, in consequence of which he obtained the pension above mentioned. A new edition of the "Essay on Truth," was published in 1776, by a private subscription among his friends, conducted on the usual liberal principles, and in the volume was added the "Essay on the Liberty of the Press," a tract which had been read before a private society at Aberdeen. In the "Essay on Truth," some corrections were made, and some further corrections were taken and modified. The other pieces displayed much refined taste, sound judgment, and acquaintance with the best authors, ancient and modern. In 1783, he published a quarto volume consisting of "Dissertation, Moral and Critical." The first are de-

tached essays on various subjects, which formed a part of a course of lectures read by the author in his professional capacity. Many useful and curious topics are discussed in them, without any pretensions to extraordinary subtlety and acuteness, but in a mode calculated to improve the heart as well as the understanding. The work is not free from somewhat of the warm and dogmatical manner which characterises the "Essay on Truth"; and though not unworthy of the writer's fame, it appears to have made little addition to it. The applause given by the bishop of London to a sketch of manuscript lectures to young persons on the evidence of Christianity, induced Dr. Beattie to draw up and publish, in 1785, a work entitled "Evidences of the Christian Religion, briefly and plainly stated," 2 vols. 8vo. This was esteemed a plain, elegant, and popular view of the subject well calculated for its intended purpose. In 1790 he published a summary of his lectures under the title of "Elements of Moral Science." The first volume contains a very accurate examination and arrangement of the perceptive faculties and active powers of man. He has also given a cursory view of what is called Natural Theology. The second volume, published in 1793, comprehends much miscellaneous information in ethics, economics, politics, and logic, including rhetoric, towards the latter part of his life. It was the last publication of the author, whose time was much occupied with the duties of his station, and with social and domestic concerns; of which one of the dearest to his heart was the education of his eldest son, James Hay Beattie, a youth of very extraordinary endowments and uncommon moral excellence. He was so successfully trained by his father, as to be made his assistant in the professorial chair at the age of nineteen; and he was become the most intimate friend and beloved companion of his reverend parent, when he fell into a decline, which carried him off in 1790, at the age of 22. Dr. Beattie had fortitude enough to be the editor of a small volume of the youth's compositions, in verse and prose, to which he prefixed a memoir on his life and character, highly interesting and unaffectedly pathetic. This grievous loss was followed in 1796 by that of his younger son, Montague Beattie, in his eighteenth year. The unhappy father was unable, with all his resources, to bear up under this accumulated sorrow. The latter years of his life were a blank of exile, which terminated at Aberdeen, on August 18, 1803, in the 68th year of his age. Dr. Beattie was amiable and exemplary in every department of private life, and fulfilled the duties of his public station in such a manner as to confer honour and credit upon the university of which he was a professor. He was a fellow of the Royal Society of Edinburgh.

BLATIUS RHIMANUS, a learned man of the 16th century, whose father, Anthony Bilde, assumed the name of Rhimanus from Rhomach, the place of his birth, was born at Seldel in Alface, in 1475. He pursued his studies at Paris and Strasbourg, and from thence proceeded to Basil, where, in 1514, he formed an intimate acquaintance with Erasmus, and applied to the Greek language under J. Conon of Nuremberg; and became a corrector of the press to the celebrated printer. At the age of 35 he returned to Seldel. He next published the works of the "History of Valentinus Petricus," and filled up the works of Tertullian to be printed from two MSS. which he borrowed from two monasteries in Germany. His notes to Tertullian were seized by the Spanish inquisition, and placed in the Index of prohibited books, because they contained some free reflections on the frailty of the clergy in his time. Rhimanus was a man of extensive learning, particularly in the Greek language, church history, and the antiquities of Germany. Scolding city, that he visited and

greatly to revive ancient literature, and Scioppius bears very honourable testimony to his talents as a critic. Towards the close of his life he was afflicted with a diabetes, and obtaining no relief from the baths of Baden in Switzerland, he died at Strasburg in 1547. He was no less distinguished by his integrity and modesty, and his mild and conciliating temper, than by his great learning. He professed great regard for Luther, and detested the tyranny which the clergy exercised at that period; but he never openly declared in favour either of Luther or of any other reformer. Although he was no less displeased than Erasmus with the errors that had blended themselves with religion, he was an enemy to schism, and wished, by prudent reformation, to preserve the unity of the Christian church. Of his works, written in Latin, which were numerous, we shall only mention his "Observations on Pliny's Natural History," his "Notes on Livy," his "Preface and Annotations to Tacitus," his "Epistle prefixed to Erasmus's edition of the Works of Origen," his "Preface to the Works of Erasmus, and his "Origines Gothicæ;" to which we may add his best work, entitled "De rebus Germaniæ libri tres," printed at Ulm in 1693, with the annotations of James Otto. Jortin's Life of Erasmus. Gen. Biog.

BEAU, CHARLES LE, was born at Paris in 1701, and became professor of rhetoric in the college des Grassins, then professor in the college-royal, secretary to the duke of Orleans, and perpetual secretary and pensionary of the academy of inscriptions. Like Rollin, he united the charms of eloquence with profound erudition, and was no less, than this eminent professor, beloved by his pupils. His most considerable work was his "History of the Lower Empire," in French, 22 vols. 12mo., which is written in a correct and elegant style. He also wrote several learned dissertations in the "Memoirs of the Academy of Belles Lettres," and some "Historical Eulogies," on the academicians. His private character was amiable, and he was much esteemed for his worth and generosity. He died at Paris in 1778. His younger brother, JOHN LEWIS LE BEAU, was professor of rhetoric in the college des Grassins, and member of the academy. He published a discourse on the condition of fortune most suitable to a man of letters; and an edition of "Homer, Greek and Latin," 2 vols. 1746, and of "Cicero's Orations," 3 vols. 1750; both with notes. Nouv. Dict. Hist.

BEAU Port, in *Geography*, a spacious and commodious harbour on the S. E. part of the Falkland islands, capable of accommodating a large fleet of ships in perfect safety. It is almost surrounded by the land, has good anchorage, and sufficient depth of water.

BEAUBASSIN BAY. See CHIGNECTO.

BEAUBASSIN Bay, is also a bay on the south coast of the strait of Maghellan, at the S. E. angle of the strait, where it extends to the W. It is nearly opposite to Wallis's harbour on the north coast, is a spacious bay, and has an open entrance.

BEUCAIRE, a town of France, and chief place of a canton in the district of Nîmes and the department of the Gard, on the right bank of the Rhone, opposite to Tarascon, with which it has a communication by a bridge of boats. This town carries on a considerable commerce in wool, silk, stuffs, spices, drugs, leather, cotton, &c.; and it has an annual fair which lasts for six days. The part of the Rhine is well constructed. The principal building is the collegiate church. The place contains 7943 and the canton 10,853 inhabitants; the territory includes 162 kilometres and 4 communes. N. lat. 43° 48'. E. long. 4° 30'.

BEUCAIRE DE PEGUILON, FRANCIS, in *Biography*, a polite scholar of the sixteenth century, was descended from

an ancient family of the Bourbonnois, and born in 1514. In consequence of his literary reputation, he was appointed preceptor to cardinal Lorraine, the second son of the first duke of Guise, and attended him to Rome. On his return, he was promoted to the bishopric of Metz, and attended his patron to the council of Trent, where he distinguished himself by his eloquence. He was likewise of singular service in rescuing the fathers of the council from the perplexity occasioned by different opinions concerning marriage; for he drew up a decree, framed in terms so ambiguous as to be accommodated to the variety of opinions that were held, and by the different senses in which it might be interpreted to satisfy all parties. However, he gave offence to the votaries of the papal power by maintaining the independence of the episcopal order, and his opinion on this point was disavowed by the cardinal of Lorraine. In 1568 he resigned his bishopric to Lewis, cardinal of Lorraine, and retired to his castle of La Chrete in the Bourbonnois. Here he employed himself in composing a "History of his own Times," which was written in Latin, and comprised the events from the year 1462 to 1567. This work was discontinued about three years before his death, which happened in 1591. It remained in MS. for several years, the author having declined the publication of it for fear of giving offence; but being found in his library by Philip Dinet, he printed it at Lyons in 1625, in folio. It is deemed a well-written, and upon the whole, a faithful history; though too favourable to the house of Guise, and very hostile to the Hugonot party. Beaucaire, some time after he had taken possession of his see, engaged in a controversy with the Calvinists upon the future state of children dying unborn. Gen. Dict.

BEAUCE, or BEAUSSE, in *Geography*, the name given before the revolution to a country of France, part of Orleansnois, now the department of Eure and Loire, which was so fertile in every part, as to be called the granary of France. Its capital was Chartres.

BEAUCHENES ISLAND, a small island to the S. of Falkland islands, in S. lat. 53°, and W. long. about 58° 30'.

BEAUCHASTEL, a town of France, in the department of the Ardeche, 2½ leagues S. S. W. of Valence.

BEAUCHIEF ABBEY, was situated in a pleasant valley, on the north side of Derbyshire, in England, within a short distance of the town of Sheffield. This celebrated religious house was founded by Robert Fitz-Ranulph, lord of Alfreton, between the years 1172 and 1176, for regular canons of the premonstratensian order. Since the dissolution of monasteries, 26th of Henry VIII. this abbey has continued to crumble by the decay of time, and only a part of the chapel remains to mark the character of this once proud pile. See Pegg's History of Beauchief Abbey, 4to.

BEAUDUN, a town of France, in the department of the Var, and chief place of a canton, in the district of Barjols; 12 miles N. E. from Barjols.

BEAVER, in *Zoology*, the English name of CASTOR FIBER, *Linnaeus*, which see. Pennant calls SOREX MOSCHATUS of *Pallas*, the *Long nosed beaver*.

BEAVER, BEVER, and in Latin *Fiber*, *Castor* & *Castorius*, JOHN, in *Biography*, a benedictine monk, in Westminster Abbey, flourished about the beginning of the 14th century. He is represented as a person of ingenuity and industry, and a great master of the history and antiquities of England, to the study of which he particularly devoted himself. He wrote, "a Chronicle of the British and English Affairs," from the coming in of Brute to his owntime, which remains in MS. in the Cottonian library; and also a book "De Rebus Cænobii

Cambii Westmoraniensis. He is commended by Leland and Bale, and cited with respect by Stow in his Survey of London and Westminster. *Biog. Brit.*

BEAVER, Creek, in *Geography*, a creek of North America, which runs into lake Erie, at the east end about 7 miles S. E. from Fort Erie.

BEAVER Creek, B. g. falls into the Allegany river, after having received several branches from the north-east, about 28 miles N. W. from Pittsburgh. It rises in the south, runs north about 6 miles, thence 12 more north-east to the Salt Lick town; then by the Mahoning town and Salt Springs, 34 miles south-easterly to the Kish-kush town, from which to its mouth are 22 miles southerly. Its whole course is about 74 miles.

BEAVER Dam, a township in Pennsylvania, on the west side of Susquehannah river.

BEAVER Eater, in *Zoology*. See GLUTTON.

BEAVER Island, in *Geography*, an island in the lake Michigan. N. lat. 45° 26'. W. long. 85° 20'.

BEAVER Indians, nations of North America, situate north of Slave lake, in N. lat. about 62°, and W. long. about 120°.

BEAVER Kill, is a south-east arm of the Popachton branch of the Delaware. Its mouth is 17½ miles east from the Cook House, and 24½ N. W. from Kuschitun Falls.

BEAVER Lake, a lake of North America, forming a part of the Saskatchewan river, in N. lat. 54° 40'. W. long. 102° 50'. To the north of it at a little distance is the source of Churchill river; to the south is Cumberland-house; and not far from it are a number of houses belonging to the Hudson's bay company.

BEAVER River, a river of North America, which rises in a lake called Beaver lake and the adjoining hills, in about N. lat. 54° 40'. W. long. 111° 15', and discharges itself into la Cros lake, in N. lat. 55° 15'. and W. long. 108° 30'.

BEAVER-RAT, in *Zoology*. See MUS CORPUS.

BEAVER skin, the fur or skin of an amphibious animal called the *castor*, or *beaver*, sometimes found in France, Germany, and Poland, but most abundantly in the province of Canada in North America, and the unhabited wilds of Siberia. The skin of the beaver has hair of two kinds: the lower hairs immediately next to the skin are short, imbricated together, and as fine as down; the upper grow more sparingly, and are thicker and longer. The latter is of little value; but the flux or down is wrought into hats, stockings, and caps.

—————"The beaver's flux

Gives kindest warmth to weak enervate limbs,

When the pale blood slow rises through the veins."

Dyer's Fleece.

The merchants distinguish three kinds of castor, though all equally the skins of the same animal; these are *new castor*, *dry castor*, and *fat castor*. The *new castor*, called also *winter castor*, and *Muscovite castor*, because ordinarily reserved to send to Muscovy, is that taken in the winter huntings. This is the best, and most esteemed for rich furs, as having lost none of its hair by moulting. In the year 1794 the importation of beaver skin into the port of St. Peterburg amounted to the value of 322,250 roubles; a circumstance, which, as Mr. Tolke observes, ought to be a matter of concern to every true Russian, as it naturally strikes in with suspicion, that a country so richly stocked with wild animals of every kind should be dependant on foreign industry in this class of its necessaries. *Dry castor*, or *lean castor*, is the result of the summer huntings, when the beast is moulted, and has lost part of its hair; this being much inferior to the former, is little used in furs, but mostly in hats. *Fat castor*, usually called *old-coat*, or *coat-beaver*, is that which has contracted a certain fat, unctuous humour, by sweat exhaled

from the bodies of the savages, who have worn it for some time; this, though better than the dry, is yet only used for hats.

Its chief use is in the composition of hats, furs, &c. Besides this, in 1669, an attempt was made to employ it in other merchandizes; accordingly, a manufactory was settled in the Faubourg St. Antoine near Paris, where they made cloths, flannels, &c. of *castor*, with a mixture of wool. The manufacture flourished for a while, but soon decayed, it being found by experience that the stuffs lost their dye when wet, and that when dry again they were harsh and stiff as felt.

After the hair is cut off the skin to be used in hats, the pelt or skin itself is used in various works, viz. for the covering of mails and trunks, in slippers, &c.

Beaver is chiefly imported by the Hudson's-bay company, from the northern parts of America, where the animal abounds. Beaver skins are also procured in considerable abundance on the western coast of North America. See FUR.

BEAVER'S Town, in *Geography*, lies between Margaret's creek, an upper N. W. branch of Muskingum river, and the north branch of that river; at the head of which north branch there is only a mile's portage to Cayahoga river. Beaver's town is distant about 85 miles N. W. from Pittsburgh.

BEAUFET. See BUFFET.

BEAUFORT, HENRY, in *Biography*, cardinal and bishop of Winchester, was the natural son, legitimated by parliament, of John of Gault, by Catherine Swineford, who afterwards became his third wife. Having been educated at Oxford and Aix la Chapelle, he was advanced, at an early period of his life, to high stations both in the church and the state. In 1397 he became bishop of Lincoln, in 1399 chancellor of the university of Oxford, and dean of Wells, in 1404 lord high chancellor of England, and in 1405 bishop of Winchester. During the reigns of his brother, Henry IV., and of his nephew, Henry V., he does not seem to have possessed much political importance; but he lived in great splendour, and acquired immense wealth, so that he was able to lend Henry V. 20,000*l.* to aid his expedition into France, and thus to divert him from his design of attacking the revenues of the church. Upon the death of Henry V. he was appointed one of the guardians of his son Henry VI. during his minority; and in 1424 he was again made lord chancellor of England. In 1425, the dissensions that subsisted between him and the protector, Humphry duke of Gloucester, rose to such a height, that Beaufort thought it necessary to appeal to his nephew, the duke of Bedford, then regent of France, and to request his presence for bringing about an accommodation. Upon the arrival of the regent an assembly of the nobility was convened at St. Albans; but then interposition proving ineffectual, the decision of the contest was referred to the parliament held at Leicester in 1426. The duke of Gloucester produced six articles of accusation against the bishop, of which he was acquitted; and the defendants being enjoined to cultivate mutual friendship, departed with outward appearances of perfect amity. The regent, however, in order to gratify his brother, the protector, took away the great seal from the bishop. In 1428 the duke of Bedford returned to France, and was accompanied by Beaufort to Calais, where he was invested with the dignity of cardinal, with the title of St. Eusebius, conferred upon him by pope Martin V. He was also honoured by the same pope with the character of legate; but on his return to England, he was forbidden the exercise of it by royal proclamation. As he was likewise appointed the pope's legate in Germany, and general of the crusade against the Hussites, or heretics of Bohemia, he obtained from parliament the grant of a sum of money, and a body of force, for the more successful execution,

education of his office. Having embarked with his troops for France, he was obliged, for some time, with reluctance on his own part, to employ them under the duke of Bedford; and he then proceeded with them to Bohemia, where he remained for some months, till he was recalled by the pope. In 1430 he accompanied King Henry into France, under the title of the king's "principal counsellor," and performed the ceremony of crowning the young monarch in the church of Notre Dame, at Paris. The honours, however, which he received during his absence, were, in his estimation, an inadequate compensation for the mortification resulting from the duke of Gloucester's successful attempts for humbling his pride, and restraining his power. He not only procured an order of council, prohibiting any of the king's subjects from accompanying the cardinal, if he should leave the king without his permission: but he attempted to deprive him of his bishopric, as inconsistent with the dignity of a cardinal. On his return, and for his more effectual security against these hostile attempts, he obtained, by the intercession of the house of commons, letters of pardon for all offences committed by him contrary to the statute of "provifers," and other acts of "præmunire." This pardon was renewed five years after, viz. in 1437, for all crimes whatsoever. Notwithstanding these precautions, the duke of Gloucester, in 1442, drew up fourteen articles of impeachment against him, and presented them with his own hands to the king, who referred the matter to his council. The examination of these articles was attended with such delay, that the protector dropped the prosecution, and the cardinal escaped. The cause of the protector's inveterate enmity against the cardinal is said to have been the part which he had taken in malignating certain persons to accuse and persecute his duchess for treason, witchcraft, and other notorious crimes.

Cardinal Beaufort died in 1447, about a month after the duke of Gloucester, in whose murder, it is supposed, he was concerned. The remorse and horror occasioned by the reflection on this event, in the near approaches of his own death, were "more," says Hume, "than could naturally be expected from a man hardened, during the course of a long life, in falsehood and politics;" and they are exhibited in very impressive characters in the representation of his last scene by Shakespeare, in the last scene of the third act of the "Second Part of King Henry VI."

"If thou be'st death, I'll give thee England's treasure,
Enough to purchase such another island,
So thou wilt let me live, and feel no pain."

Again,

"Bring me unto my trial when you will.
Dy'd he not in his bed? where should he die?
Can I make men live, whether they will or no?
Oh! torture me no more: I will confess—
Alive again? Then, shew me where he is;
I'll give a thousand pounds to look upon him—
He hath no eyes, the dust hath blinded them:
Comb down his hair; look! look! it stands upright,
Like lime-twigs fet to catch my winged soul.
Give me some drink, and bid th' apothecary
Bring the strong poison that I bought of him."

The cardinal was buried at Winchester. He died rich, and left large sums for pious and charitable purposes, in various parts of the kingdom; and he ordered 10,000 masses to be said for his soul. Haughty and turbulent, and fond of pomp and power, he is allowed to have been a faithful and able servant of the crown. Mr. Hume describes him as a prelate of great capacity and experience, but of an intriguing and dangerous character. Hume's Hist. vol. iii. p. 135. 173. Biog. Brit.

BEAUFORT, MARGARET, distinguished by her munificent

encouragement of literature, was the daughter of John Beaufort, duke of Somerset and grandson of John of Gaunt; she was born at Blotthoe, in Bedfordshire, in 1441. Her first husband was Edmund earl of Richmond, by whom she had one son, Henry VII. king of England. Her second husband was Sir Henry Stafford, second son of Henry duke of Buckingham; and her third, Thomas lord Stanley, afterwards earl of Derby, by neither of whom she had any issue. Waving all pretensions to the crown in favour of her son, she devoted her life to exercises of piety and charity, and derived her chief pleasure from relieving the indigent and distressed. She kept constantly in her house twelve poor people, whom she lodged, fed, and clothed. She extended her patronage to the students of both universities, and to men of learning throughout England. In 1502 she instituted two perpetual public lectures in divinity, one at Oxford, and the other at Cambridge, which still subsist under the name of Margaret professorships. At Cambridge she established a perpetual public preacher, whose duty it should be to preach, at least, six sermons every year, at certain churches in the dioceses of London, Ely, and Lincoln; and she also founded a perpetual chantry at Winbourn minister, in Dorsetshire, for teaching grammar. But her noblest institutions were the colleges of Christ and St. John in Cambridge, the former founded in 1505, for one master, twelve fellows, and forty-seven scholars, and the latter in 1508, for a master and fifty fellows and scholars, which being begun just before her death, was finished by her executors. It is, therefore, with justice, that Gray has made this lady the principal object of his eulogy, in his ode on the installation of the duke of Grafton as chancellor of Cambridge.

"Foremost, and leaning from her golden cloud,

"The venerable Margaret see!

"Welcome, my noble son," she cries aloud,

"To this, thy kindred train, and me:

"Pleased in thy lineaments we trace

"A Tudor's fire, and a Beaufort's grace."

Her piety and devotion were no less exemplary, though partaking in a great degree of the superstition of the times, than her charity. She died in June 1509, and was interred in the chapel of her son Henry VII. in Westminster Abbey. She is the reputed author of the translation of two devotional pieces from the French, and also of rules and orders for the prudence and attire of noble ladies at funerals. Biog. Brit.

BEAUFORT, in *Geography*, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Baugé. The place contains 5990 and the canton 15,125 inhabitants; the territory comprehends 200 kilometres and 7 communes. The castle of Beaufort gives the title of duke to the noble family of Somerset, lineally descended from John of Gaunt, duke of Lancaster, and the house of Lancaster obtained this castle from Blanche of Artois, queen of Navarre, wife to Edmund Crouchback, second son of king Henry III., and first earl of Lancaster. N. lat. 47° 26'. W. long. 0° 3'.

BEAUFORT, a town of France in the department of the Drome, 2 leagues N. E. of Crest.

BEAUFORT, a town of Italy in Savoy, on the river Oron, 30 miles E. N. E. of Chambéry. By the late French arrangement, this is the chief place of a canton in the department of Mont Blanc, and district of Montiers. The place contains 3070 and the canton 7357 inhabitants: the territory includes 182½ kilometres and 4 communes. N. lat. 45° 40'. E. long. 6 48'.

BEAUFORT, a district of the lower country of South Carolina, lying on the sea-coast, between Combahee and Savannah rivers. It is 69 miles long and 37 broad, and divided into four parishes, containing 18,753 inhabitants, of whom only

only 4326 are whites. The northern part of this district abounds with large forests of cypress; but the lands are fit for sugar, rice, indigo, &c. It sends twelve representatives to the first part of the legislature of the state. The amount of tax is 3,022,28. 11d. sterling.

BEAUFORT, the chief town of the above-mentioned district, situated in the island of Port Royal, at the mouth of the great river. It is a pleasant though small town, being only 1000, a distance of 200 inhabitants, distinguished by its regularity and cleanliness. It has a fine harbour, and is otherwise a considerable town. Its situation is healthy, and is distant about 73 miles S. W. from Charleston. N. lat. 32° 26'. W. long. 80° 55'.

BEAUFORT, a sea-port town of North Carolina, in the county of Currituck, and district of Newbern, on the N. E. point of Core bank. There are about 20 houses, a court-house, and jail; and the county-courts are held here. It is distant 35 miles S. E. from Newbern, and about 27 from Core Bank. N. lat. 34° 47'. W. long. 77° 20'.

BEAUFORT, the name of **PORT ROYAL**.

BEAUGENCY, or **BAUGENCY**, a town of France, and chief place of a canton in the district of Orleans and the department of the Loiret, situated on the Loire, over which is a bridge of 22 arches, and trading in wine and brandy; 4½ leagues S. W. from Orleans. The place contains 4842 and 11,784 inhabitants, on a territory of 140 kilometres, or 57 communes. N. lat. 47° 45'. E. long. 1° 46'.

BEAULIEU, a town of France, in the department of the Rhone, and chief place of a canton in the district of Villefranche, situated at the foot of a mountain on the Ardere, formerly the capital of the Beaujolois; 4 leagues N. N. W. of Villefranche, and 7 E. N. E. of Roanne. The place contains 1600, and the canton 12,867 inhabitants, on a territory of 252 kilometres including 11 communes. N. lat. 45° 10'. E. long. 4° 40'.

BEAUJOLAIS, a small but fertile province of France between the rivulets, now forming part of the department of the Rhone, 16 leagues long, and 8 wide, situated between the Loire, Saône, Saône, and Loire.

BEAULIU, a pleasant village in the New Forest, Hampshire, recorded in the noble history of England, in a late abbey, which was founded and endowed here by King John, in 1254, for monks of the Cistercian order. The remains of this abbey are now considerable; and the walls, which formerly inclosed an area of nearly twenty acres, are mostly standing. The abbot's house, now called the Palace, has been fitted up and much modernized by the present Duke of Beaufort. This abbey possessed the privilege of *jurisdiction*, and consequently gave protection to many villans and felons. Among other persons Warbeck, in the year 1498, having rebelled against the king, and retired with his army to Taunton, fled hither to this monastery, where he and several of his companions registered themselves factious-men. Henry VII. was prevented from seizing him by force, but offered him pardon, if he would surrender himself. This he complied with, and was brought to London, where he was executed in the Tower, and afterwards hung at Tyburn for seditious practices. Rogyn's England, vol. i. To a round Southampton, 12.

BEAULIEU, a town of France, in the department of the Charente, and chief place of a canton in the district of Brives, on the Dordogne, 17 miles to the east of Brives. The place contains 1737 and the canton 9661 inhabitants; the territory of 132½ kilometres and 14 communes.—Also, a town of France, in the department of the Indre and Loire, situated on the Indre, opposite Loches, and containing about

1500 inhabitants.—Also, a town of France, in the department of the Loiret, 4 leagues S. E. of Gen.

BEAULIEU *sous la Roche*, a town of France, in the department of the Vendée, and chief place of a canton in the district of Sables d'Olonne, 4½ leagues N. N. E. of Sables d'Olonne.

BLAULON, a town of France, in the department of the Ill and Vilaine, and chief place of a canton in the district of Redon, 4 leagues S. W. of Rennes.

BEAULY, is the name of a river in Invernesshire, Scotland. It is formed by the junction of three small streams, which concentrate near 1000 falls, whence the united waters flow rapidly, and after forming the falls of Kilmorieck and other fine cascades, they are discharged into an arm of the sea. The mouth, or mouth of the river, is 10 miles in length and 20 in breadth. The banks of this river are richly diversified with some fine natural woods, and various exhibitions of bold rocky scenery. At one place, the river divides, forming the little island of Agaitih, which is of an oval figure, about one mile and a half in circumference, and rises gradually about 100 feet above the level of the water. The Beauly is noted for its fish and fishery, whose rents have lately produced 6311. per annum.

BEAUMAN'S, or **BAUMAN'S *Island***, a cluster of three islands, so called from the name of the captain who discovered them, part of Roggewein's archipelago, situated in the great Equinoctial or Pacific Ocean, in about S. lat. 12° W. long. 155° 10'. The discovery of these islands has been ascribed by several geographers to Roggewein; and he named them, in 1721, Beauran's islands. His own words are these: "we discovered three islands at the same time in the 12th degree of latitude, of a very agreeable appearance; we found them stocked with fine fruit-trees, herbs, vegetables, and plants of every description. The islands, who came to meet our vessels, offered us all sorts of fish, coconuts, bananas, and other excellent fruit. These islands must be well-peopled, the beach being on our arrival covered with many thousands of men and women, the greater part of the former carrying bows and arrows. All the inhabitants are white, and only differ from Europeans by some of them being much sun-burnt. They form a good kind of people, lively and gay in conversation, kind and humane towards each other, and nothing of the savage in their manner. Their bodies were not painted like those we had before seen; they were clothed from the waist to the neck with fringes of silken stuff artfully wrought; their heads were covered with hats of the same kind, very fine and broad, to protect them from the heat of the sun. Some of these islands were ten, fourteen, and even twenty miles in circumference. We called them Bauman's islands, from the name of the captain of the ship Tinhover, who first saw them. It must be confessed (adds the author), that this is the most civilized and honest nation we have met with in the island of the South sea. All the coasts of these islands have good anchorage, in from 12 to 20 fathoms water." See the extract from the historical account of Roggewein's voyage, written in French, in 1759, by a German of Mecklenburgh, who was on board Roggewein's fleet, in La Perouse's Voyage round the World, vol. ii. p. 192. Eng. ed. The other cluster of islands of Roggewein's archipelago, marked in the hydrographical charts annexed to M. Richard's Voyage, are Roggewein and Gronow, situated a little to the north of Bauman's islands, and nearly in the same longitude. Some have supposed Bauman's islands to be the same with those which Bougainville has called "Navigator's islands;" but neither the safety of the inhabitants, nor the geographical position of the island, warrant this supposition.

BEAUMARCHEZ, a town of France, in the department of the Gers, 7 leagues west of Auch. N. lat. 43° 35'. W. long. 0° 1'.

BEAUMARIS, or **BEAUMARSH**, the principal and county town of the isle of Anglesea, North Wales, is situated on the western bank of the river Menai, which forms a fine spacious bay opposite the town. The castle, intimately connected with the early history and foundation of this town, owes its origin to Edward I. who, having erected two magnificent fortresses at Caernarvon and Conway, deemed it necessary to raise another at this place, for the purpose of enforcing obedience and subjection among the conquered Britons of Anglesea. The foundation of this structure was laid in 1295, in a place called Bonover Marsh, which afterwards assumed the compound French terms *beau, fair*, and *marais, marsh*. The favourable situation of the castle enabled the engineers to make such a fosse or ditch round it, as might be constantly filled with water from the bay, and a canal was also cut between the river and castle, that small vessels might carry their freightage immediately to the walls of the latter. This fortress being complete, the royal founder appointed sir William Pickmore, a Gascon, the first governor, who was also nominated captain of the town. The same person (one instance excepted) was always appointed to these two offices; and his annual salary was forty pounds as constable, and twelve pounds three shillings and four-pence as captain. The castle and town were guarded by 24 soldiers, at four-pence a day each. Other persons had proportionable pay, yet from every man's salary a certain sum was deducted monthly towards the payment of itinerant preachers and teachers, and for letters and intelligence. The castle becoming very burthenfome to the people, occasioned many contentions between the inhabitants of the town and those of the fortrefs. Battles sometimes ensued. One of them called the black fray, happened on a market-day, in the time of Henry VI. and it produced great slaughter. The history of these fortresses presents a continued series of oppression and irritation; and it seemed a grand policy of the English governors to exclude the Welsh from those strong holds, and their dependant towns, which they had wrested from the subjugated Cambrians. By a rental of the borough property of Beaumaris, taken even so late as 1608, there appear only seven Welsh names, and one burgage in the tenure of a Welshman. The castle was given by Henry IV. to Percy, earl of Northumberland, for life; and Richard III. granted the constablership and captainship of the castle and town to sir Richard Huddleston, knight. From the time of sir Rowland Villeville, alias Brittainne, the reputed base son of Henry VII., and constable of the castle, the garrison was withdrawn till 1642, when Thomas Cheddle, then constable, replenished it with men and ammunition. It was then held for Charles I. whose throne was in danger. The gentlemen of this town and island being warm partisans for the monarchy, determined to oppose the parliamentary forces which had assembled at Conway, and had deputed five commissioners to manage their business. The islanders refusing to surrender on summons, were invaded by about 1500 men, horse and foot, whose superior discipline and courage soon routed and conquered the royalists. On the 2d of October 1648, the town and castle surrendered to general Mytton: colonels Bulkeley and Whitely were made prisoners; and the inhabitants agreed to pay to their conquerors 7000l. within fourteen days. The castle is now the property of the crown. It stands in the grounds of lord Bulkeley, attached to the east end of the town, and covers a considerable space of ground. Though partly in ruins, yet its outer walls, several towers, and many parts remain, to characterise its di-

mensions and architecture. It is surrounded by a fosse, with an entrance to the east between two embattled round and square towers. Within these is the principal body of the castle, which is nearly of a square form, having a round tower at each angle, and another in the centre of each face. The area is an irregular octagon, about 57 yards from north to south, and 60 from east to west. In the middle of the north side is the hall, twenty yards long and twelve wide. What was formerly the porter's lodge is now used as the bridewell. A gallery of communication extended round the buildings of the inner court; and in different recesses of this were square holes, which seemed to have opened into dungeons beneath. The two eastern towers served also as dungeons, the descent to which was dark and narrow. On the eastern side of the castle was a small chapel, some of which remains.

The town of Beaumaris is not very ancient; nor do we find any particular records of it previous to the erection of the castle, soon after which it assumed some consequence, and Edward I. surrounded it with a wall, made it a corporation, and endowed it with certain privileges. In the 27th of Henry VIII. Anglesea, with eleven other counties of Wales were imprivileged and summoned to send members to parliament, but no return was made from this county till the 33d of Henry VIII. when Newborough, now a poor decayed village, sent one member. Since the 2d of Edward VI. Beaumaris has been regularly represented by one member, and the right of voting was vested, in 1729, in a mayor, two bailiffs, and twenty-one capital burgesses. Though this town has not an extensive trade, yet it has a custom house for the casual reception of goods, a large town-hall with assembly-room, a free school, alms-house, and a handsome church or chapel with a lofty square tower. The free school and alms-house were founded by David Hughes; the first in 1603, and the latter in 1613. Here are a weekly market on Saturday, and four annual fairs. It is situated 59 miles W. by N. from Chester, and 252 N. W. of London. N. Lat. 53° 14'. W. long. 4° 15'.

The *Bay* of Beaumaris forms a fine expanse of water before the town, and ships can ride safe at anchor in six or seven fathom water, even when the tide is out. From this to the opposite shore at Aber is a distance of about four miles, yet the channel at low water does not occupy above one mile. The remainder is a uniform bed of sand, called *Traeth-Telavan*, or the *Lavan sands*. These, the Welsh suppose, were anciently quite free from water, and formed a habitable part of Carnarvonshire; which Mr. Pennant admits, and endeavours to prove, by showing that the sea has made great encroachments at Abergeley, and that several bodies and roots of oak trees have been found in a tract of hard loam at a considerable distance from the present shores.

About one mile from Beaumaris stand some shattered remains of *Llanfues*, which Camden called "a famous religious house in times past," and belonged "to the friars minors, unto whom the kings of England shewed themselves very bountiful patrons, as well in regard to the friar's holiness, as also because (that I may speak out of the public records of the kingdom) were buried a daughter of king John, a son of a king of the Danes, the bodies also of the lord Clifford, and other knights and squires, who in the time of the noble and renowned kings of England were slain in the wars against the Welsh." This monastery, erected by Llewelyn ap Iorwerth, was consecrated, in 1240, by Howel, bishop of Bangor; and in a few years afterwards burnt in the insurrection of Madoc. At the dissolution, Henry VIII. sold the convent and its possessions to one of his courtiers. The family of Whyte (now extinct) afterwards became possessed of it, and built a respectable house, which has since been enlarged, modernized, and the grounds much improved. It is

is now one of the seats of Sir Robert Williams, Bart. Near this place a severe battle was fought, in 819, between the Welsh and the Saxons under their leader Egbert, who had invaded the island, and given it then, for the first time, the name of Angle-sea. The Saxons at first proved victorious, but were strongly opposed by Merfyn Frych, the Welsh prince, who after some severe battles expelled the invaders from this island.

Two miles north of Friars are the remains of the priory of *Penmon*, consisting of little more than the ruinous refectory and part of the church. This priory for Benedictine monks was endowed, if not founded, by prince Llewelyn ap Ierwerth before 1221.

Near Penmon is a *well* surrounded with a wall and stone seats, having two doors or entrances. This was a sacred, baptismal, or holy well. About a quarter of a mile distant is an ancient cross, six feet high, the shaft of which is curiously ornamented with sculptured chequered work. At the distance of about one mile from the shore is *Ynis Seiriol*, or Seiriol's island, now called Priest-holme. This was once appendant to the monastery of Penmon; and the remains of a square tower still mark its religious appropriation. This island is sometimes called Puffin island, from its being much frequented by birds of that name. From the beginning of April to the beginning of August, immense numbers of these and other sea-fowl resort to this spot. To the west of Priest-holme are three smaller islands, called Ynis Llygod, or the Mouse islands.

In the channel which waters these islands, the large oysters called the *Penmon* are taken by the dredge, and great quantities are pickled, packed in small casks, and sent to different parts of the kingdom.

Biron-hill, the seat of Lord Bulkeley, is finely seated on an eminence, overlooking the town, castle, &c. The original mansion of this family in Wales was *Court macor*, in Castle-street, Beaumaris. The present mansion was built by Sir Richard Bulkeley, for Prince Henry, son of James I. The house has since been enlarged and greatly improved by its present possessor, under the direction of Mr. S. Wyatt. The grounds of this domain are singularly fine and beautiful, and the various prospects of sea, mountain, and sylvan scenery, are highly grand and interesting.

About seven miles south-west of Beaumaris is *Plas-Nwyll*, an elegant modern mansion, built in a castellated style, belonging to the Earl of Uxbridge. The house is large, commodious, and handsome, and the ancient woods around it give it a venerable character. Close behind the house are two Cromlechs, the largest of which has been long designated by the name of "Cromlech of Mona." See CROMLECH. See an interesting poem called "Beaumaris Bay," with notes: "A Tour round North Wales," by the Rev. W. Bingley; and "Mr. Pennant's Tours in North Wales."

BEAU-MASS. See MASS.

BEAUME CAVE. See BAUME.

BEAUMEILLE, LAURENT-ANGELVILLÉ DE LA, in *Biography*, a modern French writer, was born in 1727, at Valenciennes, in the diocese of Allais. Having been invited to Denmark to undertake a professorship of French Belles Lettres, he opened his course by a "Discourse," printed in 1751. But the climate being too severe for his constitution, he quitted Denmark with a pension and the title of counsellor. In his return by way of Berlin, he wished to form an acquaintance with Voltaire, of whose writings he was a passionate admirer; but their irritable dispositions produced a quarrel, which admitted of no reconciliation, and which produced personalities equally disreputable to both. On his arrival at Paris, in 1753, his publication, entitled "Mes Pensees," caused him to be confined in the Bastille; and soon

after his liberation he was committed to the same prison on account of his "Memoirs of Maintenon." After his second liberation, he retired into the country; but in 1772, he was called back to Paris to occupy the post of king's librarian, from which death removed him in consequence of a disorder of his breast, in November 1773. The principal of his works are "A Defence of the Spirit of Laws;" "Mes Pensees," a satirical work; "Mem. of Mad. Maintenon," 6 vols. 12mo. soon followed by 9 vols. of her "Letters;" "Letters to M. de Voltaire," 1761, 12mo. upon the perusal of which Voltaire acknowledged, "the rascal has a great deal of wit;" "Thoughts of Seneca," Latin and French; and "Commentary on the Henriade," 1775, 2 vols. 8vo. He left some MSS. He is said to have been of an open and frank temper, but hasty, captious, and addicted to satire. *Nouv. Dict. Hist.*

BEAUMENIL, in *Geography*, a town of France, in the department of the Eure, and chief place of a canton, in the district of Bernay; 2 leagues S. S. E. of Bernay. The place contains 448 and the canton 9330 inhabitants, on a territory of 190 kilometres containing 21 communes.

BEAUMES, a town of France, chief place of a canton in the department of Vaucluse and district of Orange. The place contains 1373 and the canton 5452 inhabitants; the territory includes 122½ kilometres and 9 communes.

BEAUMETZ-LES-LOGES, a town of France, in the department of the Straits of Calais, and chief place of a canton in the district of Arras; 2 leagues S.W. of Arras. The place contains 318 and the canton 10,683 inhabitants; the territory includes 187½ kilometres and 29 communes.

BEAUMONT, ELIE DE, in *Biography*, was born at Charenton, in Normandy, in 1732, and admitted an advocate in 1752, in which profession he did not succeed for want of voice. Upon his retirement from the bar, he became a writer, and addressed a variety of eloquent pieces to the magistrates and to the public. His memoir in behalf of the unfortunate Colas family produced a permanent effect. This was succeeded by many others, no less interelling and pathetic. Beaumont's imagination was lively, but like other persons of the same cast, he was liable to dejection. He was lord of Caen, in Normandy, where he instituted an interesting festival, called "Fête des bons gens," or the good folks' feast. He died at Paris, in 1785.

The wife of the preceding, MADAME ELIE DU BEAUMONT, was born at Caen in 1735, and is known with reputation by her "Letters of the Marquis de Roselle," 12mo. a novel, which exhibits a faithful picture of the manners and characters of the courtiers of the day, and of their sycophants and dependants. In society she was beloved and respected by reason of the amiableness of her disposition, the polite ease of her manners, the soundness of her understanding, and the extent of her knowledge. She died at Paris in 1783. *Nouv. Dict. Hist.*

BEAUMONT, FRANCIS, an eminent dramatic poet, was the son of Francis Beaumont, one of the judges of the common pleas, and born at Grace-Dieu, in Leicestershire, an ancient seat of the family, in 1585 or 1586. He was educated at Cambridge, and afterwards admitted a student in the Inner Temple, where his devotion to the Muses diverted his attention from the study of the law. Beaumont and Fletcher were so intimately connected, and wrote so much in concert, that it is difficult at this distance of time to assign to each his appropriate part in the numerous compositions, tragic and comic, which have been published under their common names. Tradition reports, and probably with truth, that Beaumont was peculiarly distinguished by judgment, which was commonly employed in correcting and retouching the superfluities of Fletcher's wit. It appears, however, from

an examination of Beaumont's distinct productions, and particularly his little Masque of the Inner Temple and Gray's Inn, and also a poem entitled the "Hermaphrodite," that he was by no means destitute of poetic imagination and invention, and that his versification is elegant and harmonious. Beaumont was esteemed for accurate a judge of plays, that Ben Jonson, who expressed his affectionate regard for him in a copy of verses, submitted all his writings to his censure, and is thought to have availed himself of his judgment in correcting, if not in contriving, all his plots. He died before he had attained the age of 30 years, in March, 1615; and left a daughter, who was in possession of several poems of her father's writings, but they were all lost at sea in a voyage from Ireland, where she had lived for some time in the duke of Ormond's family. Besides the plays in which he was jointly concerned with Mr. Fletcher (for an account of which see FLETCHER), he wrote the dramatic piece above mentioned, entitled, "A Masque, &c." "A Poetical Epistle to Ben Jonson," "Verses to his Friend Master John Fletcher upon his Faithful Shepherdes," and other poems, printed together in 1653, 8vo. The elder brother of the preceding, sir John Beaumont, was distinguished by his poetical talents, and was the author of several pieces which had considerable merit. A volume of his miscellaneous poems was published by his son in 1629. Gen. Dict. Biog. Brit.

BEAUMONT, in *Geography*, a town of France, in the department of the Calvados, and chief place of a canton, in the district of Pont l'Évêque, 6 leagues E. N. E. of Caen.—Also, a town of France, in the department of the Côte d'Or, and chief place of a canton, in the district of Is-sur-Tille, 16 miles N. E. of Dijon.—Also, a town of France, in the department of the Channel, and chief place of a canton, in the district of Valognes, 8 miles west of Cherbourg. The place contains 538 and the canton 9493 inhabitants, on a territory of 192½ kilometres, including 20 communes.—Also, a town of France, in the department of Puy-de-Dôme, and chief place of a canton, in the district of Clermont-Terrand, 2 miles south of Clermont.—Also, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Pontoise, on the Oise, 33 miles north of Paris.—Also, a town of France, in the department of the Dordogne, and chief place of a canton, in the district of Bergerac, 3½ leagues west of Belvez. The place contains 1505 and the canton 7124 inhabitants on a territory of 170 kilometres and 14 communes.—Also, a town of France, in the department of the Sarthe, and chief place of a canton, in the district of Mamers, 5 leagues N. E. of Le Mans. The place contains 2402 and the canton 14,720 inhabitants: the territory includes 175 kilometres and 15 communes.

BEAUMONT *en Argonne*, a town of France, in the department of the Ardennes, and chief place of a canton, in the district of Sedan, 3½ leagues S. S. E. of Sedan.

BEAUMONT-*Les-Forges*, a town of France, in the department of the Nievre, and chief place of a canton, in the district of La Charité on the Nievre, 13 miles north of Nevers.

BEAUMONT *on Gatineau*, a town of France, in the department of the Seine and Marne, and chief place of a canton, in the district of Nemours, 4 leagues S. W. of Nemours.

BEAUMONT *de Lomagne*, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the district of Castel-Sarrazin, 5 leagues N. W. of Grenade. The place contains 3700 and the canton 11,177 inhabitants: the territory includes 200 kilometres and 20 communes.

BEAUMONT *Le Roger*, a town of France, in the department of the Eure, and chief place of a canton, in the district of Bernay, 2½ leagues E. of Bernay. The place con-

tains 1406 and the canton 13,685 inhabitants: the territory includes 227½ kilometres and 26 communes. N. lat. 49° 5'. E. long. 0° 41'.

BEAUMONT *sur Vesle*, a town of France, in the department of the Marne, and chief place of a canton, in the district of Reims, seated on the Vesle, 8 miles S. E. of Reims.—Also, a town of France, in the department of Jemappe, and chief place of a canton, in the district of Charleroy. The place contains 1376 and the canton 7458 inhabitants: on a territory of 177½ kilometres, including 10 communes.

BEAUNE, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Baugé, 3 leagues east of Angers, and 3 west of Baugé.—Also, a town of France, and principal place of a district, in the department of the Côte d'Or, 7 leagues south of Dijon. The place contains 8341 and the canton 23,090 inhabitants: on a territory of 300 kilometres. The northern canton includes 13 and the southern 15 communes. N. lat. 47°. E. long. 4° 50'.—Also, a town of France, in the department of the Loiret, and chief place of a canton, in the district of Pithiviers. The place contains 2057 and the canton 14,845 inhabitants: the territory includes 250 kilometres and 24 communes.

BEAU-PLEADER, or BEW-PLEADER in *Law*, a writ on the statute of Marlbridge, 52 Hen. III. c. 11. whereby it is provided, that no fine shall be taken of any man in any court for *fair-pleading*, i. e. for not pleading aptly and to the purpose. And beau-pleader is as well in respect of vicious pleadings, as of the fair-pleading, by way of amendment. 2 Inst. 122.

BEAUPRE', in *Geography*, an island in the Pacific ocean, so called after the name of Beupré, engineer-geographer to the expedition fitted out for search of La Perouse, lying west of the new Hebrides, in S. lat. 20° 14'. E. long. 161° 27'. It is very low, and about 1500 toises long.

BEAUPREAU, a town of France, in the department of the Mayne and Loire, and chief place of a district, 3 leagues S. of St. Florent. The place contains 1640 and the canton 11,250 inhabitants: the territory includes 260 kilometres and 11 communes.

BEAQUESNE, a town of France, in the department of the Somme, and chief place of a canton, in the district of Doullens, 2 leagues S. E. of Doullens.

BEAURAING, a town of France, in the department of the Sambre and Meuse, and chief place of a canton in the district of Dinant: the place contains 452 and the canton 667 inhabitants: the territory includes 257½ kilometres and 33 communes.

BEAUREGARD, a town of France, in the department of the Dordogne, 4 leagues south of Périgueux.—Also, a town of France, in the department of Puy-de-Dôme, 3 leagues east of Clermont-Ferrand.—Also, a town of France, in the department of Lot, 5 leagues E. S. E. of Cahors.

BEAUREPAIRE, a town of France, in the department of the Saone and Loire, and chief place of a canton, in the district of Louhans, 2½ leagues east of Louhans. The place contains 817 and the canton 8405 inhabitants, on a territory of 122½ kilometres, including 7 communes.—Also, a town of France, in the department of the Isère, and chief place of a canton, in the district of Vienne, 3 leagues S. E. of Vienne. The place contains 1800 and the canton 9850 inhabitants: on a territory of 195 kilometres including 14 communes.

BEAURIEUX, a town of France, in the department of the Aisne, and chief place of a canton, in the district of Laon, 3½ leagues N. W. of Reims.

BEAUSOBRE, ISAAC DE, in *Biography*, a learned French Calvinist minister, was Born at Nior in Switzerland, in

some mind; and, therefore, by absolute beauty he means only that beauty which we perceive in objects without comparison to any thing external, of which the object is supposed to be an imitation or picture; such as that beauty perceived from the works of nature, artificial forms, figures, and theorems. Whereas comparative or relative beauty is that which we perceive in objects, commonly considered as imitations or resemblances of something else. The general source of our ideas of beauty, according to this writer, is uniformity amidst variety; and what we call beautiful in objects seems to be in a compound ratio of uniformity and variety, so that where the uniformity of bodies is equal, the beauty is as the variety, and vice versa. This position he illustrates by a number of examples deduced from different figures, from the works of nature, from the inward structure and outward form of animals, and the proportion of their parts to each other, from the harmony of sound, from theorems or universal truths, and from the works of art. Relative beauty is founded, as he conceives, on a conformity, or a kind of unity between the original and the copy; and for obtaining this sort of beauty it is not necessary that there should be any beauty in the original; for an exact imitation may still be beautiful, though the original is altogether destitute of beauty. A sense of beauty from uniformity amidst variety is, in his opinion, universally prevalent among mankind; and for the truth of the fact, he appeals to experience. The same ingenious writer deduces all our ideas of virtue from an implanted sense, called "Moral sense;" (which see; and he describes moral good and evil by the effects accompanying the perception of them.

Dr. Price, in his inquiry into the origin of our ideas of beauty and deformity of actions, (see "Review of the principal Questions in Morals," ch. i. and ii.) distinguishes between our perception of right and wrong, and our perception of beauty and deformity, in considering the actions of moral agents. He observes that, in contemplating such actions, we have both a perception of the understanding and a feeling of the heart; and that the latter, or the effects in us accompanying our moral perceptions, depend on two causes; partly on the positive constitution of our nature, but principally on the essential congruity or incongruity between moral ideas and our intellectual faculties. "Placet suapte natura-virtus," Seneca. "Etiam si nullo laudetur, natura est laudabile." Tully. He apprehends, that the above-mentioned author was led to derive all our ideas of virtue from an implanted sense, in consequence of not duly considering the difference between the "honestum," and "pulchrum," the "*δικαιον*," and "*καλον*," of actions; or of not carefully distinguishing between the discernment of the mind and the sensations attending it in our moral perceptions. With him the rectitude of an action is the same with its gratefulness to the observer; and wrong, the contrary. But what, says this writer, can be more evident, than that *right* and *pleasure*, *wrong* and *pain*, are as different as a cause and its effect; what is *understood* and what is *felt*; *absolute truth*, and its *agreeableness* to the mind. Mr. Balguy indeed (see his "Tracts on the Foundation of Moral Goodness, p. 61.") is of opinion, that all beauty, whether natural or moral, is a species of absolute truth; as resulting from, or consisting in, the necessary relations and congruities of ideas. As to moral beauty, says Dr. Price, one would think, that the author just cited must mean, though his meaning is not very intelligible, that it denotes a real quality of certain actions. But the word beauty seems always to refer to the reception of pleasure; and therefore the beauty of an action, or character, must signify its being such as pleases us, or having an aptness to please when perceived. Nor can it be just to conceive more in the action itself, or to affirm more of it, than

this *aptness*, or that objective goodness or rectitude on which it depends. Beauty and loveliness are synonymous; but an object *self-lovely* can only mean an object, by its nature, fitted to engage love. It may be added, that the epithets beautiful and amiable are, in common language, confined to actions and characters that please us highly, from the peculiar degree of moral worth and beauty apprehended in them. All virtuous actions must be pleasing to an intelligent observer; but they do not all please to the degree necessary to entitle them to these epithets, as they are generally applied. These observations are applicable, as Dr. Price thinks, with a little variation, to natural beauty; the general sense of which, according to Dr. Hutcheson, is uniformity amidst variety. If we ask, why this pleases? The proper answer is, that by its nature it is adapted to please. There seems, as Dr. P. observes, no more occasion in this case to have recourse to an implanted sense than in the former. Regular objects contribute towards producing the complacency of our minds, and the preference we give them, because they are more easily viewed and comprehended by the mind; because order and symmetry give objects their stability and strength, and subserviency to any valuable purpose; and because regularity and order evidence art and design. Brutes are incapable of the pleasures of beauty, because they proceed from a comparison of objects, and a discernment of analogy, design, and proportion, to which their faculties do not reach.

To Dr. Hutcheson's theory of beauty, which ascribes it to uniformity amidst variety, it has been objected, that, though it accounts in a satisfactory manner for the beauty of many figures, yet when we endeavour to apply this principle to beautiful objects of some other kind, as to colour or motion, it will be found irrelative. And even in external figured objects, it is not just, that their beauty is in proportion to their mixture of variety, with uniformity, as many are highly beautiful and please us much, which have no variety at all, and others which possess variety to a degree of intricacy. With respect to the opinion, that natural beauty is a real quality of objects, it may be observed, that it seems impossible for any one to conceive the objects themselves to possess more than a particular order of parts, and certain powers, or an affinity to our perceptive faculties, thence arising: and if we call this beauty, then it is an absolute inherent quality of certain objects, and equally existing, whether our mind discerns it or not. However, order and regularity are, more properly, the causes of beauty than beauty itself.

Beauty, says another ingenious writer, (see Reid's Essay on the Intellectual Powers of man, ch. iv.) is found in things so various and so very different in nature, that it is difficult to say, wherein it consists, or what can be common to all the objects in which it is found. Of the objects of sense we find beauty in colour, in sound, in form, in motion. There are beauties of speech, and beauties of thought; beauties in the arts, and in the sciences; beauties in actions, in affections, and in characters. In things so different, and so unlike, is there any quality, the same in all, which we may call by the name of beauty? Why then should things so different be called by the same name? They please, and are denominated beautiful, not in virtue of any one quality common to them all, but by means of several different principles in human nature. The agreeable emotion, excited by them, and called beauty, is produced by different causes. However, though there be nothing common in the things themselves, yet the kinds of beauty, which seem to be as various as the objects to which it is ascribed, must have some common relation to us, or to something else, which leads us to give them the same name. All the objects we call beautiful, agree in two things, which seem to concur in our
sense

sense of beauty. First, when they are perceived, or even imagined, they produce a certain agreeable emotion or feeling in the mind; and secondly, this agreeable emotion is accompanied with an opinion or belief of their having some perfection or excellence belonging to them. Whether the pleasure we feel in contemplating beautiful objects may have any necessary connection with the belief of their excellence, or whether that pleasure be combined with this belief, merely by the good pleasure of our Maker, Dr. Reid does not determine. Beautiful objects excite an emotion of a soothing and enlivening kind, that sweetens the temper, allays all angry passions, and promotes every benevolent affection, and disposes to other agreeable emotions, such as those of love, hope, and joy. "There is nothing," says Mr. Addison, "that makes its way more directly to the soul than beauty, which immediately diffuses a secret satisfaction and complacency through the imagination, and gives a shining to any thing that is great and uncommon. The very first discovery of it strikes the mind with an inward joy, and spreads a cheerfulness and delight through all its faculties." This agreeable emotion, produced by beautiful objects, is accompanied with an opinion or judgment of some perfection or excellence of those objects, adapted by its nature for producing that emotion; and this, according to Dr. Reid, is a second ingredient in our sense of beauty. To assert, says this writer, that there is in reality no beauty in those objects, in which all men perceive beauty, is to attribute to man fallacious senses; and thus to think disrespectfully of the Author of our being; who has diffused over all the works of nature a profusion of beauties, which are real, and not fanciful, and thousands of which our faculties are too dull to perceive. This author distinguishes our determinations with regard to the beauty of objects into two kinds, viz. instinctive and rational. In the former case, objects strike us at once, and appear beautiful at first sight, without any reflection, and without our being able to say why we call them beautiful, or being able to specify any perfection which justifies our judgment. Whereas our rational judgment of beauty is grounded on some agreeable quality of the object, which is distinctly conceived, and may be specified. Beauty itself may be distinguished into original, and derived. It is natural and agreeable to the strain of human sentiments and of human language, says Dr. Reid, that in many cases the beauty which originally and properly exists in the things signified, should be transferred to the sign; that which is in the cause to be effect; that which is in the end to the means; and that which is in the agent to the instrument. E. G. The beauty of good breeding is not originally in the external behaviour in which it consists; it is derived from the quality of mind, which it expresses; and though there may be good breeding without the amiable qualities of mind, its beauty is still derived from what it naturally expresses. Good breeding is the picture; these agreeable qualities are the original; and it is the beauty of the original that is reflected to our senses by the picture.

As to the use of the term beauty, some have extended it so as to include every thing that pleases a good taste; and others have restricted it to the objects of sight, when they are either seen, remembered, or imagined. But the latter sense is much too limited, as there are beauties of various kinds, that are not objects of sight, such as those of music, composition, character, affections, and actions; and as persons may be competent judges of several sorts of beauty, who are deprived of the faculty of sight. It may be observed, that as the proper object of admiration is grandeur, beauty is the proper object of love and esteem; and the connection of beauty with real perfection was a capital theme of the Socratic school. It is often ascribed to Socrates in the dialogues of Plato and of Xenophon. We may, therefore, justly

ascribe beauty to those qualities that are the natural objects of love and kind affection: of this kind are those moral virtues, which in a peculiar manner constitute a lovely character; such as innocence, gentleness, condescension, humanity, natural affection, public spirit, and the whole train of the soft and gentle virtues: qualities which are amiable from their very nature, and on account of their intrinsic worth. There are also many intellectual talents, which excite our love and esteem of those who possess them, such are knowledge, good sense, wit, humour, cheerfulness, good taste, excellence in any of the fine arts, eloquence in dramatic action, and also excellence in every art of peace or war that is useful to society. There are likewise talents or accomplishments, which we refer to the body, that have an original beauty and excellencies; such as health, strength, and agility, the usual attendants of youth, skill in bodily exercise, and skill in the mechanic arts. Dr. Reid is of opinion, that beauty originally dwells in the moral and intellectual perfections of mind, and in its active powers, and that from this, as the fountain, all the beauty which we perceive in the visible world is derived. This was the opinion of the ancient philosophers above named; and it has been adopted by lord Shaftsbury and Dr. Akenfide among the moderns.

"Mind, mind alone! bear witness earth and heav'n,
The living fountains in itself contains
Of beauteous and sublime. Here, hand in hand,
Sit paramount the graces. Here, enthron'd,
Celestial Veaus, with divinest airs,
Invites the soul to never-failing joy." AENSING.

But neither mind, nor any one of its qualities or powers, is an immediate object of perception to man. These are perceived through the medium of material objects, on which their signatures are impressed. The signs of these qualities are immediately perceived by the senses, and by them reflected to the understanding; and we are apt to attribute to the sign the beauty which is properly and originally in the thing signified. Thus, the Invisible Creator hath stamped on his works signatures of his divine wisdom, power, and benignity, which are visible to all men. The works of men in science, in the arts of taste, and in the mechanical arts, bear the signatures of those qualities of mind, which were employed in their production. Their external behaviour or conduct in life expresses the good or bad qualities of their minds. In every species of animals we perceive by visible signs their instincts, appetites, affections, or sagacity; and even in the inanimate world, there are many things analogous to the qualities of mind; so that there is hardly any thing belonging to mind, which may not be represented by images taken from the objects of sense; and, on the other hand, every object of sense is beautiful, by borrowing attire from attributes of the mind. Thus, the beauties of mind, though invisible in themselves, are perceived in the objects of sense, on which their beauty is impressed. Thus also, in those qualities of sensible objects to which we ascribe beauty, we discover in them some relation to mind, and the greatest in those that are most beautiful. The qualities of inanimate matter, in which we perceive beauty, are sound, colour, form, and motion: the first being an object of hearing; and the other three of sight. These several qualities are particularly illustrated by Dr. Reid, with a view of evincing the beauty that respectively belongs to them. Every beauty in the vegetable creation, of which we form any rational judgment, expresses some perfection in the object, or some wise contrivance in the author. In the animal kingdom we perceive superior beauties, resulting from life, sense, activity, various instincts and affections, and in many cases, great sagacity; which are attributes of mind, and possess an original beauty. In their manner of life we observe, that they possess powers, outward form, and inward structure, exactly adapted to it;

and the more perfectly any individual is fitted for its end and manner of life, the greater is its beauty. But of all the objects of sense, the most striking and attractive beauty is perceived in the human species, and particularly in the fair sex. In the following well-known passage of Milton, this great poet derives the beauty of the first pair in paradise from those expressions of moral and intellectual qualities, which appeared in their outward form and demeanour.

“Two of far nobler shape, erect and tall,
Godlike erect! with native honour clad,
In naked majesty, seem'd lords of all,
And worthy seem'd, for in their looks divine,
The image of their glorious Maker, shone
Truth, wisdom, sanctitude severe; and pure;
Severe, but in true filial freedom plac'd,
Whence true authority in man; though both
Not equal, as their sex not equal seem'd,
For contemplation he, and valour form'd,
For softness she, and sweet attractive grace.”

The author of “*Crito*,” or “*a Dialogue on Beauty*,” considered in its reference to the human species, and particularly to the female sex, ascribed to the author of “*Polymetis*,” and republished by Doddsley, in his collection of “*Fugitive Pieces*,” reduces this species of beauty to the four heads of colour, form, expression, and grace: the two former of which may be called the body, and the two latter, the soul of beauty. As for the beauty of colour, if we allow for associations and prepossessions arising from difference of climate and peculiarity of constitution, that have great influence on the internal sense, as well as on those senses that are external, and consequently on the judgment, it seems to depend, according to the common estimate of mankind, on that quality, as it expresses perfect health and liveliness, and in the fair sex, softness and delicacy; nor can any thing be called deformity but what indicates disease and decline. The beauty of colour, therefore, is derived from the perfection which it expresses. “*Venustas et pulchritudo corporis fecerunt non potest a valetudine.*” Cicero. The most beautiful form or proportion of parts, according to this author, is that which indicates delicacy and softness in the fair sex; and in the male, either strength or agility; so that the beauty of form lies altogether in expression. With regard to expression, he observes, that this has greater power than either colour or form; and that it is only the expression of the tender and kind passions that gives beauty; that all the cruel and unkind ones add to deformity; and that, on their account, good nature may very properly be said to be the best feature, even in the finest face. Modesty, sensibility, and sweetness, blended together, so as either to enliven or correct each other, give almost as much attraction as the passions are capable of adding to a very pretty face. It is owing to this force of pleasingness, which attends all the kinder passions, says this author, that lovers not only seem, but really are, more beautiful to each other than to the rest of the world; and in their mutual presence and intercourse there is, as a French writer has well expressed it, a soul upon their countenances, which does not appear when they are absent from one another, or even in company that lays a restraint upon their features. The last and noblest part of beauty is grace, which this author thinks to be incapable of an accurate definition (see GRACE). All the ingredients of beauty, enumerated and described by this ingenious author, terminate in expression: they express either some perfection of the body, as a part of the man, and an instrument of the mind, or some amiable quality or attribute of the mind itself.

Dr. Blair (*Lectures*, vol. i. p. 101, &c.), in his enumeration of the separate principles of beauty, in each of those classes of objects, which most remarkably exhibit

it, begins with colour, as affording the simplest instance of beauty. With respect to this he observes, that neither variety, nor uniformity, nor any other principle which he knows, can be assigned as the foundation of beauty; and that it can be referred to no other cause but the structure of the eye, which determines us to receive certain modifications of the rays of light with more pleasure than others. As this organ varies in different persons, they have their different respective favourite colours. In some cases, he thinks it probable, that association of ideas has influence on the pleasure which we receive from colour. Green, for instance, may appear more beautiful, by being connected in our ideas with rural prospects and scenes; white, with innocence; blue, with the serenity of the sky. Independently of such associations, those colours, chosen for beauty, are, generally, delicate, rather than glaring. Figure opens to us forms of beauty more complex and diversified. Under this head, regularity is first noticed as a source of beauty. Thus a circle, a square, a triangle, or a hexagon, please the eye, by their regularity, as beautiful figures. But regularity is not the sole, or the chief foundation of beauty in figure. On the contrary, a certain graceful variety is found to be a much more powerful principle of beauty. Regularity, according to this author, expresses beauty chiefly, if not solely, on account of its suggesting the idea of fitness, propriety, and use, which have always a greater connection with orderly and proportioned forms, than with those which appear not constructed according to any certain rule. Nature, the most graceful artist, hath, in all her ornamental works, pursued variety with an apparent neglect of regularity. Mr. Hogarth, in his “*Analysis of Beauty*,” published about the year 1753, enumerates, as elements of beauty, *fitness, variety, uniformity, simplicity, intricacy, and quantity*; and he observes, that figures bounded by curve lines are, in general, more beautiful than those bounded by straight lines and angles. The beauty of figure principally depends, in his opinion, upon two lines which he has selected. One of them is the “*waving line*,” somewhat in the form of the letter S: and this he calls the “*line of beauty*,” which is found in shells, flowers, and such other ornamental works of nature, and is also common in the figures designed by painters and sculptors for the purpose of decoration. The other line, which he calls the “*line of grace*,” is the former waving curve, twisted round some solid body, and exhibited in twisted pillars and twisted horns, and in the curling worm of a common jack. Variety plainly appears, in the instances which he mentions, to be so material a principle of beauty, that he defines the art of drawing pleasing forms to be the art of varying well; and, according to him, the curve line, which is so much the favourite of painters, derives its chief advantage from its perpetual bending and variation from the stiff regularity of the straight line. Motion, says Dr. Blair, furnishes another source of beauty, distinct from figure; being of itself pleasing, so that bodies in motion are, “*cæteris paribus*,” preferred to those at rest. But the quality of beautiful belongs to gentle motion, such as that of a bird gliding through the air, and that of a smooth running stream. In general, motion in a straight line is less beautiful than that in an undulating direction, and motion upwards is also commonly more agreeable than motion downwards. The easy curling motion of flame and smoke is an object singularly pleasing, and exhibits an instance of Mr. Hogarth’s waving line of beauty. This artist observes, that, as all the common and necessary motions for the business of life are performed in straight or plain lines, all the graceful and ornamental movements are made in waving lines. Dr. Beattie, in his “*Dissertations Moral and Critical*,” has introduced, in his digression on beauty, some ingenious remarks on this subject. After observing that custom has a perpetual influence in determining

terminating our notions of beauty, he proceeds to prove, that from affections founded on habit, many, or perhaps most of those pleasing emotions are derived, which accompany the perception of what in things visible is called beauty. With regard to the beauty or awkwardness of motion, he observes, that the one will be found to please, and the other to displease, chiefly on account of certain disagreeable ideas suggested by the former, and of certain disagreeable ones associated with the latter. Motions, that imply ease, with such an arrangement and proportion of parts in the moving object, as may give reason to expect its continuance without injury, are generally pleasing, at least in animals, especially when they betoken a sort of perfection suited to the nature of the animal. But motions, that betray infirmity, unwieldiness, imperfection, or the appearance of danger, cannot be called beautiful, because they convey unpleasing ideas. These observations are illustrated by a variety of opposite instances. Cicero (*de Off. l. ii. § 36.*) blames every motion that alters the countenance, quickens the breath, or betrays any discomposure. Rousseau observes, that in running, a woman is destitute of that grace which attends her on other occasions. Perhaps, says Beattie, the jutting out of her elbows, the natural effect of her endeavouring with lifted hands to secure the most delicate part of the human frame, may give to her motion the appearance of timidity and constraint. Or, perhaps, she may fail in this exercise, merely because, according to our manners, she cannot be much accustomed to it. See **DANCING.**

It is not easy to convey, in so few words, so many charming ideas of beauty, in its several varieties of colour, shape, attitude, and motion, as Gray has combined in the following image:

“ Slow melting strains their queen’s approach declare ;
 Where’er she turns the graces homage pay ;
 With arms sublime that float upon the air,
 In gliding state she wins her easy way :
 O’er her warm cheek, and rising bosom move
 The bloom of young desire, and purple light of love.”

But to return from this digression. Dr. Blair observes, that though colour, figure, and motion, be separate principles of beauty; yet in many beautiful objects they all meet, and render the beauty both greater, and more complex. Thus, in flowers, trees, animals, we are entertained at once with the delicacy of the colour, with the gracefulness of figure, and sometimes also with the motion of the object. Perhaps, the most complete assemblage of beautiful objects is presented by a rich natural landscape, composed of a sufficient variety of objects; fields in verdure, scattered trees and flowers, running water, animals grazing; to which may be added some productions of art, which suit such a scene, as a bridge with arches over a river, smoke rising from cottages in the midst of trees, and the distant view of a fine building, seen by the rising sun.

The beauty of the human countenance is more complex than any which has yet been considered. It includes the beauty of colour, arising from the delicate shades of the complexion; and the beauty of figure, arising from the lines which form the different features of the face. But its chief beauty depends upon a mysterious expression which it conveys of the qualities of the mind; of good sense, or good humour; of sprightliness, candour, benevolence, sensibility, or other amiable disposition.

Another distinct species of beauty arises from design or art, or from the perception of means being adapted to an end; or the parts of any thing being well fitted to answer the design of the whole. This is altogether different from the perception of beauty produced by colour, figure, variety, or any of the causes already mentioned. This sense of beauty in fitness and design, has an extensive influence over many of our ideas. It is the foundation of the beauty which we

discover in the proportion of doors, windows, arches, pillars, and all the orders of architecture. We shall here observe, that Mr. Perrault distinguishes two kinds of beauty in architecture. The one he calls “positive,” and “convincing,” such as the richness of the materials; grandeur of the structure, neatness of the workmanship, symmetry, &c.; the other he calls “arbitrary,” which depends on the will, and which would admit of having their proportions changed without deformity. These only please by the connection or association of their ideas with others of a different kind, which please of themselves: they owe their beauty to that prepossession of the mind, by which a thing, whose value we do not know, insinuates an esteem for others which we do not know. Thus, he observes, there are many things in architecture, which reason and good sense would judge deformed, which, however, custom has not only made tolerable, but even beautiful, by their being always joined with other beauties that are positive. Being at first pleased with viewing them in company, and merely on that account, we at length become pleased with them alone; and thus we frequently become fond of faults, and fall in love with deformity. Our sense of fitness and design holds so high a rank among our perceptions as to regulate, in a great degree, our other ideas of beauty. In an epic poem, a history, an oration, or any work of genius, we always require, as in other works, a fitness, or adjustment of means, to the end which the author is supposed to have in view.

Beauty, as it is applied to writing or discourse, denotes all that pleases, either in style or sentiment, from whatever principle that pleasure flows; and a beautiful poem or oration means, in common language, no other than a good one, or one well composed. Beauty, besides this indefinite sense of it, is also used to signify a certain grace and amenity in the turn either of style or sentiment, for which some authors have been peculiarly distinguished. In this sense it denotes a manner neither remarkably sublime, nor vehemently passionate, nor uncommonly sparkling; but such as excites in the reader an emotion of the gentle placid kind, similar to what is excited by the contemplation of beautiful objects in nature, which diffuses over the imagination an agreeable and pleasing serenity. Addison was eminently a writer of this character; and it belongs also to Fenelon, the author of the *Adventures of Telemachus*. Virgil, among the ancients, is distinguished, in his general manner, by beauty and grace, rather than sublimity. Among orators, Cicero has more of the beautiful than Demosthenes, whose genius led him wholly towards vehemence and strength.

The ingenious Mr. Burke, in his “*Philosophical Inquiry into the Origin of our Ideas of the Sublime and Beautiful*,” excludes from the number of real causes of beauty, the proportion of parts, fitness, or that idea of utility which consists in a part’s being well adapted to answer its end, and also perfection; and he observes (p. 210.) that beauty is, for the greater part, some quality in bodies, acting mechanically upon the human mind by the intervention of the senses. The qualities of beauty, as they are merely sensible qualities, which he enumerates, are the following: they should be comparatively small, in outline, various in the direction of their constituent parts; these parts should not be angular, but melted, as it were, into each other; they should be of a delicate frame, without any remarkable appearance of strength; the colours should be clear and bright, but not very strong and glaring; and any glaring colour that is introduced should be diversified with others. These are the seven properties upon which, according to this author, beauty depends; properties that operate by nature, and are likely to be altered by caprice, or established by a diversity of tastes, than any others. The physiognomy also, says Mr. Burke, has a considerable share in beauty, especially in that of our own

species. The manners give a certain determination to the countenance, which being observed to correspond pretty regularly with them, is capable of joining the effects of certain agreeable qualities of the mind to those of the body. So that to form a finished human beauty, and to give it its full influence, the face must be expressive of such gentle and amiable qualities as correspond with the softness, smoothness, and delicacy of the outward form. For Mr. Burke's mode of illustrating and confirming his theory of beauty, the reader is referred to his work above cited.

Dr. Sayers, in his "Disquisitions, metaphysical and literary," 8vo. in 1793, has given a new analysis of beauty, conducted on the principles which were applied by Dr. Priestley in his "Lectures on Oratory and Criticism," and by Mr. Allison in his "Essays on Taste," to the explanation of the intellectual pleasures, namely, the doctrines of the Hartleyan school. His argument, summed up in a few words, is as follows: that individual of a class of objects is justly to be esteemed more beautiful than the rest, with the whole of which, or with its component parts (when properly understood), the greater number of the excellencies of its class are universally associated. The same may be asserted of any species of objects, when compared with any other species of its kind; and that object may be justly esteemed a "standard of beauty," with the whole appearance, or with the component parts of which (when properly understood), all the excellencies of its kind are "universally" associated.

BEAUTY, in the *Arts of Design*. Whatever of beauty or perfection becomes an object of contemplation to our minds, whether it be purely mental or perceived through the medium of our senses, must be derived from the beautiful and perfect itself, and may be traced back towards its Divine source. However diversified, it proceeds from this source, and directs us where to seek the principles and perfection of all science and art, of all things metaphysical, physical, and moral, which by their mutual connection and harmony declare their common relation and origin; therefore what is called beauty in the arts of painting and sculpture must be sought for in its principles, metaphysical, physical, and moral. In this research we should do well to take those philosophers for our guides, who were the oracles of Greece, in the times when painting and sculpture attained their highest excellence. In the dialogue between Socrates and the sculptor Clito (Xenophon's Memorabilia,) Socrates concludes "that statuary must represent the actions of the soul by form." And in the former part of the same dialogue Parrhasias and Socrates agree, that the good and evil qualities of the soul may be represented in the figures of man by painting. Plato, in his dialogues, reasons to the same purpose, and declares, that the good and beautiful are one.

Aristotle (*De Mor.* l. iv. c. 7. t. iii. p. 49. *De Poet.* c. 7. t. ii. p. 658.) observes, that beauty is order in grandeur. Order supposes symmetry, fitness, and harmony; and in grandeur are comprised simplicity, unity, and majesty. However, in his catalogue of virtues and their families, as well as of the opposite vices and their families, Aristotle concurs with Plato in acknowledging the relation between beauty and goodness, evil and deformity. Indeed, it has been one of the great objects of philosophy, through all the ancient schools, to trace and demonstrate not only the likeness but the identity of beauty and goodness. Among the Platonists and the Pythagoreans, malignity was abandoned, goodness or the just, and intellect or wisdom cultivated, because by this means, man is elevated to a nearer approach to the divinity. Fortitude and temperance were the virtues of the stoics and early epicureans, because the one raises man above common fears and wants, and the other gives him better health and enjoyment of his faculties. These conclusions are convincing, and their illustrations may be drawn in great abundance from

the history and condition of the human race. Does any one supply the wants of his fellow creatures, and raise them from distress to a state of comfort? In performing these and such good acts his expression is so tender, and his manner so gentle, that all present sympathize in his feelings, and love the benefactor. If any one shews a magnanimous contempt of danger in a good cause, or manfully resists the temptation to an evil act, in so doing his features and manner express dignity and fortitude, which inspire the beholders, with awe and respect. We look with delight on the florid complexion of a person in high health, but with concern and disgust at a pallid colour and flaccid skin, because they are signs of disease and decay. We are pleased to see a stout and well made person, because such a figure bespeaks great strength and agility. We are likewise pleased to see a more slender figure of agreeable and harmonious proportions, because in it sufficient strength is united with varied elegance of attitude. Hence, as almost every circumstance of our existence furnishes examples to the same purpose, might we not define the beauty of the human person in the following terms? "Goodness, or virtue and wisdom, in a human form best suited to their expressions and exertions." It would be as absurd as presumptuous for us to attempt entering the councils of Infinite Wisdom to discover why the figure of a man was made such as it is and no other. We might as well enquire why such a particular number of worlds were made in or out of our system subject to such laws of gravity, motion, and revolution? But taking man as he is, whether we consider the faculties of his soul, the component parts of his body, or the combined operations of both, the mind is overwhelmed with the stupendous and wonderful structure of the parts, and the harmony, beauty, and utility of the whole.

Whilst we are considering beauty in the works of painting and sculpture, it will be proper to remember that the word by which the Greeks expressed this quality was ΚΑΛΟΣ, fair, handsome, beautiful, which applied extensively to almost any being or thing giving pleasure in consequence of its goodness. According, therefore, to this use of the term, we shall investigate human beauty in both sexes, and their several distinctions of character. The human figure is wonderfully suited to its various offices and employments, as well in its internal structure as in its outward form. The mechanical powers, the geometrical figures, the motion and weight of fluids, and the operations of chemistry, are continually engaged in its support and renewal; uniting an accumulation of force with a simplicity of operation truly wonderful, and contributing in their effects and appearances to the beauty of the outward form, which in the present inquiry is to be the object of attention. The head contains the brain, which sends nerves to all parts of the body and limbs, and the organs of four senses; this is the superior member of the figure, and from its elevated station, by means of the understanding and will, directs and determines the acts of all the inferior parts. The body, which contains in its cavity those parts which supply the animal functions, is also a centre from which, and upon which, the five extremities act. The arms are supported on the body in a manner most favourable to all exertions of strength, and with their hands are so formed, that these exertions may be also employed in the most difficult and curious labours. The legs strongly support the superstructure; when closed resembling two pillars, when extended, like the triangular arch, and when necessary, swiftly conveying the person from place to place. It is proper to make these general remarks, because, as we proceed, we shall find how distinguishing an ingredient utility is in the composition of beauty. After this slight view of the advantageous complication of powers and simplicity of operation in the human form, let us consider its beautiful effect, animated by goodness, and informed by wisdom; and as what has been said in this part of the article relates to the arts of design,

design, we shall produce illustrations from the antique sculpture and painting.—The ancients assigned the first class of beauty to the superior divinities, the second to heroes, and the third to fauns. Other divinities and genii seem to have partaken more or less of these classes. Mere portraits cannot be enumerated in either, because they are but faithful representations of ordinary nature. Of the superior gods, the Saturnian family possess the rank of sublimity in the *Kaz*; or beautiful. In the face of Jupiter (lately in the pope's museum, now in the national gallery at Paris,) the hair rises from the forehead, and descends in abundant flowing locks on each side of his face and neck to the shoulders; his forehead is muscular, expressive of great strength; his nose and cheeks are correspondent; his eyes and mouth express benevolence; his wife and serious brow, his placid countenance, and full beard, inspire reverence and awe. His figure is the mightiest of the superior gods. His right arm moderately raised with his thunder-bolt, or leaning on his sceptre, presents the habitual act of governing the universe. Winkelman has judiciously remarked, that the Greek sculptors preferred the family resemblance in the Saturnian race, with as much exactness as if they had been real portraits; therefore Jupiter's brothers strongly partake of the same character, excepting that Neptune's countenance is more severe and his hair more disturbed. Pluto's hair hanging over his forehead gives a gloomy cast to his countenance, which is increased by his more open and starting eyes. Winkelman has observed, that something of the lion may be traced in the nose, forehead, and hair of Jupiter, which adds might and magnanimity to the benevolence, wisdom, and awful majesty of his character. In the youthful beauty of Apollo, Bacchus, and Mercury, the same benevolence and wisdom are expressed, modified by their peculiar characteristics and offices. Apollo is light and strong in his make; Bacchus more soft and luxurious, and Mercury more athletic. The peculiarity of Hercules is magnanimity and unconquerable strength. The heroes have a more simple character throughout, approaching nearer to common nature. The fauns may be placed in the lowest class of beauty expressed in the human figure. Although their persons are youthful, and rather handsome, their proportions are shorter than those of the classes above-mentioned; and sometimes their muscles are turgid and tendinous, accommodated to their sylvan habits and activity; their round faces have a portion of rustic good nature; but their united eye-brows, eyes placed diagonally to the nose, small hollowed noses, and grinning mouths, express some mixture of savage, servile, and mischievous dispositions. The most engaging and captivating species of beauty exists in the female sex; and was represented in perfection by the Greeks in their superior classes of statues. The large eye and full under lip of Juno, give an air of haughtiness to her countenance; her limbs are round and her figure is majestic. Minerva's figure partakes of Juno's majesty; but her face is not so full, and has an expression of abstracted wisdom. Venus is represented as a softer class of female charms; her form is delicate, perfect, and almost in the highest degree; her motion graceful, and her countenance expressive of love and friendship.

The beautiful hands of a tipicity are oval in the front view; in profile, the low forehead and nose form nearly one straight line; the lips are rather full and the chin rounded. Juno has the largest eye of the goddesses, according to Homer's epithet of "Ox-eyed;" the neck is rounded like a column; the chest is high and expanded; in the male subject the abdomen is flat; and, as Winkelman remarks, "such as it appears after sound sleep and good digestion;" the arms, descending from full shoulders, are tapered downward to the wrist with a very gentle flattened hollow towards the inner elbow, to distinguish the bend of the arm; the back

of the hand is one mass; the fingers rather long and tapered, with knuckles indicated in a manner almost imperceptible; the lower limb tapers more sensibly than the arm, because the thigh is larger in its commencement; the knee-pan in youthful statues is nearly oval; and the inner side of the tibia, or principal bone of the leg, is perceptibly marked by a curve of about 30 degrees; the great toe is large, and divided by a considerable space from the lesser toes, which are straight, and not bent over each other like such as have been confined in shoes.

In the female form, the limbs are more round and delicate; the knuckles of the hand and foot are expressed by slight dimples; the fingers are more tapered; and their outline determined by a long curve, a little reversed towards the end. The principal difference of relative proportions is, that the female figure should be about one face shorter than the male; each having eight heads in height. The female figure is also narrower in the shoulders and loins, and somewhat broader from the os pubis to the extremities of the nates. The Greeks represented the goddesses with virgin bosoms. Winkelman, in his "*Monumenti aedificati*," has treated largely on the beauty of the antique statues. Professor Camper, in his "*Principles of Design*," has also given excellent observations and rules on the beauty and proportions of the human head and figure, absolute as well as comparative. For his account of beauty, as exhibited in ancient sculpture and engravings, see his treatise, entitled "*Verhandeling over het natuurlyk verhillder wezenstrikken*," &c. or, on the natural difference of features in persons of various countries and ages, published by his son, at Utrecht, 1792, 4to. In his dissertation on the beauty of forms, subjoined to his "*Lectures*," published by his son at the same place and in the same year, entitled "*Roden Voeringen*," &c. it is his object to prove, that no particular form can, abstractedly considered, constitute beauty; that the real basis of beauty consists in the means being adapted to the end; and that, exclusively of this, our ideas are influenced by customs, national prejudices, implicit confidence in the taste and opinions of others, &c.

Proportion is an essential quality of beauty in the human form; and striking coincidences are afforded in its relation to perfect geometrical figures, and the harmony of sounds and numbers. A man, standing upright, can stretch out his arms to a length equal to his height; consequently his figure may be included in a square; by stretching the arms not so much, and the legs a little, the figure may be contained in a circle, whose centre is the top of the os pubis. The ancients divided the height of the human figure into eight heads, and the face into three parts; five of these parts are the breadth of the loins; three parts, or noses, measure the upper part of the thigh; two, the calf of the leg, and one, the ankle. A well proportioned figure measures three equal parts from the top of the shoulder to the spine of the ilium next the rectus abdominis; from thence to the top of the knee-pan; and from thence to the bottom of the inner ankle.

The term grace, as a quality of beauty, however it may have puzzled the moderns in its definition and application, was clearly understood by the ancients. The graces or graces of the Romans were the *charites* of the Greeks. *XAPIS*, is grace, beauty, fairness, endearing, agreeable, elegant; and the groupes, gems, &c. are comments which are satisfactory and convincing. The graces are three beautiful fillers, whose innocence is their only garment, embracing each other in the gentlest manner. The Greek Christians have preserved the ancient signification of this word in its application to all those endearing duties which preserve happiness to, and bestow it on others; nor is it surprising, that these characteristics are given to women, because all the milder and endearing virtues are still more amiable

amiable in the female sex. If by grace, the succession and variation of undulating lines be intended, it is seen most perfectly in an elegant female figure moving slowly. It is remarkable, that man, of all creatures, presents the most perfect view of his figure in front. Quadrupeds, birds, and fishes, are best seen in profile, and we look on the backs of reptiles and insects. It is necessary, to the most advantageous appearance of man, that we should contemplate the affections of his heart, and operations of his reason continually beaming in his countenance; the waving lines of his body, moving on the centre of gravity, and varied curves and angles formed by his limbs, perfect the whole of his figure, with an union of faculties mental and bodily, which reminds us that "God created Man in his own Image."

The various heads touched upon in the latter part of this article, will be treated of in the several articles of **PAINTING** and **SCULPTURE**.

We cannot forbear subjoining the reflection with which Mr. Thomson, (a late writer on the subject of beauty) closes his detail of the various beauties of the female form. "If we should see a person employ himself with a sledge hammer to dash the enchanting form of the Venus de Medicis to pieces, break her lovely limbs, and deface her beautiful features, we should not hesitate a moment to pronounce him a savage barbarian, without taste, feeling, or sentiment, though his frenzy was employed only on a senseless piece of stone; what then must we think of the diabolical savage, who exercises the worst of all cruelties (because the most lasting and affecting both to body and mind,) on the most beautiful and amiable of all creatures on this side heaven?—made expressly for his happiness, solace, and delight, by first corrupting and betraying her, and then safely abandoning her to perish with want, pain, wretchedness, and misery." The sentiments of mankind, with regard to female beauty, have been very various in different ages and nations; and it is not possible to establish a standard which shall comprehend all, without discrimination; among the ancients, a small forehead and joined eye-brows were charming features in a female countenance; and, in Persia, large joined eye-brows are highly esteemed. In some Indian countries, black teeth and white hair are necessary ingredients in the character of a beauty; and in the Marian Islands, it is a capital object with ladies to blacken their teeth with herbs, and to bleach their hair with certain liquors. Beauty, in China and Japan, is composed of a large countenance, small, and half-concealed eyes, a broad nose, minute feet, and a prominent belly. Some Indians of America and Asia, compress the heads of their children between two wooden planks, with a view to enlarge and beautify the face; others compress them laterally, others depress the crown only, and others make the head as round as possible. Every nation has ideas of beauty peculiar to itself; and almost every individual has his own notions and taste concerning this quality. The empire of beauty, however, amidst these discordant ideas, with respect to the qualities in which it consists, has been very generally acknowledged, and particularly in all civilized countries; and when it is united with other accomplishments that tend to render females amiable, it contributes in no small degree to give them importance and influence, to polish the manners of society, and to contribute to its order and happiness.

BEAUVAIS, **BELLOVACUM**, and **CÆSARONAGUS**, in *Geography*, a city of France, and capital of the department of the Oise, seated on the Therin; and, before the revolution, the capital of the Beauvaisis, and the see of a bishop. The architecture of the cathedral has been much admired, besides which it has several collegiate and parish churches. The manufacture of the city is a beautiful tapestry, which has supplied a considerable branch of trade. It has also

produced great quantities of serge and woollen cloth. This city was unsuccessfully besieged by the English in 1443 and by the duke of Burgundy in 1472, at the head of 80,000 men. On the latter occasion, the women displayed singular courage under the conduct of Jane de Hachett, whose portrait is preserved in the town house; and in commemoration of their brave defence, the women form the first rank of a procession, observed annually on the 10th of July. This place contains in its N. E. and S. E. districts 13,000, and in its two cantons 19,390 inhabitants, on a territory of 22½ kilometres. Its N. E. canton includes 7 and its S. E. canton has 4 communes. N. lat. 49° 26'. E. long. 2° 15'.

BEAUVAISIS, a small fertile district of France, bordered on the north by Picardy, on the west by Vexin-Normand, on the south by Vexin-François, and on the east by Senlis; now forming a part of the department of Oise. See **BEAUVAIS**.

BEAUVAIL, a town of France, in the department of the Somme, and chief place of a canton, in the district of Doullens, one league S. of Doullens.

BEAUVÉRAY, a little town of France, in the district called, before the revolution, Autunois, in the department of the Saône and Loire, seated at the foot of a mountain, and supposed by some to be the ancient *Bibracte*.

BEAUVILLE, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Agen, 3½ leagues N. of Valence. The place contains 1794, and the canton 7672 inhabitants; the territory includes 122½ kilometres and 11 communes. N. lat. 44° 17'. E. long. 0° 47'.

BEAUVOIR, a town of France, in the department of Vendée, a chief place of a canton, in the district of Les Sables d'Olonne; the place contains 1892 and the canton 8537 inhabitants: the territory includes 230 kilometres and 5 communes.—Also, a town of France, in the department of the Isère, and district of St. Marcelin, 5 leagues S. W. of Grenoble.

BEAUVOIR sur Niort, a town of France, in the department of the two Sevres, and chief place of a canton, in the district of Niort, 2½ leagues S. of Niort. The place contains 301 and the canton 5133 inhabitants; the territory includes 157½ kilometres and 13 communes.

BEAUVOISIN, **PONT DE**, a town of France, in the department of the Isère, and chief place of a canton, in the district of La Tour du Pin, on the borders of Savoy, 11 miles W. of Chambéry. It is seated on the small river Guier le Vif, which runs through it, and divides it into two parts.

BEAUZAT, a town of France, in the department of the Rhone and Loire, 1½ league S. W. of Monistrol.

BEAUZÈRE, a town of France, in the department of the Meuse, and chief place of a canton, in the district of Verdun, 4¼ leagues S. S. W. of Verdun.

BEAUZÉLEY DE LEVEYOU, St. a town of France, in the department of Aveyron, and chief place of a canton, in the district of Milhau, 2 leagues N. W. of Milhau.

BEBE', a large village of Egypt, on the west side of the Nile, distant about 3 leagues from Benisouf; the residence of a kiaschek, and the site of a mosque, and a convent of Copts.

BEBELINGUEN, a town of Germany, in the duchy of Wurtemberg, seated on a lake from which proceeds the river Wonn. N. Lat. 48° 45'. E. long. 9° 8'.

BEBENHAUSEN, a convent in the district of Wurtemberg, called Schonluck, at a small distance N. E. of Tubingen; the manor of which contains 9 parishes. In this convent is an academy, where students are qualified for admission into the seminary at Tubingen.

BEBENOWA, a town of Poland, in the palatinate of Braclaw, 14 miles S. E. of Braclaw.

BEBERACI, in *Ancient Geography*, *Katounich*, a lake of Melopo-

Mesopotamia, between mount Singara, and the river Chaboras.

BÈRRÉ, in *Geography*, a river of France, which runs into the Loire, opposite to Bourbon Lancy.

BEERYCES, in *Ancient Geography*, the first inhabitants of Bithynia. The origin of these people, and the reason of their name, are uncertain. A people of this appellation, mentioned by Silius Italicus, (l. iii. v. 420.) inhabited that part of Gallia Narbonensis, which was situated between Spain and the Volceæ, or near the Pyrenées, and from them called *B.ericæ*.

BEC, **LE**, in *Geography*, a town of France, in the department of the Eure, 9 leagues W. S. W. of Rouen.

BEC CRESSIN, a town of France, in the department of the Lower Seine, 3 leagues east from Havre.

BECABUNGA, **BROOKLINE**, in *Botany*. See **VERONICA**.

BECAH, or **BEKAH**, a Jewish coin, being half a Shekel. In Dr. Arbuthnot's table of reductions, the bekah amounts to $13 \frac{1}{2} d.$; in Dr. Prideaux's computation to 15. 6d.

Every Israélite paid a hundred bekahs a head every year for the support of the temple. Calmet.

BECALMING, in the *Sea Language*, is when any thing keeps the wind off or away from the vessel.

Thus one ship is said to becalm another, when she comes up with her on the weather-side: the like is said of the shore, when it keeps the wind away. A ship is likewise said to becalmed, when there is no wind stirring.

BECANER, in *Geography*, a town of Hindoostan, seated on the Ganges, nearly east of Dehli.

BECARDE, in *Ornithology*, a name under which Buffon describes some birds of the Linnæan genus **LANIUS**: as for example, his *becarde is lanius cayanus*, Gmel. and *becarde à ventre jaune, lanius sulphuratus* of the same author.

BECASSE, **BE'ASSINE**, a generical term in Buffon's Nat. Hist. for some birds of the **SCOLOPAX** genus, in the Linnæan system.

BECASSEAU ou **Cul-blanc**, is also a name given by Buffon to the *tringa ochropus* of Linneus.

BECCA, in the *Materia Medica of the Ancients*, a name given to a fine kind of resin collected from the turpentine and mastich-trees of Greece and Syria, and mixed together for use. It was much esteemed formerly, and not only used in the country where it was produced, but carried in great quantities to Mecca, and other parts of the Turkish dominions, where it was valued at a very great rate.

BECCABUNGÆ, in *Entomology*, a species of **CURCULIO**, of a black colour; wing-cases rufous; entirely bordered with black. Fabricius. In size and appearance it resembles *curculio cerasi*; inhabits Sweden; feeds on the *beccabunga*.

BECCADELLI, **ANTONIO**, in *Biography*, called *Antony of Palermo*, from the place of his birth; was born in 1374, studied the law at Bologna, and entered into the service of the duke of Milan, who allowed him an honourable pension. He also became professor of belles lettres and rhetoric in the university of Pavia, and, in 1432, was honoured by the emperor Sigismund, with the poetic laurel. When Alphonso king of Naples left Milan in 1435, he took Antonio with him to his court; and from this time, he became the inseparable companion of this prince, who conferred upon him many honours and gifts, and intrusted him with many important commissions. In 1451 he was deputed to solicit of the state of Venice, the supposed arm-bones of the historian Livy, which he obtained. Such indeed was his veneration for Livy, that he is said to have sold a farm in order to purchase a copy of Livy, written by the hand of Poggio the Florentine. After the death of Alphonso, Antonio became the secretary and counsellor of his son and successor Ferdinand. He died at Naples in 1471: leaving behind him ample testimonials of his talents as a Latin writer, both in prose and verse. For his work

"De Diètis et factis Alphonfi regis Arragonum," he received the recompence of a thousand gold crowns; which work has been frequently reprinted, with additions. A collection of five books of his epistles, two harangues, and some verses, was printed at Venice in 1453. His "Hermaphroditus," which was a collection of short poems in two books, excited by its obscenity loud clamours against its author; and was publicly burnt in several cities of Italy, together with the writer's own effigy. Gen. Biog.

BECCADELLI, **LUDOVICO**, was born of a noble family at Bologna in 1502, studied at Padua, and accompanied cardinal Pole in his legation to Spain. He assisted at the council of Trent, and was delegated by the papal court to Venice and Augsburg. In recompence of his services, he was promoted to the archbishopric of Ragusa; but being appointed in 1563 to superintend the education of the son of Cosmo I., grand duke of Tuscany, and expecting the archbishopric of Pisa, he renounced that of Ragusa. His expectations, however, were disappointed; and he was obliged to content himself with the provostship of the cathedral of Prato, in which office he died in 1572. He was reckoned eminent as a man of Letters, and wrote in Latin the lives of the cardinals Bembo and Pole, and in Italian a life of Petrarch, esteemed more correct than any other. Nouv. Diè. Hist.

BECCAFICO CANAFINO, in *Ornithology*, a name of *motacilla curruca*, in Olinia.

BECCAFICO, and *Beçfque*, are also names given by Olinia and Buffon to *motacilla fœcedula*. Linn.

BECCAFUMI, **DOMENICO**, in *Biography*, called *Micarrino* and *Mecherino*, was the son of a peasant near Sienna, whose name was Pacio, born in 1484, and employed by his father in keeping sheep. Beccafumi, a citizen of Sienna, whose name he assumed, being prepossessed with a favourable opinion of his talents by observing figures which he drew, with his stick upon the sand, whilst he was surrounded by his flock, took him under his patronage, and placed him under the instruction of a painter, called Cavanna; and after having been, as some say, the disciple of Pietro Perugino, or according to others, after having been employed in copying the pictures of this artist, he went to Rome, and made further improvement by studying the works of Raphael and Michael Angelo. After two years he returned to Sienna, and finished several pieces, not only in oil, but in distemper and fresco, which gained him great reputation. But he was chiefly admired for his performance on the pavement of the great church, which he wrought by combining tones of different colour, with pitch poured in holes for the dark shades, in such a manner as the light and shadow of the object required. This kind of performance is said to have been invented by one Duccio of Sienna in 1356; but it was brought to perfection by Beccafumi: He had a fine invention; his taste was elegant; his expression good; and his colouring beautiful. He was also an excellent engraver on wood and metal, and also a founder. His usual mark on his plates is a B divided in the middle by a horizontal line. This artist died at Genoa in 1549. Pilkington and Strutt.

BECCARIA, **CESAR BONISANA**, marquis of, an eminent Italian writer, was born about the year 1720. To the study of philosophy he was attached from his infancy, and he availed himself of the light and intellectual freedom, which about his time found their way into Italy from France, England, and other countries. At Naples Genovesi taught him the Italian how to think, and Beccaria distinguished him by the title of "his learned and venerable master." At Milan also count Firmian was a distinguished patron of literature and science, and a promoter of every reform, that had philanthropy for its basis. With such enlightened men Beccaria co-operated by writing in 1767

his famous work, "On Crimes and Punishments," which had an extensive spread, and produced a great change in the prevailing ideas on these subjects. Voltaire, in his commentaries on this work, says, that this short treatise is in morals what a simple drug would be in medicine, which should be adequate to the cure of every disease to which the human body is liable. As the principles of government indirectly supported in this work were hostile to absolute power, they incurred the charge of subverting the legitimate sources of authority; and the marquis owed his protection to the influence of count Firmian. Having escaped the danger that threatened him, he diverted his attention from speculations of this nature to metaphysical subjects. Besides some papers, contributed to a periodical work, entitled "The Coffee-House," he published "Disquisitions on the Nature of Style," maintaining that by nature all men possess an equal degree of genius for poetry and elocution, and by the observance of proper rules all would be able to write equally well. Beccaria was much attached to men of letters, a patron to those who needed encouragement, and a cordial friend. He was charged, however, with venality in the exercise of an office of magistracy which he held; and hence his enemies compared him to lord Bacon, with respect both to abilities and corruption. He died November 1794. Month. Mag. 1798. Gen. Biog.

BECCARIA, GIAMBATTISTA, an eminent philosopher of the eighteenth century, and a monk of the Ecoles-Pies, was a native of Mendovi in Piedmont, and became professor of philosophy and mathematics, first at Palermo, and then at Rome. His established reputation occasioned his removal to Turin, where he occupied the chair of experimental philosophy. In consequence of his appointment to the office of preceptor to the princes of Sardinia, he was introduced to the Sardinian court; but neither this employment, nor the honour connected with it, diverted him from the indefatigable prosecution of his studies; and the pecuniary advantages that resulted from the appointment were principally devoted to the increase of his library and the improvement of his philosophical apparatus. Amidst the variety of his philosophical pursuits, his attention was particularly engaged by experiments and investigations in electricity; and in this department of science he acquired singular reputation. For an account of his principal discoveries and observations, see ATMOSPHERE, and ELECTRICITY. His chief works on this subject were "Dell' Eletticismo Artificiale et Naturale," Turin 1753, 4to.; of which an English translation was published, in 1776, 4to. and "Lettere dell' Eletticismo," Bologn. 1758, fol. He also published essays "On the cause of Storms and Tempests." "On the Meridian of Turin," and on other physical and astronomical subjects. Father Beccaria, no less respectable for his virtues than his knowledge, died at Turin in an advanced age, May 22, 1781. Nouv. Dict. Hist.

BECCARIA, JAMES BARTHOLOMEW, born at Bononia, in 1682, received the early part of his education among the Jesuits. Turning his mind to the study of natural philosophy, he soon became distinguished for the variety and depth of his knowledge in physics, and in mathematics, of which he was made public professor, and, in conjunction with Morgagni, and other celebrated characters at Bononia, assisted in forming an academy there for teaching mathematics, natural history, chemistry, anatomy, and medicine. He first gave lectures in natural history, and in 1712, was appointed to the chair of medicine, which he also now practised with great success. On the death of Valsalva, he was made president of the institution, and in that post introduced many useful regulations for the government of the academy, which are still continued. He was a frequent correspondent with the Royal Society of London, of which he was made an honorary member. Among other commu-

nications from Beccaria, which appear in the Philosophical Transactions, are his "Observations on the Weather," "On the Ignis Fatuus," and "On the power some persons have enjoyed of supporting life for a great length of time, without food." This was afterwards published at Padua, under the title of "De jejunii longis Dissertatio," fol. 1748. He died Jan. 1766, being 84 years of age. Among his publications are, "Dissertatio Meteorologica Medica, in qua aeris temperies et morbi Bononiæ grassantes annis, 1729, et sequenti, describuntur." "De quampulurimis phosphoribus nunc primum detectis, Commentarius," Bonon. 4to. 1744. "Scriptura Medico-legalis," 1749. For the titles of his other compositions, and of numerous unedited pieces, see Gen. Biog. and Hal. Bib. Anat.

BECCLES, in Geography, is a market and corporate town of Suffolk, in England, situated on the northern border of that county joining to Norfolk. It is fifteen miles S.W. of Yarmouth, and 108 N.E. from London. Though not a borough town, Beccles has its corporation, consisting of a portreeve, and thirty-six other persons, who are distinguished by the names of *twelves*, and *twenty-fours*. From the twelves, the officer called portreeve is annually elected. The town consists of several streets, which concentrate in a spacious area, where the markets are held every Saturday. Here are a large handsome church, whose tower is detached from it, and the ruins of another called Ligate church, which was formerly the parish church. The church-yard, from its elevated situation, commands many fine and extended views of the adjacent country, and the meandrings of the river Waveney which adjoins this cemetery. Here are a town-hall and gaol; the former is a substantial building, where the quarter sessions are held; and the latter has been lately much enlarged and improved conformably to the Howardian plan. A public grammar school was founded here in 1712, by Dr. Fauconberg, who endowed it with certain lands for the maintenance of a clergyman, and to qualify youth for the university. Sir John Leman, knight, also founded a free English school in 1631, for the education of forty-eight boys; also for a master and usher, who are appointed by trustees, being part of the corporation. On the north-west side of the town is a very large common field, containing nearly 1600 acres, where the inhabitants are allowed, under certain restrictions, to turn a number of horses and cattle. Beccles suffered by a destructive fire, which happened on the 29th of November, 1586, when more than 80 houses were consumed, with property calculated at 20,000*l.* value. It is rather a singular circumstance, that neither mail, nor turnpike roads, communicate with this town: though it was some time since proposed at a public meeting to carry the turnpike road to Yarmouth through this place; but the proposition was negatived by a considerable majority of the inhabitants. Here are three annual fairs. The number of houses in the township is 601; of inhabitants 2788, of which 1245 are males, and 1543 are females. In the vicinity of this town are the following, besides other gentlemen's seats. *Raveningham Hall*, sir Edmund Bacon, bart.—*Langley Park*, sir Thomas Beauchamp Proctor, bart.—*Benacre Hall*, sir Thomas Gooch, bart.—*Sotterly Hall*, Miles Barre, esq.

BEC-D'OISEAU, in Zoology, the name lately given by French naturalists to that most singular Australasian animal *Platypus anatinus* of Vivarium nature; and *Duck-billed platypus* of Dr. Shaw. It is also called *Ornithorhynchus paradoxus*, by M. Blumenbach of Göttingen. See PLATYPUS.

BECEDE, LA, in Geography, a small town of France on the Aude, and chief place of a canton, in the district of Castelnaudary, 1½ league north of Castelnaudary.

BECF-AAL, in Ichthyology, a French name of the *Electrical eel*, anguille électrique.

BECHAN, in Geography, a river of North Wales, which

which runs into the Severn, 3 miles W.S.W. of Montgomerie.

BECHER, JOHN JOACHIM, in *Biography*, an industrious and successful cultivator and improver of chemistry, and an ingenious mechanic, was born at Spires in 1645. After passing through the usual preliminary studies, he was made professor of medicine at Mentz, and soon after physician to the elector there, and to the elector of Bavaria. Acquiring considerable reputation in these honourable posts, he was called to Vienna by the emperor Leopold; where, besides attending to his medical duties, he was instrumental in forming a chamber of commerce, and in improving their manufactures. He is also said to have projected the plan of an East India company there. But getting into disputes with some of the officers about the court, he left his influence, and was obliged to leave Vienna. He then went to Mayence, Munich, and Watzburg. From Watzburg he was driven away, Haller says, on being detected dissecting a human body, with the view probably of prosecuting some chemical experiments on some of the humours, as he did not cultivate anatomy. At Harlem, where he now went, he invented a machine for separating oils; and, as he tells us in his "La folie sage, et le bel art de l'imprimerie," printed at Francfort 1682, made some improvement in the art of printing; in what it consisted, is not however known. In the mean while he was not unmindful of the principal object of his studies, the advancement of the knowledge of chemistry, as appears by a rapid succession of publications on that subject. Getting again involved in disputes with some principal persons at Harlem, and compelled to quit that place, he came to London, where he died in 1685. That he was of a turbulent and restless disposition is evident by his frequent migrations, and by his constantly losing the favour and protection of his patrons, whom he had made his debtors by his abilities and services. Becher gave a new turn to chemistry, which he employed in analysing and finding out the principles of natural bodies, and thence laid the foundation of the great improvements that have been made in that art. But he was fond of mysteries, and employed no small part of his time and labour in his attempts to transmute metals. That he thought this practicable, appears by his "Experimentum chymicum novum, quo artificiali et instantanea metallorum generatio et transmutatio ad oculum demonstratur;" and his "Theses chymicae, veritatem et possibilitatem transmutationis metallorum in aëre et igne;" but he was conscious of having done more in the art than had ever before been done, and therefore probably thought it hardly any thing impossible. He had composed several useful languages, by which all men might be made mutually intelligible to each other: "Character promutabilis generatio utilis." On this subject he published, in 1661, a Latin dissertation; and as he was the first person who published a treatise on this art, since known under the name of pyrotechny, he may therefore be considered as the inventor of *Chymical Character*, and *PYROGRAPHY*. His principal works are his "Phisica sublimis," which has been translated into French editions; "Elevations chymiques," Marburg, 1662; "Paraphrasæ medicæ," Ulm, 1662, &c. See the title of the rest of his works, see Eloy's *Hist. Litt.*

BECK, DAVID, in *Biography*, an eminent portrait painter, was born at Arnheim in Guelderland in 1621, and became a disciple of Vaudeyk, from whom he acquired a fine manner of pencilling, and that sweet style of colouring in which this master excelled, together with that rapidity of execution for which he was so famous. He was appointed portrait painter to Christina queen of Sweden; and by her recommendation, most of the illustrious persons in Europe fat to him for their pictures. In his person and behaviour he was handsome, agreeable, and polite; and though he was much favoured by his royal mistress, he wished to visit his friends in Holland, very much against the queen's inclination; but as he soon after died in Holland, at the early age of 35, it was suspected that he was poisoned. As he travelled through Germany, he was suddenly taken ill at an inn, where he lodged, and the illness terminated in his apparent death, so that he was laid out as a corpse. His valet, who attended, regretted the event, and as they sat by his bedside, relieved their sorrow by drinking freely. One of them, in a state of intoxication, suggested, that their master was fond of a glass while he was alive, and proposed to try, their gratitude by giving him a glass, though he were dead. Accordingly they raised his head, and endeavoured to put some liquor into his mouth. Upon this Beck opened his eyes, and the servant compelled him to swallow what remained in the glass. The painter revived, and, by due attention, not only escaped interment, but perfectly recovered. In the month of June next ensuing, he received from his friend pieces of silver, gold chains, and several necklaces of gold of a large size. Pile a grain.

BECKM, or BECKUM, in *Geography*, a small town in Germany, in the circle of Westphalia and bishopric of Münster, seated on the Weser, 17 miles S.S.E. of Münster. In 1734 it was almost wholly consumed by fire.

BECKER, DANIEL, in *Biography*, was born at Dantzick, in December 1594. He took his degree of doctor in medicine at a Konigsberg, and was made professor of medicine there, and rector of the university. Becker was author of various medical works, but that which principally contributed to raise his name, is his "De cultura toro Prætorio, et de curatione singulari," or the extraordinary cure of the Præ-

BECIHCS, formed of the Greek βεζ, βεζθ, a cough, in the *Materia Medica*, medicines proper for relieving cough, but these being of various kinds, the general term may imitate, and is therefore improper.

BECHIC Pills. See **PILLS**.

BECHIN, in *Geography*, a town of Bohemia, and capital of a circle of the same name. It is seated on the river Lutzenice, and its citadel lies on a steep rock. The circle was miserably ravaged and laid waste in the 30 years' war, and the town was taken and burnt by general Bequoi in 1619. N. lat. 49° 14'. E. long. 15° 12'.

BECHTOLDHEIM, a town of France, in the department of Mont-Tonnere, and chief place of a canton, in the district of Mayence. The place contains 1057 and the canton 13,135 inhabitants: it includes 21 communes.

BECHTOLSHEIM, a market town of Swabia, in the Rhenish circle of nobility, belonging to four co-heirs, two of whom are Roman catholics, and two Lutherans.

BECK, a little river or brook, called also rivulet or rill.

According to Verstegan, the original word is *beke*, which properly imports a small stream of water issuing from some bourn or spring.

Hence, *bell-becks*, little brooks so called, on account of their gullinets and depth, or rather from their being covered, or much concealed. See **HELL**.

Beck is chiefly used among us in the composition of names of places originally situate on rivulets; hence Welbeck, Bournbeck, &c.

The Germans use *beck* in the same manner.

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lian knife-swallower; first published in 1636, and since frequently reprinted. The subject of the history is a young man, aged 22 years, who endeavoured to excite vomiting by introducing the handle of a knife, ten inches long, into the œsophagus; the knife slipping from his fingers, dropped into his stomach, where it continued, occasioning much pain, about six weeks. No probable means of relieving him, or of obtaining the discharge of the knife occurring, it was determined, by his medical attendants, to make an incision through the integuments of the abdomen into the stomach, and to extract the knife through the wound. The operation was performed, the knife taken out, and the patient recovered in a few days. The author relates several other cases of persons who had received wounds, penetrating into the stomach. In some, the wounds were completely healed; in others, the edges of the wounds becoming callous, left fistulous openings into the stomach, through which the food passed, unless when covered with a compress. This work was translated into English, and published in 4to. by Dan. Lakin, in 1642, under the title of "A miraculous cure of the Prussian swallow knife." Lakin added other cases of wounds penetrating into the stomach, which terminated in the same way, as those related by Becker. To both the Latin and English editions engravings of the subject are added. He died the 14th of October 1655. For the titles of his other works, none of which are of much estimation; see Haller's *Bib. Chirurg. et Anatom.* His son Daniel, who was educated under his father, after visiting the principal schools on the continent of Europe, was made doctor of medicine at Strasbourg, in the year 1652; returning to Königsberg, he was appointed professor in ordinary, and soon after physician to the elector of Brandenburg. He died suddenly Feb. 6th 1670, and was succeeded in his honours by his son Daniel Christopher, but they neither of them left any works deserving notice.

BECKER, BALTHASAR. See BEKER.

BECKET, THOMAS, an English prelate, famous as the occasion of much political contention during his life, and as the object of much superstitious veneration after his death, was born in London in 1119, and prosecuted his studies at Oxford, Paris, Bologna, and Auxerre. During the interval of his residence at Paris and Bologna, he was introduced to Theobald archbishop of Canterbury, who, being captivated with his graceful and winning address, gave him two livings in Kent, and obtained for him two prebends in the cathedrals of London and Lincoln. As at this time he was only in deacon's orders, he probably held these benefices by the pope's dispensation, which his patron might easily have procured. After his return from Auxerre, where he completed his studies, particularly in the civil and canon laws, he was employed by the archbishop as his agent to the pope, in order to solicit the restoration of the legantine powers to the see of Canterbury. Having conducted this negotiation with dexterity and success, he was deputed on another important commission, the object of which was to obtain from the pope those prohibitory letters against the coronation of prince Eustace, by which that design was defeated. Upon his return to England from this successful embassy, the archbishop conferred upon him several new favours, appointing him provost of Beverley and dean of Hastings, with the right of retaining his other benefices, and just before the death of Stephen, investing him with the archdeaconry of Canterbury. Immediately upon the accession of Henry II. to the throne, in 1158, he was appointed chancellor of England at the request of his patron, who thought no dignity or trust above his merit. The chancellor of England, at this time, had no distinct court or judicature in which he presided; but he acted together with the justiciary

and other great officers, in matters of the revenue, at the exchequer, and sometimes in the counties upon circuits. The great seal being in his custody, he supervised and sealed the writs and precepts that issued in proceedings pending in the king's court, and in the exchequer. He also supervised all charters which were to be sealed with that seal. In the council his rank was very high; and he had the principal direction and conduct of all foreign affairs, performing most of that business which is now done by the secretaries of state. Such was the office to which Becket was raised; but the favour of his master made him greater than even the power of that office, great as it was in itself. In this station he paid his court so successfully to his royal master, not only by his dexterity in business, but also by his splendid manner of living and agreeable conversation, that he became his greatest favourite, and his chief companion in his amusements. Employments and trulls of all kinds were heaped upon him without measure or propriety. Besides the office of chancellor, and a scandalous number of ecclesiastical benefices, he had royal castles and forts committed to his custody, the temporalities of vacant prelacies, and the escheats of great baronies belonging to the crown. These revenues he expended without account or controul; and Henry reposed in him such a degree of confidence, that he seemed almost to share the throne with the sovereign. It must indeed be allowed that Becket possessed in a pre-eminent degree all the qualities that could most powerfully engage the affections of a prince, who had a judgment capable of discerning, and a heart formed to love extraordinary merit, but a temper that required some delicacy of address in those who approached him very nearly, and that yielded most to those friends whose character appeared most congenial to his own. The person of Becket was graceful and his countenance pleasing; his wit was lively and facetious, his judgment acute, his eloquence flowing and sweet, and his memory capacious and ready on all occasions. The time he had passed in that school of the most exquisite policy, the court of Rome, had greatly improved and refined his understanding. Nor was his capacity limited to the sphere of business. He made himself the king's perpetual companion in most of his pleasures, and consulted his taste so naturally, and with so much ease, that in paying his court he seemed only to indulge his own inclinations. He occasionally laid aside the ecclesiastical habit and character. In an expedition with the king to France, he assumed the military profession, headed a body of men in his own pay, and commanded at various sieges. In his manners there was a certain inexpressible grace derived from nature and improved by art, which rendered his virtues more amiable, and even his vices agreeable. Thus his profuseness and ostentation appeared like generosity and greatness of spirit; nor indeed was he destitute of these qualities, though he carried them far beyond proper bounds. His expence was enormous, and Henry would have been jealous of it, as intended to acquire too much popularity, if he had not been persuaded, by the address of Becket, that all his magnificence, in which the son of a private citizen surpassed even the greatest and most opulent earls, was only designed to do honour to his bountiful master, whose creature he was, and upon whom his whole fortune must absolutely depend. Yet, amidst the luxury in which he lived for several years, and all the temptations of a court where gallantry reigned, he was, if the writers of his life may be credited, constantly temperate and invincibly chaste.

At the time of the death of archbishop Theobald, Becket's patron, the king, was in Normandy; but as soon as he heard of it, he resolved to raise his chancellor to the primacy, in hopes by his means of governing the church in tranquillity. This advancement however was retarded for about a

year by the opposition of the monks Maud, the king's mother, and of the clergy and bishops of England. But Henry's resolution was fixed, and his conduct for his private overcame all remonstrances; so that Becket, being first ordained priest, was consecrated at Canterbury, June 6, 1162. As soon as Becket found himself seated in the archiepiscopal chair of Canterbury, he suddenly changed his whole mode of life, and from being the gayest and most luxurious courtier, he became the most austere and solemn monk. Without the king's previous knowledge of his intention, and very much to his surprize and dissatisfaction, he resigned the office of chancellor. Before the king's return to England in 1163, he had received so many complaints of the severities of the new primate, that he became sensible, when it was too late, that he had made a wrong choice. In his interview with Becket at Southampton, it was observed by the whole court that his affection was cooled; and he soon after manifested his dissatisfaction with the conduct of the primate, by obliging him, much against his inclination, to resign the archdeaconry of Canterbury. In 1163, Becket attended a council, summoned at Tours by pope Alexander III., where he was treated by the pope and cardinals with particular respect; and where, it is probable, he was animat'd by the pope in his design of becoming the champion of the liberties of the church, and the innumeries of the clergy. It is, however, certain, that soon after his return he began to prosecute this design without his former reserve; and the zeal which he manifested produced an open breach between him and his sovereign. Henry was determin'd to be the sovereign of all his subjects, clergy as well as laity; to oblige them to obey his laws, or to answer for their disobedience in his courts of justice. Becket, on the other hand, maintained, that the clergy were subject only to the laws of the church, and were to be judg'd only in spiritual courts, and to be punished only by ecclesiastical censures. In order to bring this question to a speedy issue, which the licentiousness of the clergy, and the atrocious crimes committed by some of them at this time, rendered absolutely necessary: a council of the clergy and nobility was summoned at Westminster; and at this council the king required that the archbishop and other bishops would consent to deliver to his officers a clerk, who was degraded for any crime, in order to his being punished for it according to the laws of the land. This request was reasonable; but the primate's influence resisted the demand; and the council broke up in confusion. Altho' Becket solemnly promised and swore, in the words of truth, and without reserve, to obey the laws and customs, commonly call'd the "constitutions of Clarendon," which reduced ecclesiastical jurisdiction to a due subjection to the law of their country, and restricted the immunities of the clergy; he soon began to exhibit signs of repugnance, by extraordinary acts of disobedience; and by determining the performance of the sacred office of his function; and he obtained from the pope a full release from the obligation of his oath, and oblig'd him to resume the duties of his sacred office. A part however of the king's judgment, he determin'd to resign the primate's seat out of the kingdom; but being prevent'd from taking his escape by contrary winds, he return'd to Canterbury; and afterwards waited upon the king at Westsack, to supplicate forgiveness for attempting to leave the kingdom without his permission. The king receiv'd him without any other expressions of displeasure, besides asking him, "if he had not indeed break'd he thought it too late to contain the truth?" This interview was followed by fresh negotiations on the part of Becket, which induced the king to summon a parliament at Northampton, Oct. 17, 1164, which

unanimously found the primate guilty of contumacy, in refusing to attend the king's court when he was summoned, and sentenced him to forfeit all his goods and chattels. He was also required to restore a sum of 500*l.* which the king had lent to him when he was chancellor, and to render an account of 250,000 marks, which he had received from vacant benefices. These demands were of so serious a nature, that, though he appeal'd to the pope, many of his episcopal brethren deserted him through fear, and urged him to resign his office, assuring him that if he did not he would be tried for perjury and high treason. The barons likewise became loud and vehement in their clamours against him, so that Becket thought it most prudent to leave the kingdom. Accordingly he left Northampton at midnight, accompanied only by two monks, and travelling on foot and by night, he arriv'd at Lincoln, and from thence he pass'd by water to a solitary island, where he remained till an opportunity offer'd of passing over to Flanders. Some say that he travell'd to Sandwich, and hired a fishing boat to convey him to Beulogne. However that be, he retir'd to the monastery of Saint Bertin. Upon his retreat, the king confiscated the revenues of the archbishopric, and sent ambassadors to the king of France, and the earl of Flanders, dissuading these princes from affording Becket shelter in their dominions. The ambassadors met with a cold reception at the French court at Compeigne, and were told by Lewis, who was a superstitious bigot, and a great admirer of Becket, that he would protect the persecuted prelate with all his power. They then proceeded to Sens, where the pope resided, who, after admitting them to an audience, and consulting his cardinals, inform'd them, that no answer could be given to their petition till the archbishop had been heard. Becket, as soon as he was assur'd of the favour and protection of the king of France, paid him a visit at Soissons, where he was affectionately received, and urg'd to accept an order on the royal treasury for every thing he needed during his stay in France. From Soissons he proceeded with a numerous retinue for Sens, which he enter'd in a kind of triumph, and here the pope treated him with the greatest respect and kindness. At a solemn council of all the cardinals and prelates, he was seated at the pope's right hand, and allowed to keep his seat while he explain'd his cause. Having produced, in the course of an artful speech, a copy of the constitutions of Clarendon, several of which were directly calculated to abridge the power of the pope and cardinals, the whole assembly express'd their abhorrence of them in the strongest terms, and at the same time pass'd the highest encomiums on the archbishop, declar'd that his cause was the cause of God and the church, and that he ought to be supported. Becket, with a view of farthering his suit by an appeal to the pope, resign'd his archbishopric into the hands, which, however, the pope, with the advice of his cardinals, immediately restor'd to him, appointing him a residence in the abbey of Pontigny in Burgundy.

When the ambassadors return'd to England, and made their report, Henry was highly offended both with the pope and the archbishop; and in token of his resentment prohibited the payment of peter-pence, and commanded all clerks who preferr'd to appeal to the pope to be imprisoned. He also command'd all the goods and revenues of the archbishop, and of all the clergy who adhered to him, to be seized; and order'd to confiscate the estate, and to banish the person of all the primate's friends, retainers, and relations, to the number of about 400. Becket, during his residence at Pontigny, employ'd himself in exercises of devotion, and also in writing expostulatory letters to the

king and bishops of England, in issuing excommunications against several officers of the crown, and in threatening even to excommunicate the king himself. Notwithstanding a spirited remonstrance addressed to Becket by the English prelates, he persisted in his purpose; and communicated it to the pope in a letter, which represented Henry as a cruel, impious, unrelenting persecutor, who had tried and condemned Christ at Northampton, in his person. Henry was much alarmed; and called a council of his barons and prelates at Chinon in Touraine, to consider what was to be done for preventing his excommunication, or for guarding against its consequences. After a long deliberation, it was thought the most expedient to appeal to the pope. In the mean while Henry sent orders to England to guard the sea-coasts, and to take other measures of precaution. Although Becket was prevented by the interposition of the king of France from executing his design of excommunicating Henry, he excommunicated his ministers and chief confidants, and declared the impious constitutions of Clarendon null and void, absolved all the bishops of England from the unlawful oath they had taken to obey them, and excommunicated all persons who paid any regard to them. Upon these presumptuous proceedings Henry threatened to expel all the monks of the Cistercian order from his dominions, if they any longer entertained his enemy, the archbishop of Canterbury at Pontigny; upon which he removed to Sens about Martinmas A.D. 1166, where an honourable asylum was provided for him by the king of France. The pertinacity of Becket rendered ineffectual for a long time all the efforts of the English prelates, of the pope, and of the king of France, for terminating the contention between him and the king of England. At length, however, all preliminaries for a reconciliation being adjusted by the papal nuncios, the archbishop was conducted in great state to an audience of his sovereign, July 22, A.D. 1170, in a meadow near Fretville, where the French and English courts, with a prodigious multitude of people of all ranks, were assembled. The conduct of the king on this occasion was singularly condescending; but Becket's lofty and resentful temper was so little impressed by it, that he returned Henry's civility and condescension with complaints and remonstrances. After a promise extorted from the king to repair all the injuries which had been done to the church, the archbishop dismounted, in order to throw himself at his feet; but Henry prevented him, and stooped so low as to hold his stirrup, and assist him in re-mounting. This reconciliation, however, was far from being cordial, on the part either of Henry or Becket, and it was not likely to be permanent. Whilst the archbishop was waiting at Whitfand, a sea-port in Flanders, previously to his return to England, he sent over three bulls, one for suspending the archbishop of York, who had been employed in crowning the young king, and two for excommunicating the bishops of London and Salisbury, who had assisted at this ceremony. This conduct, which was inexcusable at the moment when he pretended to return in peace, excited against him universal indignation, and eventually proved the cause of his ruin. On his reaching the English shore, attempts were made to prevent his landing, and he was insulted by some persons in arms, who commanded him in a threatening tone to absolve the excommunicated bishops. In his way to Canterbury he was accompanied by a great multitude of people, and entered the city in a kind of triumph amidst the acclamations of his attendants. Soon after his arrival, application was made to him for absolving the bishops whom he had suspended and excommunicated; and the young king, who concurred in the application, and who had issued an order for this purpose, was much incensed at his refusal, more especially as the

cessures which he had inflicted on those prelates who had assisted at his coronation seemed to call in question its validity. In his progress from Canterbury to Woodstock, where the young king resided, he was attended on his approach to London by prodigious crowds of people, and conducted to his lodgings in Southwark with loud acclamations; in return for which he scattered among the populace both money and episcopal benedictions. Here his vanity was mortified by a message from the young king, forbidding him to proceed any further, or to enter any royal town or castle, and commanding him to return immediately to Canterbury, and to confine himself within the precincts of his church. After his return to this city, he found himself deserted by many of his friends, and received reports of the insults they suffered, and the depredations that were committed upon his estates, so that he indulged gloomy apprehensions, and said to one of his chief confidants, "that he was now convinced this quarrel would not end without blood, but that he was determined to die for the liberties of the church." When the excommunicated prelates arrived in Normandy, and implored the protection of the king from the disgrace and ruin with which they were threatened by the private, the indignation of Henry was roused, and in the moment of intemperate passion, he exclaimed, "shall this fellow, who came to court on a lame horse, with all his estate in a wallet behind him, trample upon his king, the royal family, and the whole kingdom? Will none of all those lazy cowardly knights, whom I maintain, deliver me from this turbulent priest?" This passionate exclamation made too deep an impression on those who heard it; and particularly on four barons, who formed a resolution, either to terrify the archbishop into submission, or to put him to death. Accordingly, having concerted their plan, they set out for Canterbury by different routes and arrived at a castle about 6 miles from the city on the 28th of December, A. D. 1170; and on the following day they proceeded to the city, and getting admission into the archbishop's apartment, they told him, that they were sent by the king with a command that he should absolve the prelates, and others whom he had excommunicated, and then go to Winchester, and make satisfaction to the young king, whom he had endeavoured to dethrone. Becket, after a violent altercation, in the course of which hints were given that his life was in danger if he did not comply, persisted in his refusal. Upon the departure of the barons, one of them charged his servants not to let him flee; to which Becket, who overheard them, replied with great vehemence; "flee! I will never flee from any man living. I am not come to flee, but to defy the rage of impious assassins." The barons, with their accomplices, finding their threats ineffectual, put on their coats of mail; and taking each a sword in his right hand, and an ax in his left, returned to the palace, but found the gate shut. When they were preparing to break it open, Robert de Broc conducted them up a back stair-case, and let them in through a window. A cry then arose, "they are armed! they are armed!" on which the clergy hurried the archbishop almost by force into the church, hoping that the sacredness of the place would protect him from violence. They would also have shut the door; but he exclaimed "begone, ye cowards: I charge you on your obedience, do not shut the door. What, make a castle of a church!" The conspirators having searched the palace, came to the church, and one of them exclaiming "Where is that traitor? where is the archbishop?" Becket advanced boldly, and replied, "here I am, an archbishop, but no traitor!—I am ready to suffer in the name of him who redeemed me with his blood. God forbid that I should fly for fear of your swords, or recede from

from justice." They once more commanded him to take off the excommunication and fasten on of the bishops. He replied "no satisfaction has yet been made; nor will I absolve them." "Then," said they, "thou shalt instantly die according to thy desert." "I am ready to die," replied Becket, "that the church may obtain liberty and peace in my blood. But in the name of God, I forbid you to hurt any of my people." They now rushed upon him, and endeavoured to drag him out of the chapel, with an intention, as they themselves afterwards declared, to carry him in bonds to the king, or if they could not do that to kill him in a less sacred place. But as he clung fast to one of the pillars of the choir, they could not free him from thence. During the struggle, he struck William de Tracy so roughly, that he almost threw him down; and as Reginald Fitzurfe pressed harder upon him than any of the others, he thrust him away, and called him "pimp." This opprobrious language more enraged that violent man; he lifted up his sword against the head of Becket, who, bowing his neck, and joining his hands together, in a posture of prayer, recommended his own soul, and the cause of the church, to God, and to the saints of that cathedral. But Edward Grime, one of the monks of Canterbury, interposing his arm to ward off the blow, it was almost cut off; and the archbishop also was wounded in the crown of his head. He stood a second stroke, which likewise fell on his head, in the same devout posture, without a motion, word, or groan; but after receiving a third, he fell prostrate on his face; and all the accomplices pressing now to a share in the murder, a piece of his skull was struck off by one of them; upon which another scooped out the brains of the dead archbishop with the point of a sword, and scattered them over the pavement of the church.

Thus was assassinated, in the 53d year of his age, and 9th of his pontificate, A.D. 1170. Dec. 29, Thomas Becket;— "a man," says Lord Lytton, "of great talents, of elevated thoughts, and of invincible courage; but of a most violent and turbulent spirit; excessively passionate, haughty, and vainglorious: in his resolutions inflexible, in his resentments implacable. It cannot be denied that he was guilty of a wilful and premeditated perjury; that he opposed the necessary course of public justice, and acted in defiance of the laws of his country, laws which he had most solemnly acknowledged and confirmed; nor is it less evident, that during the heat of this dispute, he was in the highest degree ungrateful to a very kind master, whose confidence in him had been boundless, and who from a private condition had advanced him to be the second man in his kingdom. On what motives he acted can be certainly judged of by Him alone, *to whom all hearts are open*. He might be misled by the prejudices of a bigotted age, and think he was doing an acceptable service to God, in contending, even to death, for the utmost excess of ecclesiastical and papal authority. Yet the strength of his understanding, his conversation in courts and camps, among persons whose notions were more free and enlarged, the different colour of his former life, and the suddenness of the change which seemed to be wrought in him upon his elevation to Canterbury, would make one suspect, as many did in the times when he lived, that he only became the champion of the church from an ambitious desire of sharing its power; a power more independent on the favour of the king, and therefore more agreeable to the haughtiness of his mind, than that which he had enjoyed as minister of the crown. And this suspicion is increased by the marks of cunning and falseth which are evidently seen in his conduct on some occasions. Neither is it impossible, that when first he assumed his new character, he might act

the part of a zealot, merely or principally from motives of arrogance and ambition; yet afterwards, being engaged and inflamed by the contest, work himself up into a real enthusiasm. The continual praises of those with whom he acted, the honours done him in his exile by all the clergy of France, and the vanity which appears so predominant in his mind, may have conduced to operate such a change. He certainly shewed in the latter part of his life a spirit as fervent as the warmest enthusiasts; such a spirit indeed as constitutes *le royaume*, when it exerts itself in a cause beneficial to mankind. Had he defended the established laws of his country, and the fundamental rules of civil justice, with as much zeal and intrepidity as he opposed them, he would have deserved to be ranked with those great men, whose virtues make one easily forget the alloy of some natural imperfections; but unhappily his good qualities were so misapplied, that they became no less hurtful to the public weal of the kingdom, than the worst of his vices." Mr. Hume closes his account of the assassination of Becket with the following concise sketch of his character. He was "a prelate of the most lofty, intrepid, and inflexible spirit, who was able to cover to the world, and probably to himself, the enterprises of pride and ambition under the disguise of sanctity and of zeal for the interests of piety and religion. An extraordinary personage, truly, if he had been allowed to remain in his first station, and had directed the vehemence of his character to the support of law and justice; instead of being engaged, by the prejudices of the times, to sacrifice all private duties and all public connections to ties which he imagined or represented as superior to every civil or political consideration. But no man, who enters into the genius of that age, can reasonably doubt of this prelate's sincerity." Another judicious historian (Dr. Henry) says of Becket: "He was evidently a man of very great abilities, particularly of consummate cunning, undaunted courage, and invincible constancy in the prosecution of his designs. But his schemes were of a most pernicious tendency, to emancipate the ministers of religion from the restraints of law, and to subject his king and country to a foreign power. He was vain, obstinate, and implacable; as little affected by the entreaties of his friends, as by the threats of his enemies. His ingratitude to his royal master admits of no excuse, and hath fixed an indelible stain upon his character. Though his murderers were highly criminal, his death was very reasonable, and probably prevented much mischief and confusion."

The respect paid to the memory of Becket, after his death, was extravagant beyond all bounds, and remains on record as an evidence of the superstition and credulity which prevailed at the period in which it occurred. The king of England, to whose commands it was generally imputed, was represented as "that horrible persecutor of God, who exceeded Nero in cruelty, Julian in perfidy, and Judas in treachery;" and the pope was loudly called upon by the kings of France and many prelates to draw the sword of St. Peter, and to inflict some exquisite punishment upon him. But none expressed greater grief and horror at this deed than Henry himself, who broke out into the loudest lamentations, refused to see any company, or admit of any consolation for three days. He also dispatched an embassy to Rome to vindicate himself from the imputation of having been the cause of it. All divine offices were suspended for nearly a year in the church where it had happened; and the church itself was, by order of the pope, reconsecrated. In 1173, Becket was canonized by a bull of pope Alexander; and a particular collect was appointed to be used in all the churches of the province of Canterbury, for expiating the guilt of his murder. In
the

the following year, king Henry, on his return to England, went to Canterbury, where he did penance, and underwent a voluntary discipline, walking barefoot to his tomb, prostrating himself before it, and submitting to be scourged by the monks, passing all the day and night without any refreshment, kneeling on the bare stones, and bestowing great benefactions on the church of Canterbury, as a testimony of his regret for the murder. His virtues were the subjects of endless paegyric, and the miracles, operated by his relics, were more numerous, more nonfictitious, and more impudently attested, says Hume, than those which ever filled the legend of any confessor or martyr. Gervase of Canterbury informs us, that two large volumes of them were preserved in that church. In 1221, his body was taken up in the presence of king Henry III. and a vast concourse of the nobility and others, and deposited in a rich shrine erected at the expence of archbishop Stephen Langton. This shrine was enriched with presents from all parts of Christendom; pilgrimages were performed to it for obtaining the martyred prelate's intercession with heaven; and it has been computed that, in one year, above 100,000 pilgrims arrived in Canterbury, for the purpose of paying their devotions at this tomb. "It is indeed," says Hume, "a mortifying reflection to those who are actuated by the love of fame, to justly denominate the last infirmity of noble minds, that the wisest legislator and most exalted genius that ever reformed or enlightened the world, can never expect such tributes of praise as are lavished on the memory of a pretended saint, whose whole conduct was probably, to the last degree, odious or contemptible, and whose industry was entirely devoted to the pursuits of objects pernicious to mankind." Lyttelton's Hist. Henry II. vol. ii. p. 321, &c. vol. iv. p. 361, &c. 8vo. Hume's Hist. of England, vol. i. p. 447, &c. 8vo. Henry's Hist. of Great Britain, vol. v. p. 340, &c. 8vo.

BECKET, WILLIAM, son of Isaac Becket, a surgeon of some eminence at Abingdon, in Berkshire, under whom he received his education, was born in the year 1684. At a proper age, he was sent to London, and was for some years pupil to Mr. Jos. Bateman, surgeon to St. Thomas's hospital in Southwark. That he was diligent in cultivating his profession, appears by the early specimens he gave of the result of what he had seen in practice: for in 1707, he published a collection of chirurgical observations, containing relations of some curious cases that had fallen under his notice; and in 1722, "New discoveries in the Cure of Cancers;" and soon after, a recital of the case of Dr. James Keil, the celebrated physician and mathematician, who died of a cancer in his mouth. Becket had been accused of mismanaging this case, and therefore published the account in vindication of his practice. In his *New Discoveries*, he pretends to have been frequently successful in removing cancerous tumours, by means of a digestive, the manner of preparing which he does not however disclose. In a subsequent edition of this work, he gives the description of a medicine, which had been used successfully, it was said, in eradicating cancers by the family of the Paines of Northampton. It consists of yellow arsenic and bole armenic, mixed to the consistence of a paste with the pulp of an apple. It is called the red caustic. A similar preparation has been since used by Plunket and others. In 1721, he published two letters addressed to sir Hans Sloane, in which he refutes the current opinion of the efficacy of the royal touch in curing the evil, which was perhaps preparatory to his being elected fellow of the Royal Society. About this time he published proposals for printing an account of the lives and writings of the most eminent British writers in medicine, in 2 vols. 8vo. which he

did not however complete. Dr. Milward, who had formed a similar design, is said to have purchased what manuscripts were left by him on this subject, of his executors; but neither did he carry his intention into execution. It is probable that, while making this search after ancient British writers, Becket met with accounts of the disease called a brenning, and conceiving that to be a symptom of the venereal disease, he was induced to publish his three dissertations on the antiquity of that complaint, which was known, he says, before the discovery of the West Indies by Columbus. These were first printed in the *Philosophical Transactions*. Becket died at Abingdon in 1738. His works were collected together, and published in 9 vols. 8vo. in 1740, by the noted Mr. Edmund Curl.

BECKET, ISAAC, a mezzotinto engraver of some eminence, was born in Kent in 1653, was originally an apprentice to a calico-printer, and obtained the secret of scraping mezzotinto from one Loyd, a print-seller, with whom he lived for some time. He afterwards connected himself with an engraver in mezzotinto, with whom he had been acquainted at an earlier period of his life, and who assisted him, as he drew better and more expeditiously than himself. His mezzotintos are often clear and well scraped; but his middle tints are not sufficiently distinguished, so that his shadows appear flat and heavy. One of his best prints is engraved on a middling-sized upright plate, representing Adrian Beverland drawing from a statue, and having in the back ground monuments, pyramids, and several relics of antiquity. The time of his death is not known. Strutt.

BECKET, ST. THOMAS, *Brotherhood of*, in *Commerce*, a name given to the most ancient company of English merchants of which history furnishes any record, which was established about the end of the 13th century, and thus called in honour of Becket. The design of this company was to export the woollen cloth, which about that time began to be manufactured in considerable quantities in England; and as that manufacture increased, the trade of the brotherhood also increased. Henry IV. A. D. 1406, incorporated this society by a charter, regulating their government and their privileges. By this charter, any merchant of England or Ireland, who desired it, was to be admitted into the company on paying a small fine. As this society was composed of the native subjects of the kings of England, it was favoured both by government and by the people, made gradual encroachments on the trade of the merchants of the staple, and at length ruined that company. *Anderf. Comm. vol. i. p. 233, 260, &c. See STAPLE.*

BECKET, in *Geography*, a township of America, in Berkshire county, Massachusetts, containing 751 inhabitants, 10 miles east of Stockbridge, and 130 west from Boston.

BECKETTS, in the *Marine*, signify large hooks, or circular wreaths of rope, or wooden brackets, used to confine ropes, tackles, oars, or spars, in a convenient place, till they are wanted. And to put the tacks and sheets in the beckets, is to hang up the weather-main and fore-sheet, and the lee-main and fore-tack, to a little knot and eye-becket on the fore-mast, main, and fore-shoulders, when the ship is clove-hauled, to prevent them from hanging in the water. Some beckets have an eye spliced in one end, and a small walnut-knot crowned at the other, and some have both ends spliced together like a wreath. The noose made at the breast of a block, to make fast the standing part of a fall-to, is also called a becket.

BECKINGTON, THOMAS, in *Biography*, an English prelate of the 15th century, was born in the parish of Beckington, in Somersetshire, towards the close of the 14th century, educated at Wykeham's school, near Winchester, and

and finished his studies at New College, Oxford, of which he was admitted fellow in 1408. After several ecclesiastical preferments he became dean of the arches about the year 1429, and was employed by a synod held in St. Paul's church, London, in conjunction with two other persons, to draw up a form of law, by which the prosecution of the Wickliffites, or Lollards, was to be conducted. While he was tutor to King Henry VI. he wrote a Book preserved in manuscript in the Cottonian Library, in which he strenuously asserted, in opposition to the vulgar law, the right of the kings of England to the crown of France; and then gaining the special favour and patronage of that prince, he was made secretary of the king, keeper of the great seal, and bishop of Bath and Wells, to which he was consecrated in 1443. He is represented as having been well skilled in polite learning and history, and very conversant in the holy scriptures; as a good preacher, and as a generous patron of ingenious and learned men, for that he was called the Mæcenas of his age. His works of beneficence and charity were numerous. He finished Lincoln college in Oxford; procured an endowment for New College, in 1440; laid out a considerable sum of money in repairing houses belonging to his see; and erected the west side of the cloisters at Wells, and also a conduit in the market place of that city. He died at Wells in 1465. A large collection of his letters is preserved in the library at Lambeth; and a volume of sermons and some other treatises are ascribed to him. Biog. Brit.

BECMARE, in *Entomology*, a genus of insects established by Geoffroy. See RHINOMACER.

BÉCOUYA, in *Geography*. See BEKIA.

BECSANGIL, a name sometimes given to a province of Asia, which is a part of Anatolia, bounded on the north by the Black sea, on the west by the sea of Marmora and the Archipelago, on the south by Natolia Proper, and on the east by the province of Bolli. The capital is Barfa.

BECTIVE, in the county of Meath, Ireland, where are considerable ruins of an abbey which belonged to the Cistercians. It was founded by Murehard O'Malachin, king of Meath, in 1146; and being richly endowed, the abbot had a place among the peers in the assemblies of parliament, and wore a mitre. The cloisters with a tower are almost entire. It was pleasantly situated on the banks of the Boyne, over which river there was a bridge; and at present a little village, called *Beckive-bridge-end*, has two fairs annually. It is 3 miles from Trim, and about 24 from Dublin. Monast. Hibern. Ware's Antiquities.

BECTASSE, a sect among the Turks denominated from their founder Bectash, preacher to Sultan Amurath.

All the Janizaries belonging to the Porte are of the religion of Bectasse, and are said to have derived their origin from the founder of this sect. Their habit is white; on their heads they wear white caps of several pieces, with turbans of wool twisted rope-fashion. They observe constantly the hour of prayer, which they perform in their own assemblies, and they make frequent declarations of the unity of God.

BED, a place prepared to stretch and compose the body on, for rest and sleep; made chiefly of feathers inclosed in a ticken case. Of beds there are several sorts: as a feather-bed, a down-bed, a standing-bed, a settee-bed, a tent-bed, a truckle-bed, &c.

In the first and ruder ages of mankind, it was the universal practice to sleep upon the skins of beasts. This was the custom among the Greeks and Romans, and also among the Celtic nations, and ancient Britons. This custom prevailed till modern times among the common people in some parts of Germany. These skins, some of which

are worn in the day, were spread at night on the floors of their apartments. In process of time, these skins were changed for loose rushes and heath, and afterwards for straw. Pliny (l. viii. c. 48. l. xvi. c. 36.) says, that the beds of the Roman gentry were generally filled with feathers, and those of the commons with the soft down of reeds. Straw was used even in the royal chambers of England, so late as the close of the 13th century. Beds, filled with chaff, heath, or straw, are used by the common people in many parts of Great Britain and Ireland, and also in France and Italy, at this day. Beds were for a long time laid upon the ground; till at length the custom of raising the beds on feet or pedestals, which anciently prevailed in the East, and which was introduced into Italy, was adopted in Britain. But all the materials of which beds are made, and the manner of disposing them, vary among different ranks, and in different nations. By the English statutes, no beds are to be sold, except filled with one sort of stuffing only; e. g. feather beds with only dry pulled feathers; and down beds with clean down alone. No scalded feathers are to be mixed with the former; nor fen-down with the latter, on pain of forfeiture; the mixture of such things being conceived as contagious for man's body to lie on. Stat. 11 Hen. VII. c. 19.

Also bed quilts, mattresses, and cushions stuffed with horse-hair, fen-down, goat's hair, and neat's hair, which are dressed in lime; and which the heat of man's body will cause to exhale, and yield a noxious smell, whereby many of the king's subjects have been destroyed, are prohibited by the same statute.

The ancient Romans had various kinds of beds for repose; as their *lectus culicularis*, or *chamber-bed*, whereon they slept; their *table-bed*, or *lectus discubitorius*, whereon they ate (for they always ate lying, or in a recumbent posture), there being usually three persons to one bed, whereof the middle place was accounted the most honourable, as well as the middle bed. See TRICLINIUM. These beds were unknown before the second Punic war; the Romans, till then, sat down to eat on plain wooden benches, in imitation of the heroes of Homer; or as Varro expresses it, after the manner of the Lacedæmonians and Cretans. An innovation in this practice is ascribed to Scipio Africanus, who brought from Carthage some of those little beds, called "Punicani," or "Archaici," which were of wood, very low, stuffed only with hay or straw, and covered with the skins of sheep or goats, "*lectus pennis strati*." These beds in respect of delicacy differed little from the wooden benches; but when the custom of bathing prevailed, the practice of resting themselves more commodiously by lying along than by sitting down, was adopted. As for the ladies, it did not seem at first consistent with their modesty to adopt the mode of lying; accordingly they kept to the old custom all the time of the commonwealth; but, from the first Cæsars, they ate on their beds. As to the youth, who did not yet put on the *toga virilis*, they were long kept to the ancient discipline. When they were admitted to table, they only sat on the edge of the beds of their several relations. Never, says Suetonius, did the young Cæsars, Cæsar and Lucius, eat at the table of Augustus; but they were set "in medio," or, as Tacitus expresses it, "ad lectularem." From the greatest simplicity, the Romans, by degrees, came to use downy beds to the most surpassing magnificence. Pliny observes, it was no new thing to see them covered over with plates of silver, adorned with the softest mats, and the richest counterpanes. Hist. Nat. lib. xxxiii. cap. 11. Lucius Junius, speaking of Hellogabalus, says, that he had beds of gold silver; and Pompey, in his third triumph, introduced beds of gold. They had also their *lectus lecticosterius*, or what they called;

and a *lectus funebris*, or *emortualis*, on which the dead were carried to the pile. See FUNERAL.

BED of State. See PARADE.

BED of Justice, Lit de Justice, in the French *Laws*, denoted a throne on which the king used to be seated in parliament. In this sense, he was said to hold his *lit de justice*, when he went to the parliament of Paris, and held a solemn session, under a high canopy erected for the purpose. The bed of justice was only held on affairs relating to the state; on which occasion, all the officers of the parliament appeared in red robes; at other times they wore black ones. Several authors have treated expressly on the ceremonies of the bed of justice.

BED of a great Gun, is a piece of plank laid within the cheeks of the carriage, on the middle transom, for the breech of the gun to rest on.

BED, or Stool of a Mortar, is a solid piece of oak, in form of a parallelopiped, bigger or less, according to the dimensions of the mortar, hollowed a little in the middle to receive the breech and half the trunnions. On the sides of the bed are fixed the cheeks or brackets by four bolts of iron.

In ships, when the decks lie too low from the ports, so that the carriages of the pieces, with the trucks, cannot mount the ordnance sufficiently, but that they lie too near the gunwale; the method is to make a false deck for so much as the piece will require for her traversing to raise it higher; and this they call a *bed*.

BED, in *Gardening*, a small elevated plot or compartment of ground, of three, four, or more feet in breadth, which is useful in the culture of many sorts of plants, especially those of the smaller kinds. It is always an eligible practice to sow and prick out different sorts of small plants on beds having narrow alleys between them, for the greater convenience of weeding, watering, gathering, &c. as by this means such operations can be performed without trampling on the crops. Thus the ground intended for asparagus and strawberries should be divided into four feet wide beds, with eighteen inches or two feet alleys between them. Onions are likewise cultivated to the best advantage on four feet wide beds, having ten or twelve inch alleys; the different sorts of lettuce and endive should also be sown and transplanted into separate beds occasionally; and also various sorts of small plants, which can be more conveniently cultivated on beds, or in borders of similar widths. Early radishes are generally sown on beds, or similar compartments, as being more convenient for the purposes of covering them occasionally in frosty nights, and for weeding, thinning, watering, and gathering them.

All sorts of plants that are particularly intended for transplantation, should be sown in beds or narrow borders, so as to admit of standing to weed, water, and draw the plants, without treading upon them; and for the same reason, all plants necessary to be pricked out previously to their final transplanting, should also be put out on such beds; as celery, cabbages, cauliflowers, broccoli, &c. Aromatic and medicinal herbs of all sorts should also, for the greatest part, be disposed in beds with twelve or fifteen inch alleys between, or at least in borders of similar widths; particularly mint, thyme, savory, marjoram, sage, hyssop, balm, penny-royal, tansey, tarragon, feverfew, rue, &c. as this method of bedding all sorts of small plants is not only more commodious for performing the necessary operations without injuring the plants, but has an air of uniformity which is constantly to be observed in garden work.

The most proper dimensions for beds of this sort, as has been observed, is four feet or four feet and a half in width,

the length at pleasure, with intervening shallow alleys of from nine, twelve, or fifteen inches to two feet width, according to the different sorts of plants, so that a person in the alleys may easily reach half across them to do the necessary work without trampling the plants down, or treading the surface of the ground hard.

Where flower gardens are wanted to be distinct from the general pleasure ground, the spaces should be divided into regular parallel beds, of three or four feet in width, with eighteen inches or two feet wide alleys, especially when chiefly intended for the curious sorts of bulbous rooted flowers, such as tulips, hyacinths, ranunculuses, anemones, and other choice sorts, where, by being deposited together in beds, having intervening alleys, they admit of passing between them, to perform the necessary business of culture more easily, as well as to view the plants when in flower. Many sorts likewise appear to greater advantage in this way.

The beds, in these cases, should be neatly edged with box or thurst. See EDGING.

The grounds of nurseries intended for raising all sorts of flowers from seeds, slips, cuttings, parting of roots, &c. should also be divided into beds of three or four feet in width. And in large nurseries for trees, the ground intended for the reception of cuttings of most sorts of hardy trees and shrubs, should also be generally divided into three or four feet beds, having twelve or fifteen inch alleys between them.

Beds in common should only be raised a very little higher than the alleys, unless in cases of too much stagnant moisture, three or four inches higher than the level of the alley is mostly sufficient; for when raised considerably, the alleys assume the appearance of trenches, and have a disagreeable effect.

The earth of all sorts of beds should be well broken down, and laid as even as possible in digging them over, being afterwards raked into neat order on the surface.

Beds for raising melons, mushrooms, and the like, are commonly denominated *ridges*.

BEDS, in speaking of hops, denote the floors whereon they are spread to dry.

BED of Corn, is a heap, flat at top, three or four feet high; otherwise called a *couch*.

BED-algenfe, a name given by the Arab *Astronomers* to a fixed star of the first magnitude in the right shoulder of ORION. *BED-algenfe* is of a ruddy colour, by which it is easily distinguished.

BED, in *Masonry*, denotes a course or range of stones.

BED, Joint of the, is the mortar between two stones placed over each other.

BED, in *Sea Language*, a flat, thick piece of timber laid under the quarters of casks, containing any liquid, and stowed in the ship's hold.

BED of a River, the bottom of the channel in which the stream flows.

BEDS, in speaking of minerals and fossils, signify certain strata, or layers of matter, disposed over each other.

BEDS, in the *New Husbandry*, denote the spaces occupied by the rows of corn, in contradistinction from the open spaces between them, which are called alleys.

BEDALACH, in the *Materia Medica*, a name given by some writers to the gum bdellium; but particularly to that kind of it which was brought from Arabia, and was of a yellowish colour, like wax.

BED-CHAMBER.—*Lords or Gentlemen of the BED-CHAMBER*, are persons of the first rank, fourteen in number, whose office used to be, each in his turn, to attend a week in the king's bed-chamber, lying by the king on a pallet-

pallo del di' night, and to wait on the king when he eats in private. The salary is 1000l. per annum. The first of these is called *grove of the Stork*. There are also twelve groves of the bed-chamber.

BED MOULDING, in *Archit. Aure.* is a term used by workmen to express those members of a cornice which lie below the corona. A bed-moulding usually consists of three or four members, an ogee, a lot, a large bouline, and another lot under the front.

BEDA, or **BEDR**, distinguished by the epithet *Venerabilis*, in *Begeſt. Angl.* a learned monk of the eighth century, and one of the best writers of his time, was born in the neighbourhood of Wearmouth, in the bishopric of Durham, in 672 or 673. At the age of seven years he was brought to the monastery of St. Peter, founded near the place of his nativity about two years after he was born; and the care of his education was intrusted with abbot Benedict, his successor Cuthbert, and John of Beverly, for twelve years. Endowed with an excellent genius, and distinguished by assiduous application, his progress in various branches of learning, during this period, was very considerable. At the close of it, or when he had attained the age of 19 years, he was ordained a deacon by the last mentioned preceptor, then bishop of Hexham, and afterwards archbishop of York. About this time he seems to have removed from the monastery of St. Peter's at Wearmouth, where he was educated, to that of St. Paul at Jarrow, near the mouth of the river Tyne, founded, as the former had been, by the abbot Benedict. Here he was employed in the prosecution of his own studies, and in assisting those of others who resorted to this monastery for instruction. His whole life, which he spent in this retreat, was devoted, as he himself informs us, to the exercises of devotion in the church, and to those of teaching, reading, and writing. At the age of thirty, A.D. 702, he was ordained priest by the same person from whom he had received deacon's orders. Although he lived in retirement, the fame of his learning and character soon spread over Europe; so that pope Sergius addressed a letter to abbot Cuthbert, in which he urged him to send Bede to Rome. The death of the pope, which probably happened soon after this letter was written, prevented Bede from leaving his own country; nor indeed does it appear, with sufficient evidence, that he ever quitted Northumberland, though some have said that he visited the monastery founded at Gracechester or Cambridge, in 720, to see the ark of the covenant, in which he died, and in which he was buried. When in the full vigour of his mind, he was still indefatigable in the acquisition of knowledge, and in the communication of it to others. His genius, from his numerous works on a variety of subjects, that his knowledge comprehended every kind of learning, and from the time he was known at the period in which he lived; and from other collateral evidence of unquestionable authority, that he was justly entitled to the appellations of "the wise man," and of "Venerable Bede," conferred on him by his countrymen, and uniformly retained by posterity. From his superior learning accepted any preferment above the level of a monk or a simple priest, we may infer his singular modesty; his letter addressed to his intimate friend, the learned abbot, a bishop of York, and containing excellent advice, the result of long experience, evinces the purity of his morals, and the liberality of his sentiments; and as he was never censured as a saint, and the beauty of the things he did to be much performed by him, we may reasonably conclude, that he was animated by the spirit of his order, formed to give to his character. He appears indeed, more of a philosopher than of a religious man; "to be a philosopher, the more a religionist of learning, who is

destitute, of devotion with liberality, and of high reputation in the church with voluntary and honourable poverty."

The largest and most popular of Bede's works is his history of the church, intitled, "Ecclesiastice Historie Gentis Anglorum libri quinque," and first published in 731, the year to which he continued his history of Christianity from its first introduction into Britain. In collecting materials for this history, he consulted several chronicles of the English kings before his time; he kept up a correspondence in the several kingdoms of the heptarchy, and he had recourse to various records and archives preserved in several monasteries; and his history has been regarded as containing the most authentic and comprehensive account of the early state of Christianity in this country. The famous Milton, indeed, has objected to this history, that it is deficient with regard to the civil affairs of the country, which are mentioned very cursorily, and which form rather a calendar of dates, than a regular history; but if it be duly considered, that his object was the state of the church, and not the secular transactions of the period which his history comprehends, this objection must appear to be urged against it without sufficient reason. Milton himself confessed, that he travelled with much worse guides after he parted with Bede. The charge that has been alleged against him, of partiality to the Saxons in preference to the Britons, seems to be less exceptionable. But the chief objection to which his history is liable, is the diffuse account which he introduced of legendary miracles and of other trivial and absurd circumstances, extracted without sufficient discrimination and with apparent credulity from the chronicles to which he had access; and yet, when we recollect the period in which he lived, and consider, that the principal transactions of the church upon record consisted of such fooleries and impostures, we may admit some apology for a writer who wished to approve himself a faithful historian. Without adverting to the censures of M. du Pin, which extend to the style and subjects of Bede's works in general, and which are amply stated and satisfactorily obviated in the Biog. Brit., it may not be improper to mention the objection urged by father Pezron against the chronology of Bede. This father, who has taken great pains, after Isaac Vossius and father Morin, to support the chronology of the Septuagint, informs us, that Bede was the first who endeavoured, in the western church, to maintain the shorter chronology of the Hebrew text; and archbishop Usher, in his "Sacred Chronology," observes, that Bede was considered as an heretic on account of this innovation. However, his computation was afterwards received, and scarcely any other was admitted in the west till the three learned men above-mentioned appeared in defence of the contrary opinion. If Bede, therefore, was singular in being an advocate for the Hebrew chronology, this singularity affords evidence of his learning, penetration, and good sense. The author's ecclesiastical history is written in easy, though not very elegant Latin; and as to the faults in his style, which some, and particularly Du Pin, have censured, they will not appear to be very great, if compared with contemporary writers; and to compare him with Homer is certainly unjust. Of the Latin original of the History there have been several editions with notes and commentaries; particularly at Antwerp in 1550, at Heidelberg in 1577, at Cologne in 1601, at Cambridge in 1644, at Paris in 1681, and at Cambridge in 1722. A Saxon version attributed to king Alfred, with learned notes by Abraham Whedde, was printed at Cambridge in 1644; and an English translation by Dr. Stapleton was printed at Antwerp in 1755. The design of the latter translation was to support the popish religion; and of course it is not deemed very valuable; but the history of

Bede, even as he has given it in English, might in many passages be shewn to be far enough from favouring the doctrines of the church of Rome.

The last literary labour of venerable Bede, was "A Translation of the Gospel of St. John into the Saxon Language," which he completed with difficulty on the day and hour of his death, which happened on the 26th of May, A. D. 735. The disorder of which he died was an asthma; and he bore the pain that attended it with exemplary fortitude and patience, discharging the duties of his office, and prosecuting the works in which he was engaged, and which he wished to finish, with unabated assiduity. During many sleepless nights, he is said to have sung praises to Almighty God; and in the prospect of dissolution, he did not dissemble his apprehensions of it, though he expressed the utmost confidence in the divine mercy, and was able, on a review of his conduct, to declare seriously that he had so lived, as not to be ashamed to die. During an act of devotion, and whilst he was pronouncing the last word of it, he expired. It would be easy to cite a great number of testimonies to the extent of Bede's learning, as well as to the excellence of his character. William of Malmesbury, after giving him an extraordinary character, tells us, "that it was much more easy to admire him in thought, than to do him justice in expression." Bale assures us, that he was so well skilled in the writings of Pagan authors, that he had scarcely an equal in that age, and that he learned natural philosophy and mathematics from the purest sources, the Greek and Latin authors themselves. Pits says, that he was so well versed in all the branches of learning, that Europe scarcely ever produced a greater scholar in all respects; that even, while he was living, his writings were of such authority, that it was ordered by a council held in England, and approved afterwards by the catholic church, that they should be publicly read in the churches; that from his earliest years, he was remarkable for his piety and love of learning, alternating without interruption his prayers and his studies; and that his intense application furnished him with a complete knowledge of poetry, rhetoric, natural philosophy, metaphysics, astronomy, arithmetic, music, geometry, cosmography, chronology, history, and the whole circle of the liberal arts, and all parts of inathematics, philosophy, and divinity. Camden represents him as the singular light of our England; and many testimonies in his favour may be found in the works of our historians and antiquarians, such as Hollinshed, Stowe, Speed, Selden, sir Henry Spelman, Stillingfleet, Mabillon, Warton, &c.

Besides the History, the translation of St. John's gospel, and the letter to Egbert already mentioned, there are a great many works, both published and in manuscript, that have been attributed to Bede; some of which, however, are of dubious genuineness. They are enumerated in the *Biographia Britannica*, Cave's *Hist. Lit.* and in the appendix to the fourth volume of Henry's History. They compose a very miscellaneous collection of versions and commentaries upon several books of the Old and New Testament, of legends, and theological dissertations; among which are some of greater value on the scripture chronology, and many elementary compilations, for the use of his scholars, on the subjects of arithmetic, grammar, rhetoric, astronomy, music, and natural philosophy. The first general collection of his works appeared at Paris, in 1544, in 3 vols. folio; and again in 1544, at the same place, in 8 vols.; at Basil, in the same size and number of volumes, in 1563, reprinted at Cologne in 1612, and at the same place in 1688. Several of Bede's works have been separately printed; and those treatises, which are mentioned in his own catalogue of his works, annexed to his ecclesiastical history, were published by the

learned and industrious Mr. Wharton, from three manuscripts in the archiepiscopal palace at Lambeth, London, 1693, 4to. Cave's *Hist. Lit.* vol. i. p. 612, &c. Henry's *Hist.* vol. iv. p. 26, &c. Wharton's *Hist. Poetry*, vol. i. diss. 2. *Biog. Brit. Gen. Dict.*

It is from the *Ecclesiastical History* of this worthy monk, that we know any thing concerning music in our country during the seventh and eighth centuries, the most barbarous period of its annals. In his account of the conversion of the Saxons to Christianity, he speaks of *litanies* and *allelujabs* being sung in the Gregorian manner, according to the Roman ritual, when bishop Stillingfleet thinks that the goodness of the music was the principal incitement to the reception of the mass by the Saxons.

Bede was himself an able musician, and is supposed to have been the author of a short musical tract, "De Musica Theorica, et Practica seu Mensurata." Of the two parts of this treatise ascribed to Bede, the first may have been written by him; the second, however, is manifestly the work of a much more modern author; for we find in it, not only the mention of music in two or three different parts, under the name of *discant*, but of instruments never mentioned in writers contemporary with Bede; such as the *organ*, *viola*, *atola*, &c. A notation too of much later times appears here, in which the *long*, the *breve*, and *semibreve*, are used, and these upon *five lines* and spaces, with equivalent rests and pauses. The word *modus* is also used for *time* in the sense to which the term *mood* was applied after it ceased to mean *key*. Upon the whole it seems as if this last part of the tract attributed to Bede, was written about the twelfth century; that is, between the time of Guido and John de Muris.

Bede, however, informs us that, in 680, John, præcentor of St. Peter's in Rome, was sent over by pope Agatho to instruct the monks of Weremouth in the art of singing, and particularly to acquaint them with the manner of performing the festival services throughout the year, according to that which was practised at Rome. And such was the reputation of his skill, that "the masters of music from all the other monasteries of the north came to hear him; and prevailed on him to open schools for teaching music in other places of the kingdom of Northumberland."

And it is from Bede's information that we have any knowledge of the social and domestic singing to the harp in the Saxon language, upon our island, at the beginning of the eighth century; which is amply detailed in bishop Percy's essay on the ancient English minstrels. *Reliques of Ancient Poetry.*

BEDA, or BEDE, a doctor of divinity in the university of Paris, was a native of Picardy, and flourished in the beginning of the sixteenth century. His temper was violent and impetuous, and he was a great enemy to every kind of innovation and reform. Erasmus and Faber Stapulensis, who were great promoters of literature, were the objects of his vehement attack. Against the scriptural paraphrases of the former he wrote a book, in which Erasmus detected many misrepresentations and calumnies; and yet such was his influence among his brethren, that he induced the faculty of divinity to censure the works of his antagonist. In his opposition to the design of Francis I. for obliging the Sorbonne to concur with the other universities of France in giving a favourable opinion concerning the divorce of Henry VIII. of England, he acted a more justifiable part; but he injured his character, and ruined his cause, by his passionate and turbulent behaviour, and involved himself in the crime of perjury. After having made the *amende honorable*, by publicly acknowledging that he had spoken against truth and the king, before the church of Notre Dame, he was committed to prison in 1535, and afterwards sentenced to

be banished to the abbey of mount St. Michael, where he died in the year 1537. He was a furious persecutor of the protestants, and one of the chief promoters of the punishment of Lewis de Berguin, the protestant martyr. His Latin works were a treatise "De unice Magdalenâ," against Faber, Paris, 1519; "Two books against Faber's Commentaries and Erasmus's Paraphrases," Paris, 1526; "An Apology against the secret Lutherans," Paris; and "An Apology for the Daughters and Grand-children of St. Anne," against Faber. His works in French were "A Restitution of the Benediction of the Paschal taper," and "A Confession of Faith." Gen. Diet. Nouv. Diet. Hist.

BEDA, a sacred book of the religion and law of the Brahmins of Hindoostan, called also *Vedam* and *Viedam*, which see; see also BRACHMANS, and SHASTAH.

BEDALE, in *Geography*, a market town of England. It is situated in that division of the north riding of Yorkshire called Richmondshire, at the distance of 6 miles from North Allerton, and 223 miles north of London. Seated on the bank of a small river, it enjoys a pleasant and fertile situation; but being at some distance from any public road, its principal trade is derived from a weekly market and five annual fairs. These are abundantly supplied with horses; the buying and selling of which are the chief business of many persons in this part of Yorkshire. The rectory of this town is very valuable; and the church, which is a large handsome structure, contains some ancient monuments, one of which commemorates Brian Fitz Alan, the last male heir of that family. A Roman road passed through this town to Barnard castle, &c.; and some Roman encampments are remaining on the high grounds between this town and Ripon. There is a charity school; and the township contains 226 houses, with 1205 inhabitants.

BEDANG, a commentary on the Beda of the Brahmins of Hindoostan, called also *Shyster* or *Shyllab*; which see.

BEDARIDES, in *Geography*, a town of France, in the department of Vaucluse and chief place of a canton, in the district of Avignon. The place contains 1658 and the canton 6206 inhabitants: the territory includes 107½ kilometres and 4 communes.

BEDARIEUX, a town of France, in the department of the Hault, and chief place of a canton, in the district of Beziers, seated on the Orbe, 5½ leagues north of Beziers. The inhabitants carry on a manufacture of druggets and other woollen stuff. The place contains 3338 and the canton 8651 inhabitants: the territory includes 142½ kilometres and 7 communes. N. lat. 43° 27'. E. long. 3° 24'.

BEDAS, BADAË, or VALDAP, a name given to a species of savages, who occupy a small district in the northern part of the island of Ceylon, and who seem to be (says Buffon) of a peculiar race. The spot which they inhabit is entirely covered with wood, where they conceal themselves in such a manner, that it is difficult to discover them. Their complexion is fair, and sometimes red, like that of the Europeans. Their language has no analogy to that of any of the other India languages. They have no villages or houses, and hold no intercourse with the rest of mankind. Their arms are bows and arrows, with which they kill a number of bears, stags, and other animals. They never dress their meat, but season it with honey, of which they have great abundance. The wisest of these woodland wanderers recognize no authority, except that of their own chiefs; but other, without formally acknowledging the sovereignty of the king, furnish him with ivory, wax, and deer. Such of them as visit the European territories, barter their articles with the English for the simple things which their mode of life requires. To prevent themselves from being surprised or robbed by the natives carrying on this traffic, the method

they employ is curious: when they stand in need of cloth, iron, knives, or any other articles of smith's work, they approach by night some town or village, and deposit, in a place where it is likely to be immediately discovered, a certain quantity of their goods, along with a talipot leaf expressive of what they want in return. On a following night they repair again to the same place, and generally find their expected reward awaiting them. For although they are easily satisfied, and readily allow the advantage to the person with whom they deal, yet if their requests are treated with neglect, they will not fail to watch their opportunity of doing him a mischief. The Cinglese, as they can afterward dispose of the articles afforded by the Bedahs, find the traffic profitable; and in some parts frequently go into the woods, carrying with them articles of barter. This trade, however, can only be carried on in the manner already described; for no native of the woods can be more afraid of approaching a stranger than the Bedahs. Few will venture even to converse with other natives; but the wilder class, known by the name of "Ramba-Vaddahs," are more seldom seen even by stealth than the most timid of the wild animals. The origin of this small tribe, who live in detached families, is unknown. These Bedas, as well as the Chaerelas of Java, who are both fair and few in number, appear (says Buffon) to be of European extraction; and he conjectures, that some European men and women have been formerly left on these islands by shipwreck or otherwise, and that, for fear of being maltreated by the natives, they and their descendants confined themselves to the woody and mountainous parts of their country, where they retain a savage life. See CEYLON.

BEDASPES, in *Ancient Geography*, the name given by Ptolemy to the Hydaspes, or modern Behut, a river of Hindoostan. See HYDASPES, and BEHUT.

BEDAT, LE, in *Geography*, a river of France, which runs into the Allier, near Montferand.

BEDBURG, a town of Germany, in the circle of the Lower Rhine, and electorate of Cologne, seated on the Erft, 14 miles west of Cologne. N. lat. 51°. E. long. 6° 20'.

BEDDING, in *History*, in respect of horses and other cattle, denotes straw or litter spread under them to lie on.

Bedding, in speaking of a roe, is used by sportsmen for the lodging of that beast. A roe is said to *bed*; a hart to *harbour*; a fox to *kennel*.

BEDE POINT, in *Geography*, the eastern cape at the mouth of Cook's river, on the north-west coast of North America.

BEDEA, BADAËH, or BAIDEËH, the name of a valley near the Red sea, which, according to Niebuhr, is 6 German miles from Suez, and where the sea (Bruce says) is something less than 4 leagues broad, by 50 feet deep. This valley ends in a pass between two considerable mountains, called Gewoube on the south, and Jibbel Attakah on the north; and opens into the low stripe of country which runs along the Red sea. The mouth of this valley, opening to the flat country and the sea, was called "Pihahiroth;" and through this valley it has been supposed that the Israelites made their passage from the pursuing army of Pharaoh to the Red sea; and it is added, that they encamped in the bay which terminated this valley, at Pihahiroth, opposite to BAAL-ZEPHON (which see), betwixt Migdol and that sea. In these circumstances, says Dr. Shaw, the Egyptians might well imagine, that the Israelites could have no possible way of escape; inasmuch as the mountains of Gewoube would stop their flight or progress towards the south, as those of Attakah would prevent their passing towards the land of the Philistines: the Red sea likewise lay before them to the east; whilst Pharaoh closed up the valley behind them.

them, with his chariots and horsemen. This valley, adds Dr. Shaw, is called "Tiah Beni Israel," i. e. the road of the Israelites, from a tradition, that is still kept up by the Arabs, of their having passed through it. It is also called "Baideah," he says, from the *new* and unheard-of *miracle*, that was wrought near it, by dividing the Red sea, and destroying in it Pharaoh, his chariots, and horsemen. Bruce observes, that Dr. Shaw, by interpreting "Badeah" as the "valley of the miracle," forces an etymology, because there was yet no miracle wrought, nor was there ever any in the valley. But "Badeah," he says, means "barren," and "uninhabited;" such as we may imagine a valley between stony mountains, a desert valley. To his translation of "Jibbel Attakah," as the "mountain of deliverance," Bruce objects, that so far were the Israelites from being delivered, on their arrival at this mountain, that they were then in the greatest distress and danger. Attakah means, according to this traveller, to "arrive," or "come up with;" either because they arrived within sight of the Red sea; or it might more probably derive its name from the arrival of Pharaoh, or his coming in sight of the Israelites, when encamped between Migdol and the Red sea. Shaw's Travels, p. 302. Bruce's Travels in Abyssinia, vol. i. p. 232, &c.

A late writer observes, that this hypothesis of the passage of the Israelites at Bedea, has been given up by our best modern critics; and the "Siuis Heroopolitanus," or gulf of Suez, pitched upon as the scene of action. The idea was first suggested by Le Clerc, and since adopted and defended by Michaelis, Niebuhr, and almost all the German commentators. Mr. Bryant, however (Obs. on the Plagues of Egypt, p. 378.), still contends for Bedea, and calls the arguments of Niebuhr prejudices and misconceptions. The writer, to whom we now refer, who excludes from this event every thing that was miraculous, contends, for the pass at Suez, or not far from Suez, where, he says, at this day there are shallows fordable at low water, and which might, in former times, have been frequently dry. Geddes's Critical Remarks, vol. i. p. 225. See SUEZ.

BEDEC, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Montfort, one league N. of Montfort.

BEDEGUAR, in the *Materia Medica*, the name of a fungus, or gall, growing upon the rose plant (*rosa silvestris*), which belongs to the class of astringents, as it is possessed of and celebrated for its astringent power; but it has hardly yet got a place in our dispensaries, and we are quite unacquainted with its powers. Cullen's Mat. Med. vol. ii. p. 36.

BEDEL, or BEDEO, *Bay*, in *Geography*, lies in the gulf of the river of St. Lawrence, on the south-west coast of the island of St. John's, in North America, and is situated S. by E. from Egmont bay, on the same coast of the island.

BEDELL, WILLIAM, in *Biography*, an eminent prelate of the English church in Ireland, was born at Black Notley in Essex in 1570; and being designed for the church, was educated at Emanuel college in the university of Cambridge. Having been chosen fellow of his college in 1593, and taken his degree of bachelor of divinity in 1599, he removed to St. Edmundsbury in Suffolk, where he continued in high estimation for his attention to the duties of his profession till he accompanied sir Henry Wotton to Venice, as his chaplain. Here he became intimately acquainted with father Paul Sarpi, who taught him the Italian language, into which he translated the English common prayer book; and in return for the favour conferred upon him by father Paul, he drew up an English grammar for his use, and assisted him in his studies. During his stay at Venice, he availed himself of the assistance of Rabbi Leo, in acquiring the knowledge of the Hebrew language, and of Rabbinical learning; and by

his means he had an opportunity of purchasing a very fair MS. of the Old Testament, which cost, it is said, its weight in silver, and which he presented to Emanuel college. He also formed an acquaintance with Antonio de Dominis, archbishop of Spalato, and communicated to him several corrections of his book "De Republica Ecclesiastica," afterwards printed in London. Upon his leaving Venice, after a residence of eight years, he received from father Paul, as tokens of his esteem and friendship, his picture, and several valuable books, together with a MS. copy of his famous history of the council of Trent, his histories of the Interdict and Inquisition, and a collection of letters. At Edmundsbury, where he settled upon his return to England, he employed himself in translating the histories of the Interdict and Inquisition, and the two last books of the history of the council of Trent into Latin, the two first having been translated by sir Adam Newton. In 1615, Bedell was presented by sir John Jermyn to the living of Horingheath, in the see of Norwich; but having scruples about paying the fees of induction, which he regarded as a species of simony, he declined accepting it; however, he was afterwards admitted without fees, and lived in this parish for twelve years unnoticed. To such a degree, indeed, was he disregarded, that when Diodati, a famous divine of Geneva, came to England, he discovered his place of abode by mere accident. Bedell was introduced by Diodati to Morton bishop of Durham, as the esteemed friend of father Paul, and was treated by him with peculiar respect. In this obscure retreat he evinced his talents by the publication of some letters which had passed between him and James Wadsworth, formerly his fellow-collegian, but since become a convert to popery, and a pensioner of the inquisition at Seville, concerning the authority of the church of Rome. These letters were dedicated to king Charles I. then prince of Wales, in 1624. In this work there was a passage which justified resistance to tyrannical princes. Whilst the author lived, the passage escaped animadversion; before the treatise was reprinted in 1685, in order to be bound up with bishop Burnet's life of Bedell, it could not obtain the licence of sir Roger l'Estrange, till some words were introduced which made the passage appear like a reference to arguments that were used by others. In 1627, Bedell was elected provost of Trinity college, Dublin, which he was constrained to accept by the king's special command. Upon his return to England, for the purpose of taking over his family, he had serious thoughts of resigning his post; but he was persuaded to retain it by an encouraging letter from the primate, Usher. He then engaged in the discharge of the duties of his station with vigour and activity, and was eminently useful in composing divisions among the fellows, establishing discipline, and promoting religion by weekly sermons on the church catechism, which he formed into learned lectures of divinity and morals. In this employment he continued about two years, when, by the interest of sir Thomas Jermyn, and the application of bishop Laud, he was advanced to the sees of Kilmore and Ardagh. He was consecrated at Drogheda in September 1629, being then in the 59th year of his age. In this new station he had to encounter many difficulties; but he determined to adopt plans of reformation, and to correct the abuses and disorders that had prevailed to a very great degree in his diocese. In order to secure success in his laudable design, and the more effectually to abolish pluralities, he set an example of moderation by separating the see of Ardagh from that of Kilmore, though he had been at a considerable expence in recovering some of its revenues; these fees, however, have been since re-united, and have so continued. After the compromise of a dispute, which had occurred between him and lord Wentworth, afterwards lord Strafford, who was appointed lord deputy of Ireland in 1633,

on account of his having subscribed a petition addressed to him for the redress of certain grievances, Bedell proceeded without interruption in his episcopal duties and reforms. In the exercise of his episcopal functions, he adhered strictly to the rubric; but in cases that depended on his own determination, he appeared to be jealous of all approaches to superstition. He was extremely assiduous in preaching, catechising, and employing all means for disseminating religious knowledge; and though he never persecuted the papists, he was the most formidable opponent they had in Ireland. He converted several of their clergy by argument; and laboured to bring over the natives by dispersing among them the scriptures, with popular tracts in their own language, and by causing the common-prayer in Irish to be read every Sunday in his own cathedral. Bishop Bedell seems to have considered the theological differences that subsisted among Protestants in his time as of little moment; and it was his wish to promote the well-intended project of Mr. Drury for effecting a reconciliation between the Calvinists and Lutherans.

The character of bishop Bedell was held in such high estimation among the Irish, that when the rebellion broke out in 1641, the most barbarous of them were known to declare, that he would be the last Englishman whom they would expel the country. His house in the county of Carra was an unmolested asylum for many Protestants who were driven from their own habitations; and he treated them with hospitality and kindness, exhorting them at the same time by prayers and religious discourses, to prepare for the distress that threatened them. He declared resolution not to dismiss their fugitives from his house, and to share the fate that awaited them, occasioned his being removed, with his two sons and family, to a ruinous castle in the middle of a lake where they suffered much from the severity of the weather. The bishop and his sons were incessant in preaching and praying with their distressed companions; and their piety inspired the bigotted and rude Irish who guarded them with respect, that they never disturbed their devotions. At length they were removed from this place to the house of an Irish nobleman, and a convert to protestantism, where the bishop was seized with a fever, which terminated his life, February 7, 1641-2, in the 71st year of his age. At the funeral of his interment, the Irish attended with great decency, and fired a volley over his grave; exclaiming in Latin, "Requiescat in pace ultimo Anglorum! May the Lord of the English rest in peace!" And a popish priest who attended on the occasion, is said to have paid him a tribute of respect and veneration, in the following wish: "O sit anima mea cum Bedello! May my soul be with that of Bedell!"

The character of Bedell, delineated by Mr. Clogy, who resided in his family, and recorded in bishop Burnet's history of the prelate, appear to have been in a very eminent degree exemplary and amiable: so that in the most appropriate sense of the term, he was a primitive and apostolical bishop. His venerable and simple aspect and habit; his insatiable zeal in discharging his duty through all the vicissitudes of illness; his profound and unobscured hearing, displayed however in various ways, and attended on a particular occasion at the table of the earl of Strafford, which produced the conviction of the prelate archbishop Usher, after the bishop had continued long silent, according to his usual manner, "Touch him, and you will find good liquor in him;" his charity and hospitality, exhibited in the supply afforded by him to many poor Irish families, some of whom he entertained at Christmas at his own table, and in the sensible relief which the persecuted protestants obtained in his house; his detachment from worldly interests, of which an

instance, selected from many more, has been given in the separation of the sees of Kilmore and Ardagh; his integrity and honour, and his pious resignation under all the evils of life, in the obscurity of his humbler station, and amid the persecutions which he suffered after the attainment of a higher rank; all these qualities, which have been amply illustrated in the memoirs of his life, exalted his character to the highest degree of professional excellence. His bequests at his death corresponded to the uniform tenor of his life; for out of his very limited fortune he allotted some legacy to every place to which he had any relation. He thus obtained the esteem of the most bitter enemies of his faith and country, while he lived, and he has also secured the veneration of posterity, and left a model for the imitation of all his successors. He studied and wrote much on the controversy between the papists and protestants, and he had composed a large treatise in answer to the two questions, addressed by the former to the latter with a kind of triumph; "Where was your religion before Luther? and, What became of your ancestors who died in popery?" But this treatise, which the bishop intended to have printed, together with many other MSS., were lost in the confusion of the times. His Hebrew MS. Bible was preserved, and is now deposited in Emmanuel college, Cambridge, to which the author bequeathed it.

As bishop Bedell objected to burial in churches, partly because it indicated superstition and pride, and partly because the putrid effluvia of dead bodies annoyed the living, he gave orders for burying his wife in the least frequented part of the church-yard of Kilmore, and directed by his will that he should be placed near her. By his wife, who was of the ancient and honourable family of L'Estrange, he had one daughter and three sons, of whom two survived him; one provided for by a small benefice of 80*l.* a year, besides the entailed estate of the family in Essex, and the other by a small estate of 60*l.* a year, the only purchase made by the father. Biog. Brit.

BEDLNGIAN, in *Botany*, a name given by Avicenna and Serapion to the *poma amoris*, or *love-apple*, a sort of fruit used in food by the Italians, and some other nations, and seeming to be the third kind of the *strychnos*, or *filicium*, mentioned by Theophrastus. That author first describes two kinds of this plant, the one of which occasioned sleepy disorders, and the other threw people who eat of it into madness. After these, which he properly accounts poisonous kinds, he mentions a third, which was cultivated in gardens, for the sake of the fruit, which, he says, is large and esculent. This is certainly the same with *bedngian*, or *poma amoris*.

BEDER, in *Ancient Geography*. See BEDR.

BEDER, in *Geography*, a fortified city of Hindostan, in the territory of the *Nizam*, about 80 road miles N.W. of Hyderabad; was formerly the capital of a considerable kingdom, and is now celebrated for the number and magnificence of its pagodas. *N.* lat. 18. *E.* long. 78.

BEDFORD, AETHUR, in *Biography*, was the son of Richard Bedford, and was born at Tiddesham in Gloucestershire, 1658. Having received the rudiments of learning from his father, he came, in 1674, at the age of sixteen, admitted a commoner of Brazen Nose college, Oxford, where he acquired some reputation as an orientalist. In 1688 he received holy orders from the bishop of Gloucester. About this time he removed to Bristol, where the mayor and corporation presented him to the vicarage of Temple church. At Bristol he staid a few years, devoting a great portion of his time to the seconding Mr. Collier's attack upon the stage; he was involved, indeed, in a very brisk controversy with several of the greatest wits and ablest writers of the age, but acquitted himself

himself with so much force and vivacity, as actually to produce both repentance and amendment, and was a great cause of that decorum which has for the most part been observed by the modern writers of dramatic poetry. From Bristol he went to a small living in Somersetshire, where he employed himself in a work on scripture chronology, which, in consequence of sir I. Newton's labour, he afterwards relinquished for a time, and was engaged to assist in correcting an Arabic version of the Psalter and New Testament, for the benefit of the poor Christians in Asia. In 1719, he communicated his thoughts to Dr. Charlet, in regard to the foundation of a Syriac professorship at Oxford. The letter which contained them is a most excellent production, and is printed at length in Mr. Ellis's History of Shoreditch, where he became chaplain to Aske's hospital, in 1724. About 1730, he renewed his attack upon the stage, particularly directed against a new playhouse in Goodman's fields, where Garrick made his first appearance. From this period, to the time of his death, we know few particulars of consequence; but the 15th of September, 1745, closed a life that had been very useful. Besides many single sermons, and his tracts upon the playhouse, his chief publications were, "The Temple of Music;" 1706, 8vo. "The abuse of Music;" 1711, 8vo. "Essay on singing David's Psalms;" 1708. "Animadversions on Sir Isaac Newton's Chronology;" 1728, 8vo. "Scripture Chronology;" 1730, fol. "The Doctrine of Justification by Faith, in Nine Questions and Answers;" 1741, 8vo: and "Horæ Mathematicæ vacuæ;" 1743, 8vo.

BEDFORD, in *Geography*, the county town of Bedfordshire, in England, is seated on the banks of the river Ouse, nearly in the centre of the county, at the distance of 51 miles N.W. from London. It is a place of some antiquity, and was called by the Saxons *Bedan-ford*, or Bedician Forda, signifying the fortrefs on the ford. At the time of Offa, that powerful king of the Mercians, Bedford was probably of some note, as this monarch directed his corpse to be interred in a small chapel here, which, being seated on the river Ouse, was carried away by the floods during an inundation. In the year 572, a pitched battle was fought here between Cuthwulf the Saxon, and the Britons; when the latter were defeated, and obliged to deliver up several of their towns to the haughty conqueror. During the Danish wars, this town suffered materially by the ravages of these plundering marauders; but in the year 911, they were severely beaten, and driven from this neighbourhood. A strong Norman castle was erected here by Pagan de Beauchamp, the third baron of Bedford, who fortified it with a deep intrenchment and lofty wall. "While it stood," says Camden, "there was no storm of civil war which did not burst upon it." King Stephen laid siege to, and conquered this castle; and, according to Camden, slaughtered the inhabitants; but other historians assert that he granted them honourable terms. During the contests between king John and his barons, it was seized by the latter, but reconquered again by the forces under Fulco de Brent, to whom it was given by the king as a reward for his services. This rebellious villain occasioned his own destruction with that of the castle, by opposing Henry III. who laid siege to the fortrefs, and after a contest of sixty days, made himself master of this "nursery of sedition." De Brent was sent to London and imprisoned, but his brother and twenty-four other knights were executed on the spot. (For an account of this siege, see *Beauties of England and Wales*, vol. i. p. 6.) The embankments of the castle form a parallelogram; some of which may be easily traced; but the walls are entirely rased to the ground.

The government of the town is vested in a mayor, recorder, deputy recorder, an indefinite number of aldermen, two bailiffs,

and thirteen common councilmen. The bailiffs are lords of the manor, and have the right of fishing in Ouse for an extent of nine miles each way from Bedford. Henry III. granted the *borough* to the burgeses for 40l. yearly: Edward I. seized it for the crown rents, which the burgeses had neglected to discharge. The last renewal of their charter was in the reign of James II. when the mayor and aldermen were removed from their respective offices by a royal mandate, for not electing two burgeses to serve in parliament. The members were in consequence chosen by his majesty's ministers. The right of election is now vested in the burgeses, freemen, and inhabitant householders not receiving alms, amounting to nearly 1400.

This town is seated in a fertile tract of land, called the vale of Bedford, which accompanies the Ouse, and produces abundant crops of wheat, barley, turnips, &c. The land on the north side of the river is a strong clay, that on the south side is much lighter, yet very productive, and its natural fertility is much increased by the overflowing waters of the Ouse. This river flows through, and divides the town, which is connected by a strong old stone bridge. On the centre of this flood the old town gaol, which was taken down about thirty-three years since. The river was made navigable to Lynn in Norfolk, by act of parliament. Bedford contains five distinct parishes, and an equal number of churches, two of which are on the south side of the river, and three on the north side. Of these St. Paul's is the principal for size and architecture, having a handsome octagonal stone spire. It was collegiate before the conquest. Here are four meeting-houses, appropriated to different religious sects, besides one for the Methodists, and another for Moravians. To the latter is attached a dwelling-house for maiden ladies of this sect, called the single sisters' house.

This town is distinguished by many charitable endowments. The hospital of St. John is supposed to have been founded in 980 by Robert Deparis, who was the first master. It now consists of a master, who is rector of St. John's, and ten poor men. St. Leonard's hospital was built and endowed towards the end of the reign of Edward I. The hospital of Grey Friars was founded in the reign of the succeeding monarch: by the lady Mabilia de Paterhall, who was buried in the cemetery. Mr. Thomas Chirly repaired the old town-hall, founded an hospital for eight poor people, and endowed a charity school for forty children. But the most considerable charity of this town, and one whose augmented revenues have been astonishingly great, was bequeathed by Sir *William Harpur*, whose name and benevolence it perpetuates. This gentleman was a native of Bedford, and made lord mayor of London in 1561. He purchased for 180l. thirteen acres and one rood of land lying in the parish of St. Andrew, Holborn, London. This, with his dwelling-house in Bedford, he gave to the corporation of that town, for the endowment of a school and for apportioning young women of the town upon marriage. The annual rent of the above land was only 40l. at first; in 1668 it was leased for forty-one years at the annual rent of 99l. A reversionary lease was granted for a further term of fifty-one years at the increased rent of 150l. A number of streets, rows, and courts, were then built on the leased ground, and the annual rent is now 4000l. which in three or four years is expected to increase at least another thousand. In consequence of this almost unparalleled augmentation of revenue, the trustees have applied to parliament for two different acts, to extend the objects of the charity, and regulate the application of the receipts. The school endowed by it is situated near St. Paul's church, having over the door a statue in white marble of the founder, and a Latin inscription beneath. Besides the above charities a *house of industry* has lately been opened for the reception of all the poor of the

BEDFORD.

five consolidated parishes. A new town gaol has lately been erected, and a county gaol is just finished; towards the completion of which the late Mr. Whitbread left a legacy of 500*l.* This town contains 800 houses and 3948 inhabitants.

Bedford was made a dukedom by Henry the fifth, who constituted John Plantagenet, third son of Henry the fourth, the first duke. After being enjoyed by a Nevil, and a de Hatfield, it was bestowed on John Russell, in whose family it still continues. See RUSSELL.

At Ellow, about one mile from Bedford, was an abbey of benedictine nuns, founded by Judith, niece to the conqueror. At the dissolution its revenues were valued at 28*l.* 12*s.* 11*d.* The church of Ellow is a very fine ancient building, with a detached tower. This place gave birth to John Bunyan in the year 1628. His allegory of the Pilgrim's Progress was written during confinement in the county gaol. See BUNYAN, Beauties of England and Wales, vol. i.

BEDFORD, a township of America, in Hillsborough county, New Hampshire, incorporated in 1750, and containing 898 inhabitants. It lies on the west bank of Merrimack river, 56 miles west of Portsmouth.

BEDFORD, a township in Middlesex county, Massachusetts, containing 523 inhabitants, 13 miles northerly from Boston.

BEDFORD, New, a flourishing town of Bristol county, in Massachusetts, containing 3313 inhabitants, lying at the head of navigation on Accutuck river, 58 miles southward of Bolton. N. lat. 45° 41'. W. long. 70° 52'.

BEDFORD, a township of West Chester county, in the state of New York, containing 2470 inhabitants, including 38 slaves. It lies contiguous to Connecticut, 12 miles N. from Long Island sound, and 35 from the city of New York. In the census of 1796, it appeared to have 32 electors.

BEDFORD, a town on the west end of Long Island in New York, 4 miles N. W. from Jamaica bay, and 6 E. from the city of New York.

BEDFORD, a village near the Georgia side of Savannah river, 4 miles above Augusta.

BEDFORD, a county of Pennsylvania, lying on Juniata river, and having a part of the state of Maryland on the south, and Huntingdon county north and north-east. It contains 12,124 inhabitants, including 46 slaves; half of its lands is settled, and it is divided into three townships. Bedford, the chief town of the county, lies on the south side of Raystown branch of the same river, 25 miles E. of Berlin, and 210 W. of Philadelphia. It is regularly laid out, and has a stone gaol, and a market-house, court-house, and record-office built of brick. It was incorporated in 1795. N. lat. 40° W. long. 78° 50'.

BEDFORD, a county of Virginia, is separated from that of Amherst on the north by James river, and has Campbell on the east, Botetourt on the west, and Franklin county on the south. It is 34 miles long, 25 broad, and contains 10,531 inhabitants, including 2,774 slaves. Its soil is good, and it is agreeably diversified with hills and valleys. In some parts chalk and gypsum have been discovered. The chief town is New London.

BEDFORD'S bay. See TORRINGTON bay.

BEDFORD, Cape, is more than 80 leagues E. by N. from the west entrance of Bassin's straits, and the S. E. point of James' island; its latitude is 11° 30' N. and it forms one of the western limits of Davis' straits.

BEDFORD, Cape, is also the extreme north-east point of the coast of New Holland, opening to the south-west into Endeavour river, in S. lat. 15° 18'. E. long. 145° 15'. The

sea to the east and north is almost every where full of shoals and reefs.

BEDFORD LEVEL, is the name given to a large tract of fenny, boggy land in England, which remained a sterile waste for many ages. It was calculated to contain 400,000 acres, distributed through the several counties of Cambridge, Huntingdon, Northampton, Lincoln, Norfolk, and Suffolk. The chief part of this extensive tract appears, from the various phenomena noticed by different authors, to have been formerly a dry and cultivated land; but either from injudicious embankments, which prevented the waters from the upland issuing at their proper outlets, or from sudden and violent convulsions of nature, it was reduced to the state of a morass; where the waters, stagnating and becoming putrid, filled the air with noxious exhalations; and not only destroyed the health of the inhabitants, but likewise impeded their endeavours to obtain the necessaries of life; the country being almost rendered impassable even to boats, by the fedge, reeds, and slime with which it was covered. The name given to it originated with Francis earl of Bedford, who having large possessions in the fens, mostly granted him by Henry the eighth, upon the dissolution of monasteries, engaged, in conjunction with thirteen other gentlemen, to drain the whole upon the condition of having 95,000 acres in the result of successful accomplishment. These terms were acceded to by the commissioners and the country at large, and in 1634 the king granted these adventurers a charter of incorporation. In the course of three years and a half this Herculean task was completed to the satisfaction of the commissioners, who, with the king's surveyor, set out the allotted land to the corporation. Above 100,000*l.* was expended upon this work. The king, and some persons devoted to his interest, afterwards opposed the right of the earl of Bedford, and dispossessed him of his property. Other persons engaged in the concern, but the civil wars breaking out frustrated all their schemes, and in 1649, William earl of Bedford, the heir and successor of Francis, was restored by the convention-parliament to all the rights of his father. A new act was obtained to repair the decayed works, and extensive operations were adopted. In 1653 the level was adjudged to be fully drained, and after the adventurers had expended 400,000*l.* more, the 95,000 acres were confirmed to them. In 1697 the Bedford level was divided into three districts, called north, middle, and south, having one surveyor for each of the former, and two for the latter. This distribution, intended for its better government, proved a cause of considerable opposition and contention, and it was many years before the whole was settled in a systematic and equitable manner. To pursue the history of those litigations, charters, and laws, originating in, and made for this great concern, would lead us into a narrative too extensive for the limits of our work: we must therefore refer those persons, desirous of further information, to the "Beauties of England and Wales," vol. ii. and to a work recently published, entitled "An historical Account of the Bedford Level," with the law, &c. relating to the same, 8vo.

That this vast tract was at some former period dry habitable land, is evident from the quantity of trees and various other natural and artificial substances that have been dug from different depths in various parts of it. Dugdale, in his "History of Embanking," states that many oak, fir, and other trees, were found in draining the ile of Axholm. These were at the depths of three, four, and five feet from the surface, lying close to the roots, which were in firm earth below the moor. The bodies or holes of the trees appeared to have been burnt asunder (not cut down with saws or axes) the ends of them being *coaled* do manifest. The oaks were lying

lying in multitude, and of an extraordinary size, being five yards in compass, and sixteen yards long; and some smaller of a great length, with a great quantity of acorns and small nuts near them. Other authors relate similar facts; and Mr. Elstob, in his "Historical Account of the Bedford Level," states that in the year 1764 many roots of trees, standing as the trees had grown, were found near Bolton in Lincolnshire at the depth of eighteen feet below the thin pasturage surface. Tacitus, in his life of Agricola, relates, that "the Britons complained of their hands and bodies being worn out and consumed by the Romans, in *clearing the woods and embanking the fens.*" This sentence seems particularly applicable to the forementioned circumstances, and alludes to the period when some great operations of this nature were exacted from the enslaved Britons. The emperor Severus is said to have been the first who intersected the fens with causeways: one of which is described by Dugdale as extending about 24 miles from Denver in Norfolk to Peterborough. It was composed of gravel three feet in depth and sixty feet wide, and about five feet beneath the surface. In 1637 some workmen discovered, at eight feet below the bottom of Wisbech river, a second stony bottom, with seven boats lying in it covered with silt; and at Whittlesea, on digging eight feet beneath the surface, a perfect soil was found with swaths of grass on it: as they lay when first mowed. Near Bolton, at the depth of sixteen feet, were discovered a smith's forge, with many of his tools, some horse shoes and other iron articles. Various other things have been found at different times, and in different places, all tending to prove the extraordinary effects that nature has produced here in one of her revolutions. The cause and time of this event are not recorded. Henry of Huntingdon, who wrote in the time of king Stephen, describes this part of the country as then "very pleasant and agreeable to the eye, watered by many rivers which run through it, diversified with many large and small lakes, and adorned with many woods and islands." William of Malmesbury, living in the first year of Henry II. describes the district in glowing colours, as "a very paradise; for that in pleasure and delight it resembled heaven itself; the very marshes abounding in trees, whose length without knots do emulate the flars. There is not any *wasse* place in it; for in some parts thereof there are apple trees; in others vines, which either spread upon the grounds, or run along the poles." From these testimonies it appears that the *great inundation* of the fens must have occurred after the time of the latter historian. The first attempt at draining them was in the reign of Edward I.; since which time numerous schemes have been proposed, and tried to render this large tract of country subservient to agriculture.

BEDFORDSHIRE, one of the inland counties of England, bounded on the north by Huntingdonshire and Northamptonshire, on the west by Buckinghamshire, on the south by Hertfordshire, and on the east by part of the latter, and Cambridgehire. Its limits are very irregular and artificial, having only two short spaces of the Ouse as natural boundaries on the east and west.

This part of the kingdom, with the districts now called Hertfordshire and Buckinghamshire, were inhabited at the time of the Roman invasion, by a tribe of Britons called Cattiuchlani, whose chief or governor Cassivellaunus, was chosen by unanimous consent to lead them against the arrogant invading Cæsar. In the year 310 the emperor Constantine divided this island into five Roman provinces, when Bedfordshire was included in the third division, called Flavia Cæsariensis. At the establishment of the Mercian kingdom it was made part of that government, and continued so till the year 827, when, with the other divisions of the island, it

became subject to the west Saxons under Egbert. Alfred having subdivided his kingdom into shires, hundreds, and tythings, and marked the limits and name of each division, this was called Bedfordshire, since contracted to its present name. Its length is computed at 35 miles, and breadth at 20. It contains an area of about 260,000 acres, which are divided into nine hundreds, containing ten market towns, 124 parishes, 58 vicarages, 550 villages, about 12,000 houses, and nearly 64,000 inhabitants.

The face of the country, though not characterized by high hills and deep vallies, is considerably diversified with some inequalities of surface, and on the southern side is a range of chalk hills. Beneath these is an extensive tract of cold, steryl land. The western side of the county is mostly sandy and flat, yet, from the improvements adopted and recommended by the duke of Bedford, lord Osborn, &c. the greatest part is appropriated to some species of agriculture. On the north and north-east the soil is a deep loam, famous for the skill employed in its cultivation, for producing large crops of corn, particularly barley. A large proportion of the land in this county had long continued in open or common fields, but within the last five or six years great quantities have been inclosed, and farther inclosures are intended. The chief employment for the lower classes of persons in this county arises from agriculture, making of lace, and the manufacturing of straw hats. In the two latter, numbers of women and children are constantly occupied, and from them derive a bare subsistence. There is no such thing as *bone lace* made in the county, and the *fuller's earth* pits are all in Buckinghamshire. Bedfordshire is watered by the rivers Ouse and Ivel, and some smaller streams. The former enters the county on the western side, and after a devious course through many fine meadows, passes through the town of Bedford, where it becomes navigable. Flowing eastward it leaves the county at St. Neot's, on the confines of Huntingdonshire. (See *Ouse*). The river Ivel rises in Hertfordshire, and passing Baldock and Biggleswade, falls into the Ouse a little above Tempsford.

Bedfordshire is in the Norfolk circuit, in the province of Canterbury, and bishopric of Lincoln. It is crossed by two Roman roads, the Watling-street and the Ichnild-way, and contains some encampments attributed to that people: one at Sandy, near Potton, called Salenæ, and another near Dunstable, called Maiden-bower, supposed to be the magic-vinum of Antoninus. The duke of Bedford has a magnificent seat at Woodburn Abbey in this county. Luton Hoo, the marquis of Bute's; Amptill Park, lord Osborn's; and Wrest-house, lady Lucas's, are very fine seats in the county. Beauties of England and Wales, vol. i.

BEDIRUM, or **BEDERON**, in *Ancient Geography*, a town of Africa, in the interior of Libya. Ptolemy.

BEDKA, in *Geography*, a town of European Turkey, in the Sangiakship of Belgrade, seated on the Kolubra.

BEDNORE, or **BIDDANORE**, a fine province of Hindoostan, lying north-west of the Mysore country, and deriving its name from Beduore, the capital. Hyder Ally took possession of this province about the year 1763; and it was afterwards comprehended within the dominions of his son Tippoo Sultan, who styled himself regent of Mysore, and who retained it till the time of his death in 1799, when, after the capture of Seringapatam by the British troops, his dominions were distributed among the conquerors. Part of Biddanore was assigned to the Malirattas; the sons and relations of Tippoo were removed into the Carnatic; and a descendant of the ancient rajahs of Mysore, about five years old, was placed upon the throne, under certain conditions.

BEDNORE, a city of Hindoostan, and capital of the fore-mentioned province. N. lat. 13° 47'. E. long. 75° 7'.

BEDNORE,

BEDVORE, RANNY, a town of Hindoostan, seated on the Toombuddra river, in the territory belonging, by the treaty of 1792, to the Mahrattas. N. lat. 14° 35'. E. long. 75 42'.

BEDOWEENS or **BENOUENS**, in Arabic *Bedouai*, formed of *bid*, desert, or country without habitations, a denomination given to a wandering tribe of Arabs, who retain the customs and manners of their ancestors, the "Arabs Scimitar," and who are said to be descended from Ishmael. They originate from the deserts of Arabia, where they live in tents, and are separated into distinct tribes, subject to their sheiks, who direct and superintend in every transaction; and they have migrated with their flocks and herds to Egypt and Syria, and other countries both of Asia and Africa, inhabiting the vast deserts which extend from the confines of Persia to Morocco. They select those spots which afford them springs and pasture, and they are in the strict sense a race of rovers or wanderers, without any permanent abode.

Although they are divided into independent communities, or tribes, not infrequently hostile to each other, they may still be considered as forming one nation. The resemblance of their language is a manifest token of this relationship. The only difference that exists between them is, that the African tribes are of a less ancient origin, being posterior to the conquest of these countries by the caliphs or successors of Mahomet; while the tribes of the desert of Arabia, properly so called, have descended by an uninterrupted succession from the remotest ages.

The Arabs, says M. Volney, seem to be especially condemned to a wandering life, by the very nature of their deserts. To paint to himself these deserts, the reader must imagine a sky almost perpetually inflamed, and without clouds, immense and boundless plains, without houses, trees, rivulets, or hills, where the eye frequently meets nothing but an extensive and uniform horizon like the sea, though in some places the ground is uneven and rocky. A moiil invariably naked on every side, the earth presents nothing but a few wild plants thinly scattered, and thicket, whose solitude is rarely disturbed but by antelopes, hares, locusts, and rats. Such is the nature nearly of the whole country, which extends 600 leagues in length, and 300 in breadth, and stretches from Aleppo to the Arabian sea, and from Egypt to the Persian gulf. The soil, however, varies considerably in different places; and this variety in the qualities of the soil is productive of some minute differences in the condition of the Bedouens. In the more fertile countries, or those which produce few plants, the tribes are feeble and very distant; which is the case in the desert of Suez, that of the Red sea, and the interior of the Great Desert, called the Najd. Where the soil is more fruitful, as between Damascus and the Euphrate, the tribes are more numerous and less distant from each other; and in the cultivable districts, such as the parishes of Aleppo, the Hauran, and the neighbourhood of Gaza, the camps are frequent and contiguous. In the former case the Bedouens are merely pastors, and subsist only on the produce of their herds, and on a few dates and fish-ment, which they eat, either fresh, or dried in the sun, and reduced to a powder. In the latter they sow some land, and add cheese, barley, and even rice to their flesh and milk. Such is the situation in which nature has placed the Bedouens, to render them a race of men equally singular in their physical and moral character. This singularity is so striking, that even their neighbours, the Syrians, regard them as extraordinary beings; especially those tribes which dwell in the depths of the desert, such as those of Anaza, Kaibar, Tai, and others, which never approach the towns. In general, the Bedouens are small, meagre, and ravenous; more so, however, in the heart of the desert, than on

the frontiers of the cultivated country; but they are always of a darker complexion than the neighbouring peasants. They also differ among themselves in the same camp: the sheiks, that is, the rich, and their attendants, were always taller, and more corpulent than the common class. Some of them are more than five feet five inches high; though in general they do not exceed five feet two inches. This difference can only be attributed to their food, with which the former are more abundantly supplied than the latter. The Bedouens of the lower class live in a state of habitual wretchedness and famine: and it is an undoubted fact, that the quantity of food consumed by each of them does not exceed six ounces a day. This abstinence is most remarkable among the tribes of the Najd and the Hedjaz. Six or seven dates soaked in melted butter, a little fresh milk, or curds, serve a man a whole day, and he thinks himself happy when he can add a small quantity of coarse flour, or a little ball of rice. Meat is reserved for the greatest festivals, and they never kill a kid but for a marriage or a funeral. A few wealthy and generous sheiks only can kill young camels, and eat baked rice with their victuals. In times of dearth the vulgar, half-starved, eat locusts, rats, lizards, and serpents, which they broil on briars.

It has been already observed, that the Bedouen Arabs are divided into tribes, which constitute so many distinct nations. Each of these tribes appropriates to itself a certain tract of land, and is collected in one or more camps, which are dispersed through the country, and which make a successive progress over the whole, in proportion as it is exhausted by the cattle. Such is the law among them, that if a tribe, or any of its subjects, enter upon a foreign territory, they are treated as enemies and robbers, and a war ensues. Moreover, as all the tribes have affinities to each other by alliances of blood or treaties, leagues are formed which render these wars more or less general. As soon as the offence is made known, they mount their horses, and seek the enemy; when they meet, they enter into a parley, and the dispute is frequently compromised; if not, they attack either in small bodies, or man to man. They encounter each other at full speed with fixed lances, which they sometimes dart, notwithstanding their length, at the flying enemy; the victory is rarely contested; it is decided by the first shock, and the vanquished fly off at full gallop over the naked plain of the desert. The tribe which has been defeated strikes its tents, removes by forced marches to a distance, and seeks an asylum among its allies. The enemy, satisfied with their success, drive their herds further on, and the fugitives soon after return to their former situation. Diffusion, however, are often perpetuated by the slaughter that is made on these occasions; and they have established laws among themselves, that the blood of every man who is slain must be avenged by that of his murderer. This vengeance is called "Tar," or retaliation; and the right of exacting it devolves on the nearest of kin to the deceased. If any one neglects to seek his retaliation, he is for ever disgraced. He therefore watches every opportunity of revenge. If his enemy perishes in any other way, he seeks satisfaction by inflicting vengeance on the nearest relation. These animosities are transmitted, as it were, by inheritance, from father to children, and never cease but by the extinction of one of the families, unless they agree to sacrifice the criminal, or purchase the blood for a stated price, in money or in stock. Such being the condition of society, most of the tribes live in an habitual state of war; and this circumstance, together with their mode of life, renders the Bedouens a military people, though they have made no great progress in war as an art. Their camps are formed in a kind of irregular

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gular circle, composed of a single row of tents, with greater or less intervals. These tents, made of goat's or camel's hair, are black or brown, or striped black and white, and thus differ from those of the Turkmans, which are white. They are stretched on three or four pickets, only five or six feet high, which gives them a very flat appearance; so that at a distance one of these camps appears like a number of black spots. To the colour of these tents, says Dr. Shaw, there is a beautiful allusion, (Cant. i. 5.) "I am black, but comely like the tents of Kedar." For nothing, adds this writer, can afford a more delightful prospect than a large extensive plain, in its verdure, or even scorched up by the sun-beams, with these moveable habitations, situated in circles upon them. These tents are the same with what the ancients called "Mapalia," (Sil. Ital. l. xvii. 90. Lucan. l. iv. 684.) and are represented by Sallust, (Bell. Jug. § 21.) as resembling the bottom of a ship turned upside down. The length of these tents is much greater than their breadth; and they are entirely open on one of their long sides, that is sheltered from the wind, and on that which is exposed they are closed. The tent of the sheik is in some of their encampments distinguished from the others merely by a large plume of black ostrich feathers placed upon its top. Each tent, inhabited by a family, is divided by a curtain into two apartments, one of which is appropriated to the women. In these tents the Bedoween, when they take their rest, lie stretched out upon the ground, without bed, mattress, or pillow; wrapping themselves in their hykes or blankets, and lying upon a mat or carpet, in any part of them, where they can find room. A number of these tents, from 3 to 300, are arranged in a circle, and called Douwar. The empty space within the large circle serves to fold their cattle every evening. As the shade of trees is very agreeable in torrid regions, the Bedoween in the desert take pains in selecting shaded situations for their encampments: but those of Egypt encamp on spots destitute of trees; and when any happen to be there, it is no consideration with them in the pitching of their tents. They never have any entrenchments, their only advanced guards and patrols are dogs: their horses remain saddled and ready for being mounted on the first alarm; but being strangers to all order and discipline, these camps, always open to surprise, afford no defence in case of an attack. Accidents, therefore, frequently happen, and cattle are carried off every day. The tribes which live in the vicinity of the Turks, are still more accustomed to alarms and attacks; for these strangers arrogating to themselves, in right of conquest, the property of the whole country, treat the Arabs as rebel vassals, or as turbulent and dangerous enemies; and on this principle they never cease to wage secret or open war against them. The Arabs, on their side, regarding the Turks as usurpers and treacherous enemies, watch every opportunity to do them injury. On the slightest alarm, the Arabs, confounding the innocent with the guilty, cut their harvests, carry off their flocks, and interrupt their communication and commerce. These depredations produce a misunderstanding between the Bedoween and the inhabitants of the cultivated country, which renders them mutual enemies. Such is the external situation of the Arabs.

As to their internal constitution, each tribe is composed of one or more principal families, the members of which have the title of sheiks, that is, chiefs or lords. One of these sheiks has the supreme command over the others. He is the general of their little army, and sometimes assumes the title of "Emir," which signifies commander and prince. The more relations, children, or allies he has, the greater is his influence. To these he adds other adherents, whom he attaches to himself by supplying their wants. Besides, a

number of small families, who, not being strong enough to maintain their own independence, and needing alliances and protection, range themselves under the banner of this chief. Such an union is called "Kabila," or tribe. These tribes are distinguished by the names of their respective chiefs, or by that of the ruling family; and when they speak of any of the individuals that compose them, they call them the "children" of such a chief; as, e. g. "Beni Temin," "Oulad Tai," the children of Temin and of Tai.

The sheiks and their subjects are born to the life of shepherds and foldiers. The more considerable tribes rear many camels, which they either sell to their neighbours, or employ in the carriage of goods, or in their military expeditions. The smaller tribes keep flocks of sheep. Among those tribes which apply to agriculture, the sheiks live always in tents, and they leave the culture of their ground to their subjects, whose habitations are wretched tents. The peculiar distinctions which characterise their different tribes result from their different modes of living. The genuine Arabs disdain husbandry, as an employment by which they would be degraded. They maintain no domestic animals but sheep and camels, except, perhaps, horses. Those tribes which are of a pure Arab race, live on the flesh of their buffaloes, cows and horses, and on the produce of some little ploughing. The former tribes, distinguished as noble, by their possession of lands, are denominated "Abu el Abaar;" and the second "Moædan," which are esteemed a middle class, between genuine Arabs and peasants. These are sometimes mentioned contemptuously, because they keep buffaloes and cows. The "Moædan," transport their dwellings from one country to another, as pasturage fails; so that a village springs up suddenly in a situation where, on a preceding day, was not to be seen a single tent. The genuine Bedoween, living always in the open air, have a very acute smell; and the fetid exhalations produced by cities are one cause of their dislike of them. So acute is their smell, that, according to Niebuhr, if they are carried to the spot from which a camel has strayed, they will follow the animal by smelling its track, and distinguish the traces of its footsteps from those of other animals that have passed the same way. Those Arabs who wander in the desert will subsist five days without drinking, and discover a pit of water by examining the soil and plants in its environs. Like other people that lead an erratic life, they are addicted to robbery, and of course are formidable enemies to those who traverse the deserts; but they never murder those whom they rob, unless travellers in their own defence should chance to kill a Bedoween, in which case the others are eager to revenge his death. Upon all other occasions they act in a manner consistent with their natural hospitality. Of their hospitality Niebuhr has recorded several very pleasing instances. The pillaging of the caravans, he says, is not always owing merely to their propensity for robbing, but their expeditions for this purpose are commonly considered by themselves as lawful hostilities against enemies, who would defraud the natives of their dues, or against rival tribes, who have undertaken to protect those illegal traders.

The government of the Bedoween is at once republican, aristocratical, and even despotic. It is republican, as the people have great influence, and nothing can be transacted without a majority: it is aristocratical, because the families of the sheiks possess some of the prerogatives which every where accompany power; and it is despotic, because the principal sheik has an indefinite, and almost absolute authority, which he may abuse; though the state of the tribes confines this abuse within very narrow limits; for if he should kill an Arab, it would be almost impossible for him to

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escape punishment, and the law of retaliation would be in force. His subjects, harassed by severity, would abandon him and join another tribe; his own relations would depose him, and advance themselves to his station. The dignity of sheik is hereditary, but not confined to the order of primogeniture; the petty sheiks, who form the hereditary nobility, elude the grand sheik out of the reigning family, without considering his immediate relation to his predecessor. Little or no revenue is paid to the grand sheik. In fact, the principal sheik in every tribe defrays the charges of all who arrive at or leave the camp. His rank subjects him to great expence by the entertainment of his allies, and of the principal men, who assemble to deliberate concerning encampments and removals, peace and war, and the litigation between individuals. To these he must give coffee, bread baked on the ashes, rice, and sometimes roasted kid or camel. In a word, he must keep open table. On his generosity depend his credit and his power. To provide for these expences, the sheik has nothing but his herds, a few spots of cultivated ground, the profits of his plunder, and the tribute he levies on the high roads, the total of which is very inconsiderable. The most powerful sheiks among the Bedowees, though sometimes denominated princes and lords, may be compared to substantial farmers, whose simplicity they resemble in their dress, as well as in their domestic life and manners. A sheik, who has the command of 500 horse, does not disdain to saddle and bridle his own, nor to give him his barley and chopped straw. In his tent, his wife makes the coffee, kneads the dough, and superintends the dressing of the victuals. His daughters and kinswomen wash the linen, and go with pitchers on their heads, and veils over their faces, to draw water from the fountain. These manners agree precisely with the description in Homer, and the history of Abraham in the book of Genesis.

The simplicity, or rather poverty of the lower class of the Bedowees, corresponds to that of their chiefs. The whole wealth of a family consists of moveables, of which the following is a pretty exact inventory. A few male and female camels, some goats and poultry, a mare with her bridle and saddle, a tent, a lance 16 feet long, a crooked sabre, a rusty musket, with a flint or matchlock, a pipe, a portable mill, a pot for cooking, a leathern bucket, a small coffee-roaster, a straw mat, which serves equally for a seat, a table, and a bed, some clothes, which are put up in leather bags hung up in their tents, a mantle of black woollen, and a few glass or silver rings which the women wear upon their legs and arms. But the principal and most important article in the possession of a Bedoween is his mare, which serves in making his excursions against hostile tribes, or seeking plunder in the country or on the highways. The mare is preferred to the horse, because, as Volney, Clémier, and others say, she does not cough, is more docile, and yields milk, which occasionally satisfies the thirst, and even the hunger of her rider.

The Bedoween of the desert preserve their butter in a leathern bag; and their water in goat skins. Their hearth consists of a hole made in the ground, and lid with stones; instead of an oven they use an iron plate in preparing their bread, which is made into small cakes. In their excursions, they carry with them a supply of meal, and their other provisions are dates, milk, cheese, and honey. They are dressed much like their brethren in Egypt, except that they wear shoes of undressed leather, and of a peculiar shape; and that many of them walk bare-footed over the scorching sand, which renders their skin at length

insensible. Their women appear less shy and scrupulous than the other females of the east, converse more freely with strangers, and expose themselves with their faces unveiled.

The arts of the Arabs, whose wants are few, consist in weaving their clumsy tents, and in making mats and butter. Their whole commerce only extends to the exchanging of camel, kids, stallions, and milk, for arms, clothing, a little rice or cotton, and money, which they bury. They are totally ignorant of all science, and have not even any idea of astronomy, geometry, or medicine. They have not a single book; and nothing is so uncommon among the sheiks as to know how to read. Their whole literature consists in reciting tales and histories, in the manner of the Arabian Nights Entertainments. For such stories they have a peculiar passion; and in the evening they seat themselves on the ground, at the door of their tents, or under cover, if it be cold, and there, ranged in a circle, round a small fire of dung, with their pipes in their mouths and their legs crossed, after indulging for some time in silent meditation, they amuse themselves with the recital of tales of this kind. They have likewise, besides their love-stories, their love-songs, which have in them more nature and sentiment than those of the Turks and the inhabitants of the towns.

It has been observed, that the Bedowees, though their condition in the depths of the desert resembles, in many respects, that of the savages of America, have not the same ferocity. So that, accustomed to endure hunger, they have never been addicted to the practice of eating human flesh; and their manners are in general much more sociable and mild. Volney attributes this difference of manners to the difference of their situation. The American savages have been induced by the nature of their country to become hunters rather than shepherds; and their habits have contributed to produce and cherish a ferocity of character. But the Bedowees, whose naked plains, without water or forests, are destitute of fish or game, and possessing the camel, have been determined to a pastoral life, and hence they have acquired manners which have influenced their whole character. Finding at hand a light, but constant and sufficient nourishment, they have acquired the habit of frugality. Content with the milk of the camel and dates, they have not desired flesh; they have shed no blood; their hands are not accustomed to slaughter; nor their ears to the cries of suffering creature; and they have preserved a sensible and humane heart. Nevertheless, when the Arab shepherd became acquainted with the use of the horse, his mode of life was considerably changed. The facility of passing over extensive tracts of country rendered him a wanderer. He became greedy from want, and a robber from greediness: and such is his present character. A plunderer rather than a warrior, the Arab possesses no sanguinary courage; he attacks only to despoil; and if he meets with resistance, never thinks a small booty is to be put in competition with his life. To irritate him, you must shed his blood, and then he is found to be as obdurate in his vengeance as he was cautious in avoiding danger. The spirit of rapine, with which the Arabs have been often reproached, is exercised only towards reputed enemies, and is accordingly founded on the acknowledged laws of almost all nations. Among themselves they are remarkable for a good faith, a disinterestedness, and a generosity, which would do honour to the most civilized people. What can be more noble than the right of asylum so respected among all the tribes? A stranger, nay even an enemy, touches the tent of the Bedoween, and from that instant his person becomes inviolable. It would be reckoned a disgraceful meaness, an indelible shame,

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to satisfy even a just vengeance at the expence of hospitality. Has the Bedoween contented to eat bread and salt with his guest, nothing can induce him to betray him. The power of the sultan himself would not be able to force a refugee from the protection of a tribe but by its total extermination. The Bedoween, so rapacious without his camp, has no sooner set his foot within it, than he becomes liberal and generous. What little he possesses he is even ready to divide; and when he takes his repast, he takes his seat at the door of his tent, in order to invite passengers; and this act of generous hospitality he regards as a matter of duty; and of course he himself takes the same liberty with others. So far does this reciprocal generosity prevail, that one would imagine that Arabs possessed all their goods in common. Nevertheless, they are no strangers to property; but without that selfishness which the increase of the imaginary wants of luxury has given it among polished nations. Among the Arabs there exist a kind of equality in the partition of property, and a variety of conditions, which have appeared, says Volney, to the wisest legislators as the perfection of human policy. From this state of things, it becomes difficult for their sheiks to form a faction for enslaving and impoverishing the body of the nation. Each individual, capable of supplying all his wants, is better able to preserve his character and independence; and private property becomes at once the foundation and bulwark of public liberty. This liberty extends even to matters of religion. Whilst the Arabs of the towns crouch under the double yoke of political and religious despotism, those of the desert, or the Bedoweens, live in a state of perfect freedom from both. On the frontiers of the Turks, indeed, the Bedoweens from policy preserve the appearance of Mahometanism; but so relaxed is their observance of its ceremonies, and so little fervour has their devotion, that they are generally considered as infidels, who have neither law nor prophets. They scruple not to say, that the religion of Mahomet was not made for them; for, they add, "how shall we make ablutions, who have no water? How can we bestow alms, who are not rich? Why should we fast in the Ramadan, since the whole year with us is one continued fast? And what necessity is there for us to make the pilgrimage to Mecca, if God be present every where?" In short, every man acts and thinks as he pleases; and the most perfect toleration is established among them. Volney observes, that there are few polished nations, whose morality is, in general, so much to be esteemed as that of the Bedoween Arabs. If this be the fact, we may reasonably ascribe it to a variety of circumstances altogether independent of that singularity which he mentions in connection with it, and which serve to counteract its effects. Among these Bedoweens, as well as the Turk-mans and Curds, religion is the freest from exterior forms, inasmuch that no man has ever seen among these classes of people either priests, temples, or regular worship. We can scarcely imagine, that even Mr. Volney himself, though we are not unapprized of his mode of thinking on the subject of religion, would presume to ascribe the excellence of the morality of these tribes to their total want or disuse of all the outward means of producing and maintaining it; but he would probably suggest the inefficacy, in a moral view, of those forms and modes of worship which are established and practised among the Mahometans. The manners of these people are preserved pure and simple, and such as are described in their ancient histories, as Sonnini observes, by the absence of luxury and factitious pleasures, bringing immorality in their train, which have made no attempt to fix their abode on the parched and barren sands occupied by the Bedoweens.

The Bedoweens, who live in tents in the desert, have never

been subdued by any conqueror; but those who have settled near towns, and fertile provinces, are reduced, in some measure, to a state of dependence on the sovereigns of those provinces. Such are the Arabs, in the different parts of the Ottoman empire; some of whom pay a rent or tribute for the towns or pasturages which they occupy; and others frequent the banks of the Euphrates only in one season of the year, and in winter return to the desert. These last acknowledge no dependence on the Porte, neither are, properly speaking, subject to the Turks; but the police of the latter occasions frequent, but neither long nor bloody, wars among the Bedoweens. Whenever the Turks interfere in their quarrels, all the tribes combine to repulse the common enemy of the whole nation. Every grand sheik considers himself as absolute lord of his whole territory, and accordingly exacts the same duties upon goods carried through his dominions as are levied by other princes. The Europeans, therefore, are wrong in supposing the sums paid by travellers to the grand sheiks to be merely a ransom to redeem them from pillage. The Turks, who send caravans through the desert to Mecca, have submitted to the payment of these duties, paying a certain sum annually to the tribes who live near the road to Mecca; and these in return keep the wells open, permit the passage of merchandise, and escort the caravans. If the Bedoweens sometimes pillage these caravans, the haughty perfidious conduct of the Turkish officers is always the first cause of such hostilities. The tribes of Bedoweens on the confines of the desert, are those who have preserved the national character in its greatest purity, and who have maintained their liberty unimpaired. Of these, that denominated "Beni Khaled" is one of the most powerful, on account of its conquests and wealth, and the number of other tribes subject to it. It has advanced from the desert of Nedsjed to the sea, and conquered the country of Lachisa. That of the tribe of "Kiab" inhabits north from the Persian gulf, and rarely encamps. These have possessions in the province of Chusistan in Persia, in which province there are five different considerable tribes of independent Bedoweens. Those of the tribe "Beni Lam," inhabiting between Korne and Bagdad, upon the banks of the Tigris, receive duties upon goods carried from Bassora to Bagdad, and sometimes pillage caravans. "The Montefidi," or "Montefik," are the most powerful tribe north from the desert, with respect to extent of territory and number of subaltern tribes, acknowledging their authority. They possess all the country on both sides of the Euphrates, from Korne to Ardje. The Arabs of this tribe often plunder travellers passing between Helle and Bassora, and are frequently chastised by the pacha of Bagdad, who deposes their sheik, and substitutes another in his room. This tribe derives its appellation from one Montefik, who came from Hedjaz, and was descended from a family, illustrious before the days of Mahomet. All these tribes, that live on the confines of the desert, are genuine Arabs, who breed sheep and camels, and live in tents. This, however, is the case with respect to the reigning tribes; though some of the subaltern ones have lost their nobility, by intermixing the practice of agriculture with the habits of pastoral life.

The rich plains of Mesopotamia and Assyria, which were once cultivated by a populous nation, and watered by surprising efforts of human industry, are now inhabited, or rather ravaged, by wandering Arabs. The lands between the Tigris and the Euphrates are occupied by tribes practising agriculture, or "Moædan." All travellers complain of the robberies of the Bedoweens of Assyria. The restless and thievish disposition of these people seems to increase the farther they recede from their native deserts, and to approach

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proach the country inhabited by the plundering Curds and Turkmen. The pachas of Syria are as much interested in guarding against the depredations of the wandering Arabs, as the Turkish governors on the Persian frontier. As it is of great consequence to the cities of Aleppo and Damascus (which see) that their caravans travelling to Bagdad or Balfora should be suffered to pass in safety through the desert, the pachas, in order to protect them from insult and pillage, artfully venture to employ one tribe of Arabs against the rest; and with this view they give the title of Emir to the most powerful sheik in the neighbourhood. To him they pay an annual tax, or the produce of a certain number of villages, for guiding the caravans, for keeping the other Arabs in awe, and for levying the dues from those who feed their cattle on the pacha's grounds. The most powerful tribe near Aleppo, is denominated "Mauali," besides which, there are many other tribes, amounting to twenty, or more, who pay a trifling sum to the Emir for liberty to hire out or sell their camels, and to feed their cattle through the country. Other tribes pay a tax for the privilege of gathering salt in the "Desert of Salt." In the vicinity of Damascus there are numerous tribes, one of which, named "Abu Salibe," it is said, consists solely of Christians. The greatest tribe in the desert of Syria that called "Anæse," which is spread into Nedsjed, and reckoned the most numerous tribe in the heart of Arabia. The caravans of Turkish pilgrims pay the Bedowees of this tribe a considerable duty for their free passage through the country; when dissatisfied, they plunder the caravans, and they often make war on the pacha of Damascus. The Bedowees, who occupy those countries that are usually comprehended under the appellation of "Arabia Petrea," or the deserts that lie between Egypt, Syria, and Arabia, properly so called, are distributed into several tribes which wander among dry sands and rocks, seeking some few interspersed spots, that afford scanty food for their cattle. The Arabs of Palestine seem to be poor neglected hordes, who inhabit that barren and dismal country; and the pilgrims that visit the Holy Land have given exaggerated relations of the molestations and injury which they have suffered from them.

Of the Bedowees, there are several tribes, who arrive every year in Egypt after the inundation, from the heart of Africa, to profit by the fertility of the country, and who in the spring retire into the depths of the desert. Others of them are stationary in Egypt, where they farm lands, which they sow, and annual change. All of them observe a sort of law, but different, which they never pass, or pass in war. They all lead nearly the same kind of life, and have the same manners and customs. Ignorant and poor, they preserve an original character distinct from surrounding nations. Pacific in their camp, they are everywhere also in an habitual state of war. Some of these, dispersed in families, inhabit the rocks, caverns, ruins, and secluded places where there is water; others, united in tribes, encamp under low and flimsy tents, and pass their lives in perpetual roaming, sometimes in the desert, sometimes on the banks of rivers; having no other attachment to the soil, than what arises from their own safety, or the sustenance of their flocks. The husbandmen, whom they pillage, hate them; the travellers whom they despoil, speak ill of them; and the Turks, who dread them, endeavour to destroy and corrupt them. It is calculated that the different tribes of them in Egypt might form a body of 30,000 horsemen; but these are so dispersed and disunited, that they are only considered as robbers and vagabonds. The young women among the Bedowees of Egypt might be

reckoned not destitute of beauty, eyes Soarini; though they have a tawny hue, and indelible compartments, not easily reconcilable to the eyes of an European, which they painfully mark on the lower part of the face with a needle, and a black dye. The men are, in general, very handsome. A simple and uniform mode of life, uninjured by excess, prolongs their existence to the period fixed by nature. They live to be very old, and at an advanced age, they are remarkable for their truly venerable and patriarchal physiognomy. Those, however, who are wandering, predatory, and wretched, are for the most part of a slender make and mean appearance. Some of the Egyptian Bedowees have among them a tradition, that their ancestors were Europeans and Christians, one of whose ships having been wrecked on the coast of Egypt, the crew had been plundered, and reduced to the necessity of living in the desert. The only remnant they have of the supposed Christianity of their forefathers is the sign of the cross, which they traced with their fingers upon the sand. In the plans that have been adopted in Egypt, under Ali Bey, for preventing robbery and establishing public tranquillity, the extermination of the Bedowees has been a principal object. Several hordes fell victims to the policy of the governor; and whole tribes retired into the desert. However, the people of Egypt, far from approving those means of protecting their property, murmured aloud at the scarcity of camels, sheep, and other animals, with which the Bedowees had been accustomed to supply them in great abundance, though it was their practice to steal the property which they had fold. It has since appeared, that the prosperity of Egypt is intimately connected with the preservation of the Bedowees.

To the above accounts of the Bedowees, extracted from modern travellers, we shall subjoin the description given of their ancestors above 1800 years ago by Diodorus Siculus, l. xix.

"The wandering Arabs dwell in the open country, without any roof. They themselves call their country a solitude. They do not chuse for their abode places abounding in rivers and fountains, lest that allurements should draw enemies into their neighbourhood. Their law or their custom forbids them to sow corn, to plant fruit-trees, to make use of wine, or to inhabit houses. He who should violate these usages would be punished infallibly with death, because they are persuaded, that whoever is capable of subjecting himself to such conveniences, would soon submit to matters in order to preserve them. Some lead their camels to graze, some their sheep. The latter are the wealthiest; for, besides the advantages they derive from their flocks, they go to sell in the sea-ports frankincense, myrrh, and other precious aromatics, which they have received in exchange from the inhabitants of Arabia Felix. Extremely jealous of their liberty, at the news of the approach of an army, they take refuge in the depth of the deserts, the extent of which serves them as a rampart. The enemy, in fact, perceiving no water, could not dare to traverse them, whilst the Arabs, being furnished with it by means of vessels concealed in the earth, with which they are acquainted, are in no danger of this want. The whole soil being composed of clayey and soft earth, they find means to dig deep and vast cisterns, of a square form, each side of which is the length of an acre. Having filled them with rain-water, they close up the entrance, which they make uniform with the neighbouring ground, leaving some imperceptible token, known only to themselves. They accustom their flocks to drink only once in three days, so that when they are obliged to fly across these parched sands, they may be habituated to support thirst. As for them-

themselves, they live on flesh and milk, and common and ordinary fruits. They have in their fields the tree which bears pepper; and a great deal of wild honey, which they drink with water. There are other Arabs who cultivate the earth. They are tributary, like the Syrians, and resemble them in other respects, except that they do not dwell in houses. Such are pretty nearly the manners of this people." Volney's Travels in Egypt and Syria, vol. i. Niebuhr's Travels through Arabia, &c. vol. ii. p. 158—183. Sonnini's Travels in Upper and Lower Egypt, p. 303. 317—322. 399. Savary's Letters in Egypt, vol. ii. p. 274, &c. See ARABIA.

BEDR, or BEDDER HOUNEINE, in *Geography*, a place of Arabia, 20 miles from Medina, and 40 from Mecca, lying in the high road of the caravan of Egypt. The fertile vale of Bedr is rendered famous by the battle fought between Mahomet and the Koreish of Mecca, in the second year of the Hegira, A. D. 623. In this vale Mahomet was informed by his scouts of the caravan that approached on one side, and of the Koreish, consisting of 100 horse, and 850 foot, who advanced on the other. After a short debate, the holy prophet sacrificed the prospect of wealth to the pursuit of glory and revenge; and a slight intrenchment was formed to cover his troops, and a stream of fresh water that glided through the valley. "O God," he exclaimed, as the Koreish descended from the hills, "O God, if these are destroyed, by whom wilt thou be worshipped on the earth? Courage, my children, close your ranks; discharge your arrows, and the day is your own." At these words he placed himself, with Abubeker, on a throne or pulpit, and instantly demanded the succour of Gabriel and 3000 angels. His eye was fixed on the field of battle: the Mussulmans fainted and were pressed: in that decisive moment the prophet started from his throne, mounted his horse, and cast a handful of sand into the air: "Let their faces be covered with confusion." Both armies heard the thunder of his voice; their fancy beheld the angelic warriors; the Koreish trembled and fled; seventy of the bravest were slain; and seventy captives adorned the first victory of the faithful. The dead bodies of the Koreish were despoiled and insulted; two of the most obnoxious prisoners were punished with death; and the ransom of the others, 4000 drams of silver, compensated in some degree the escape of the caravan. Herbelot. Bib. Orient. p. 180. Gibbon's Hist. vol. ix. p. 300.

BEDRIACUM, in *Ancient Geography*, a village of Italy, situate, according to Tacitus, between Verona and Cremona, or about 16 miles from the confluence of the Adda and Po. Clavier places it between Cremona and Mantua, and supposes it to have been the present Caneto, a large village on the left of the Oglio. M. d'Anville thinks that it was the place now called Cividale on the right side of that river. It is famous for two battles fought within a month by Romans against Romans, A. D. 69; in the first of which the emperor Galba was defeated by Otho, and in the second Otho was defeated by Vitellius.

BEDRIEGER, GROOTE BEDRIEGER, in *Ichthyology*, a name given by some to the *sparus insidiator* of Pallas and Gmelin. Vide *Russch. theatr.* &c.

BEDRIP, or BEDREPE, or BEDERAPE, the customary service which inferior tenants anciently paid their lord, by cutting down his corn, or doing other work in the field. The word is formed from the Saxon *bidon*, to pray, and *repe*, to reap, or cut corn.

BEDROLA, in *Geography*, a town of Spain, in Arragon; 8 leagues from Sanguesa.

BEDSTRAW, in *Botany*. See GALIUM.

BEDUSTA, in *Ancient Geography*, the ancient Hindoo name of the river Hydaspes, or the modern BEHUT.

BEDWIN, GREAT, in *Geography*, is an ancient borough town situated on the eastern side of the county of Wilts, in England; at the distance of 70 miles west of London, and 17 miles north from Salisbury. It is an ancient borough by prescription, and sent members to all the parliaments of Edward the first. During some parts of the subsequent reigns, it intermitted sending; but from the 9th of Henry V., two members have constantly represented the borough. These are elected by about eighty persons who possess freeholds, or inhabit ancient burghage-houses. The town is governed by a port-reve, assisted by a bailiff, and some inferior officers, all of whom are chosen by the former. Bedwin had formerly a market on Tuesday, but this has been discontinued for some years, in consequence of its proximity to the larger market town of Marlborough.

Dr. Stukely and some other antiquaries have given to this place the honours of a Roman station, and a Saxon city; but there is little proof or probability, that it was ever the former. There are some entrenchments remaining on a hill south of the town, where it is said Cissa erected a castle, and where he seated himself as viceroy of Wiltshire and Berkshire. Towards the end of the seventh century, a severe and destructive battle was fought near this town, between Wulfhere, king of Mercia, and Æseuin, a powerful Saxon nobleman, when, as Mr. Turner in his Anglo-Saxon History, characteristically observes, "mutual destruction was more conspicuous, than the decision of the battle."

The church of Bedwin is a large ancient structure, built mostly with flints, and shaped in the form of a cross. Among the monuments it contains, is one to sir John Seymour, who was father of the protector, and of the unfortunate lady Jane Seymour. According to the tradition of the neighbourhood, this lady was married to the tyrannic monarch at a place called Wolf-hall, near Bedwin, where sir John Seymour then resided.

Here are two annual fairs. The parish contains 316 houses, and 1632 inhabitants, most of whom are employed in agriculture. The famous Oxonian physician, Dr. Thomas Willis, was born here.

About two miles west of the town is Tottenham park, a seat of the earl of Aylebury. The house was built by the celebrated earl of Burlington, on the site of an ancient palace belonging to the marquis of Hertford, who was afterwards created duke of Somerset. Tottenham-park is part of the forest of Savernake, which is the only private forest in England independently belonging to a subject. It is a large tract of wild ground, profusely wooded, and containing much fine old oak timber.

BEE, APIS, in *Natural History*, a genus of the *Hymenopterous* order, in the Linnæan classification of insects; in *Physiology*, and in *Husbandry*, more commonly expressive of the common honey-bee (*apis mellifica*), although likewise applicable to the various other species of honey-bees; and in a still more general sense to those which do not, as well as those which do, produce honey; those which live in societies, as well as those which lead a life of solitude, or independence from their kindred kinds; all which have a certain appearance and cast of character, which, in the common acceptance of the word, claim the distinctive epithet of *bee*, or *honey-bee*, *humble bee*, *wild bee*, &c.

The bee, or apis tribe, characterised in the Linnæan system as having, in common with other hymenopterous insects, four membranaceous wings, and the female being

armed with a sting. This genus comprehends an amazing number of distinct species, many of which are clearly ascertained; some are doubtful; and many, if we may be allowed to reason by analogy, are most likely yet unknown. Upon the whole, there are scarcely any genera of insects that comprehend a greater number or variety of species than the *apes*. The majority of those correctly known have been already enumerated under the article *APIS*, to which the reader is requested to refer. The principal subdivisions, or natural families of the genus under which they have been described by Linæus, and by various writers before and since the time of that naturalist, will be also found there. Descending from the minutæ of critical inquiry into the complicated characters of those subdivisions, it rests with us in this place to speak of the *apes* in another point of view:—as a race of animals highly entertaining, for their manners, habits, and instinctive properties, to the naturalist; important to the economist in rural life; and familiar to every one by the trivial appellation of “a bee.”

Under this head, the common honey, or domesticated bee, demands the first consideration, as it will serve to elucidate the peculiarities of the whole tribe, at least so far as they are of material consequence in the concerns of human life. By the indiscriminate term of the common honey-bee, we comprehend what are individually named the *queen bee*, or female; *male bee*, or drone; and *working bee*, or neuter. The natural history of the common bee has been more fully and impartially considered than that of any other creature of the insect tribe; with the exception of the silk-worm, and the cocoon employed in dyeing, there appears to be none more deserving of the regard paid to it. As an object of advantage, the honey-bee has been deemed, by the common consent of mankind in all ages, of sufficient consequence to be particularly attended to. We are not to forget the occasional recurrence of classic writers of antiquity to the bee: the pastoral poets celebrate its praise; nor was the cultivation of this useful creature overlooked even by the earliest Britons, of whom we possess any record. Its preservation and its culture were recognized in their laws; the bee itself was considered as a most serviceable domestic, and the honey one of the greatest delicacies the bounty of heaven had granted them. In modern days, the importance of the bee has suffered a very sensible diminution in this country: still it is cultivated, and with advantage, by the thrifty agriculturist. But in the warmer regions of Europe, such as the south of France, Italy, and the neighbouring parts of Asia, its cultivation is attended with more success than with us; the climate of these countries, mild, invigorating, and abundantly productive of luxuriant vegetation, is perfectly congenial with the nature of the bee; there it requires but little care from the hand of culture, and amply repays that little bestowed with the spontaneous produce of its industry.

Whilst we are speaking on this particular topic, it will not be thought superfluous to advert to a few remarks that have lately fallen from the pen of M. Latroille, an ingenious French naturalist, in an introductory discourse to the study of bees published last year in Paris. “Dans la grande série des animaux appelés insectes (says that writer), il n’en est pas dont l’histoire présente une aussi grande richesse de faits, et une aussi prodigieuse fécondité de merveilles, que celle des abeilles. Sous les rapports de l’industrie, ces insectes font le chef d’œuvre de la toute-puissance du Créateur; et l’homme lui-même, si fier de ses dons naturels, est, en quelque sorte, humilié à la vue de l’intérieur d’une ruche. Cessons de nous extasier sur la cabane singulière du castor, sur la construction ingénieuse du nid de quelques oiseaux; tout cela est oublié, lorsqu’on voit les travaux de l’abeille. Quoi!

un animal, qui échappe presque à la vue, dont l’organisation, comparée avec celle des êtres des classes supérieures, est si imparfaite, se réunit en société pour fonder une ville, s’y gouverner par des loix invariables, y vivre dans une harmonie que ni une population excessive, ni la diversité d’humeurs et de caractères des individus qui la composent, ne sauroient altérer! Quoi! une insecte si vil en apparence, travaillera sans relâche pour rassembler atomes par atomes, les matériaux de son habitation, les pétrira, les façonnera avec tant d’art, élèvera ces superbes édifices, dont l’architecture a été le sujet des méditations des plus grandes géomètres, recueillera avec tant de peine cette liqueur si agréable, cette espèce de nectar connu sous le nom de miel; et votre ame ne seroit pas ravie d’étonnement! vous ne seriez pas en contemplation! L’abeille n’a pas seulement des droits à votre admiration, elle en a aussi sur votre cœur. Si elle travaille avec tant de zèle, c’est moins pour la conservation de sa frêle existence, que pour celle de ses semblables, pour la prospérité de l’état.” In pursuing this lofty strain of comment, we are less inclined to admit the accuracy of his reasoning, than the energy of diction with which it is advanced. The philosophy of his arguments is lost in emphasis; and that which requires coolness to disarm us of prejudices, is placed in a most flattering and glowing light, more likely to mislead than to inform. We may reply to nearly all that he has said in this respect, in the precise words of the late Mr. John Hunter, who, after a patient investigation of the bee, its operations, and mode of life, has given his opinion, in the Philosophical Transactions, upon this point to the following effect.—“From these animals forming colonies, and from a vast variety of effects being produced, and with a degree of attention and nicety that seem even to vie with man; man, not being in the least jealous, viz. a reasoning faculty; while every action is only instinctive, and what they cannot avoid or alter, except from necessity, not from fancy. They have been supposed to be legislators, even mathematicians: indeed, on a superficial view, there is some shew of reason for such suppositions: but people have gone much farther, and have filled up from their own imagination every blank, but in so unnatural a way, that one reads it as if it were the description of a monster.” The prevailing sentiments of this latter writer precisely corresponding with those of a well-known moralizing poet, may be still more elegantly enforced;—

* * * * * The realm of bees
 * * * * *
 * * these, for ever, though a monarch reign,
 Their separate cells and properties maintain.
 Mark what unvaried laws preserve each state;
 Laws wise as nature, and as fix’d as fate.”

POPE.

To a certain extent this opinion is inadmissible. The unerring laws by which the bee are governed, imply rather the instinctive compliance of the creature with the appointed ordinance of the Creator, than the result of any reasoning faculty. We are “to look through nature, up to nature’s God.” We admire, we are wrapt in astonishment at the wonderful order preserved amidst such a vast society of contemptible animals: their skill is worthy of our contemplation, their industry of our imitation; but when we hear of the prudence, the sagacity, or wisdom of a bee, compared, nay analysed, by the same criterion as the stupendous powers of intellect in man, the wild conjectures of the enthusiastic observer sink into contempt beneath the calm reflection of the mind, and beneath the pen of criticism. Much as we are amazed with the perfection of its works, with the prevailing order, the policy, and assiduity of the bee, in its social

mode of life, we cannot perceive the benefit likely to result to the architect, the geometrician, or the statesman, by making these the subjects of their contemplation.

Thus far we have proceeded only in a general manner; in descending to particulars, the subject before us naturally divides itself into a variety of distinct branches, under every one of which it is necessary the BEE should be considered. The line of discrimination is to be first drawn between those which herd in societies, and are most conducive to the interest of mankind: those which, living in societies, are rather injurious than of utility; and those which are solitary, and of course, like the latter, live in a state of wildness. Bees of the first description consist only of a few species; the species of wild associated bees are rather more numerous; but the far greater number are solitary.

While we are speaking of those included in the first class, our attention again reverts with much propriety to the common bee, between which, and the other sorts of honey-bees, the line of parallel is so intimately connected, that they cannot easily, and need not necessarily be regarded separately. Of the common bee we are to consider the queen bee, male bee, and working bee; their structure and anatomy; their economy, generation, preservation, and varieties; the other analogous species productive of honey; the general habits of those bees which live in societies; and of those which are of a solitary disposition. The *architecture* of BEES, so far as it relates to the common honey-bee, will fall under notice in the article HONEY-COMB;—*Colonies* of BEES, under HIVE and HIVING;—the *swarming* of BEES, their WAX and HONEY, under their respective articles.

BEES, *Sexes of*. There are in every hive or colony three sorts of bees, which Linnæus calls *regina* (fœmina), *fuci* (mares), and *operariæ* (spadones). The first is the *queen*, or female; the second the *drones*, or males; and the last the *working* bees, or neuters. The queen is larger than the others; she is armed with a sting, and has thirteen joints in the antennæ, including the radicle; those of the male have one joint more in the antennæ; the eyes in this sex are large, and it is destitute of a sting; the working bees are armed with a powerful sting, and have fifteen joints in the antennæ. And here it will be proper to observe, that the circumstance of the antennæ in the female and neuter bee, containing the same number of articulations, were not observed till lately. Linnæus tells us the antennæ of the female has ten joints, the male eleven, and the working bee fifteen; the discovery to the contrary is due to Mr. Kirby, who, to use his own language, says; “In every one of these assertions, with due deference to a name to great be it spoken, Linnæus is mistaken.”

BEES, *Structure and Anatomy of*. There is nothing particularly striking in the structure of the bee. In their form they vary in different species, and in different sexes, but generally speaking they are uniformly bulky animals, having the head large, the eyes oval and conspicuous, the thorax broad and thick, as well as the body, and most are commonly covered with hair or down; the sexes distinguishable by the number of articulations in the antennæ (being one more in those of the male than the female), and the mouth furnished with strong *instrumenta cibaria*. The jaws and lip of the *apis mellifica* are membranaceous at the tip, the former bidentated; as in other bees, the jaws open to the right and left, and serve to carry out of the hives any thing that incommodes them. To those which have no sting, the teeth of these jaws are of essential service in their wars with such as possess that formidable weapon; and it is believed, but on what foundation is uncertain, that the wounds inflicted by means of these teeth inevitably prove mortal to

the other, or stinging bees, when they bite. The tongue in different kinds of bees is very different in shape. It has been observed, that in the more industrious species, this instrument, when stretched out, is shorter than in the others: be this as it may, the tongue of the common honey-bee is long, inflected, and extremely pliant; by means of this, the bee not only procures itself necessary subsistence, but it is also employed by the animal to collect the honey, which we appropriate to ourselves. The parts of which the tongue consists in different bees are not uniformly distinguished by the same terms in the works of entomological writers. Proboscis is that by which Mr. Kirby, after the example of Linnæus, when defining the *Apis* genus, calls the tongue, together with all the machinery that belongs to it, inclusive of the sheath or vagina. This is more fully illustrated in his dissections of the proboscis of the male, the female, and the neuter of the common honey-bee, wherein the structure of this instrument, and the several parts of which it consists, are correctly discriminated. It may not be altogether irrelevant to our purpose to follow this agreeable writer, in some degree, whilst explaining the structure of the proboscis or tongue. This part of the bee is said to consist of seven pieces; Mr. Kirby speaks of more, *viz.* the fulcrum, tubus, valvulæ, cardo, lora, palpi exteriores, palpi interiores, lacinia exteriores, lacinia interiores, and lingua. The *fulcrum* is that part upon which the tube is seated, and has been noticed both by Swammerdam and Reaumur; the latter of whom calls it le pivot. *Tubus* is that part called by Fabricius the base of the tongue, and by Swammerdam and others the sheath of the tongue, including the base of that organ; and in a certain measure answering the same purpose as the valvulæ. The latter, or *valvula*, form the exterior sheath of the tongue. As to the *cardo*, cardines intervene between the valvulæ and the lora, and seem to perform the office of hinges. Reaumur mentions these as “filets tendineux par les quels les tiges sont attachées a leurs appuis.” *Lora* are so named by Mr. Kirby from their use, which seems to be to let out or pull in the proboscis, being those parts which Reaumur calls “les leviers;” when the proboscis is extended, the angle on which the fulcrum of the tube sits, is observed to point towards the breast, but when retracted, its position changes, and it points towards the mouth. *Palpi exteriores* are organs noticed in the rude sketch of the proboscis of the hive bee by Swammerdam, who does not, however, speak of them. In this kind they are small, and consisting only of a single joint, escaped the observation of Reaumur; in some bees they are large, and contain from one to six joints. *Palpi interiores* are those parts of the proboscis which Reaumur distinguishes by the term “barbes;” in the common bee, these consist only of two articulations; in other species they are known to contain a greater number. De Geer calls these little organs, “les petit barbillons.” *Lacinia exteriores* are to be met with in almost every family of the *apis* genus. *Lacinia interiores* are peculiar to the *apis*, and embrace and defend the tongue where it enters the tube; these are called by Swammerdam the third pair of joints or the proboscis; Reaumur mentions them as “pièces qui embrassent et fortifient la trompe;” Latreille, in his *Nomada* family, names them “soies laterales.” *Lingua*, or the true tongue, called sometimes by De Geer “le levre inferieur,” or inferior lip, is occasionally mentioned by Fabricius under the term of labium, or lip. Roemer, in a work entitled “Genera Insectorum, &c.” lays down the character of *apis* thus:—“Jaws dentated, with an inflected proboscis, with two bivalve shells, in which the tongue is included.” Latreille, in a work recently published, divides the *apis* genus into two families. the first, corresponding

corresponding with the *melita* of Kirby, has these characters: "Machoirs et langue tres alongées, deux ou trois fois plus longues que la tête, dirigées en avant dans l'innation, et dont la base refort inférieurement de la cavité ou elles sont logées. Partie saillant de la langue évasee, a trois divisions plus courte que la gaine: celle-ci longue et cylindrique." The two Fabrician genera, *hyleus* and *andrena*, are arranged under this family; the tongue in *hyleus* is thus described, "langue large; divisions du milieu échancree, dentelée, ciliée." In *andrena*, "langue oblongue; division au milieu en point renfendue." La gaine, or sheath of the tongue, is not invariably cylindrical in this division (*melita*) of *apis*; it is sometimes conical.

In the family which includes the true *apis* of Kirby, the tongue is thus described by Latreille: "langue tres prolongee, étroite, lineaire presque, cylindrique, un peu coriace, a papilles vers l'extremite, flechie à la sortie de la gaine." *Nomada*, *apis*, and *euera* of Latreille are included under this head. His *nomada* is thus characterized still further: "langue d'une piece avec deux tres petites foies laterales." *Apis*, "langue de trois pieces (organes de la nutrition plus petits dans les males)." *Euera*, "langue de cinq pieces." We have deemed it requisite to be thus minute in following the observations of Kirby, Latreille, and others, who have dissected and examined the structure of the proboscis in different bees, with the aid of microscopic glasses, for the purpose of shewing the fallacy of the commonly received opinion, that in all bees the structure of this organ must be the same. For instance, we see that in one family the tongue is very long, more than twice or thrice the length of the head, with the extremity opening into three divisions, the whole of which is contained within a sheath of a cylindrical form; in others this part is conical. Some have a large tongue, with the middle division of it sloping, jagged, and ciliated, and the end truncate; again, others have an oblong tongue, the middle piece of which is cleft or lacerated at the tip. In many, the tongue is very long, straight or linear, almost cylindrical and papillous at the extremity; while the tongue in others consists of a single piece, having two lateral lacinie of a small size; and sometime, on the contrary, the tongue is formed of five pieces; in the *hyleus*, *andrena*, and *nomada* families, the tongue is three-cleft, in *apis* five-cleft, and in *euera* seven-cleft.

In the formation of the proboscis, the purpose for which nature has designed this curious instrument is very apparent. That of the common bee has been examined with attention. First, the sheath or external parts are observed to protect and strengthen the organs of nutrition which they contain; the valves of the sheath are disposed on each side of the tongue in pairs; with the tongue itself, which is pervious, the bee extracts and gathers the nectarous juices from flowers, which are shortly after converted into honey. The two pieces of the exterior sheath are horny or membranaceous; those of the inner sheath are placed higher above the base than the exterior ones. The proboscis is partly membranaceous, and partly of a gristly nature, and the lower part formed in such a manner that it is capable of considerable distension, by means of which the internal cavity may be prodigiously enlarged, and rendered capacious enough to receive a great quantity of native honey. When the proboscis is shut up, and inactive, it is very much flattened, and broader than it is thick. The lower and membranaceous part of the trunk at the base have no hair upon them, but are covered with little transparent protuberances that are placed in regular order, and at equal distances from each other; these are supposed to be glands, and may have a considerable share in changing or preparing the honey that is swallowed or

taken up by the proboscis. Down the middle of the proboscis there is a tube of a much harder nature than the sides which becomes rather tapering towards the apex, where the proboscis is very thick set with small hairs, which may serve to keep it in a proper situation when in use.

The proboscis is not cylindrical, but rather a kind of convex blade, terminating to all appearance in a point; and the sheaths are so contrived as to cover little more than the upper part of it. These exterior sheaths lap over each other on the upper part, so that the outside of the proboscis is protected by a very strong double case; a covering that was unnecessary for the under part, because, when this instrument is in use, the sheaths are opened, but when inactive, it is so folded, that the under part is protected by the body of the bee. Within the exterior sheath, and near the bottom, are two levers, which are fixed to the end of the proboscis, and by the motion of which it is raised or lowered. If a bee is attentively observed when it alights upon a full blown flower, the activity and address with which it employs this apparatus will prove highly entertaining. The tongue is first protruded, then lengthened, then shortened, and continually kept in motion, bending and turning in every possible direction to adapt itself to the form of the flower.

The *sting* of the BEE is a curious weapon, adapted to the industrious habits of its life, which exposes it to a multitude of dangers. It is truly an instrument in every manner calculated for offensive or defensive operations in the annoyance of its enemies. The wound which the bee inflicts with its sting is severe, to its little antagonists it oftentimes proves mortal, because it not only strikes deeply into their bodies, but conveys at the same time a powerful poison into the wound which it occasions. In the queen or female bee, the sting is longer as well as stouter than in the working bee, and is bent a little under the belly. The female and the working bees are those only which are furnished with a sting; for the male, as before observed, has none. The sting in both is put in motion by means of certain muscles attached to its base, and contained within the abdomen, where also the glands for the secretion of the poison is concealed. This internal apparatus for the preparation of the poison has been misconceived: every writer, except the late Mr. Hunter, considers it as a single receptacle; whereas it appears, from the observations of that judicious anatomist, to consist not of one, but of two small ducts, although those two seem to unite into one: these are situated in the region of the abdomen among the air vessels, and when pressed, inject into the passage of the sting the poisonous fluid drop by drop. The sting is apparently thick and solid at the base, and at the extremity remarkably acute; such is its appearance to the common observer: but strictly speaking, this is nothing more than the sheath or case in which the genuine sting is contained; the latter is an apparatus consisting of two extremely slender bearded darts, each of which has five or six recurved teeth or barbs placed near their extremity, or, according to Derham, they amount to eight recurved teeth on each dart. The sheath is of an horny substance, round at the base, and on the sides grooved, ending in a sharp point, and has an opening near the tip, through which the two bearded darts are protruded beyond the sheath, when the bee is in the act of stinging. When the two bearded darts, of which the true sting consists, are united, they easily enter the flesh, and then opening a little, become for a moment most securely fixed by means of the teeth with which they are beset. Some say one of these darts is rather longer than the other, and fixes its beard, or teeth, first; and the other instantly following, they penetrate alternately deeper and deeper, holding themselves hardy in the flesh with their beards,

till the whole sting is buried in the wound, and the poison injected. When once the bee has completely transfixed its sting into the flesh, the acrid caustic liquor, called the poison, is pressed from the glands in which it is secreted, and passing down the channels of the darts, discharges its malignant contents into the wound, occasioning an acute pain and swelling of the part, the inflammation of which continues not unfrequently for several days after. Dr. Hunter, being desirous of ascertaining the force of this poisonous fluid, dipped needles into it, with which he pricked the back of his hand; the like experiment he tried on the same part with needles that were not dipped into it, and found that the punctures occasioned by the former grew sore and inflamed, while the others did not.

But if the wound which the bee inflicts be painful to those who receive it, to the bee it is attended often with more serious harm, for it inevitably proves fatal if by any accident the sting is broken off in the act of inflicting it. When the creature strikes its sting deep into the flesh, and the person starts, and decomposes the bee before it can disengage itself, the sting is almost certain of being broken off, and left sticking in the wound. On the contrary, if he has patience to stand quiet, the bee will bring the two slender darts close together, and withdraw the whole, in which case the wound is always less painful. A wasp is not so liable to leave its sting in the wound as a bee; the beads of the darts being shorter, and the insect more nimble and vigorous in its operations. When the bee means to sting, it flies about the object of its anger very quickly, and by the velocity of its motions, seems to evade being struck or attacked to advantage, while preparing for the assault. The sound emitted at this time is also peculiar, and to those accustomed to bees, is perfectly well understood. "The danger of being stung by bees (it has been said), may be in a great measure prevented by a quiet composed behaviour. A thousand bees will fly and buzz about a person without hurting him, if he will but stand still and forbear disturbing them, even when near his face; in which case he may observe them for hours together without danger; but if he molests or beats them away, he usually suffers for it." In the "Edinburgh Medical Commentaries" it has been affirmed, that a person is in perfect safety in the midst of myriads of bees, if he were to keep his mouth carefully shut, and breathe gently through the nostrils only; the human breath, it would seem, being peculiarly offensive to their delicate organs: and merely with this precaution, it is said, the lives may be turned up, and even part of the comb cut out while the bees are at work.

Reaumur made use of no other remedy for the sting of the bee than to bathe the part affected with cold water, a remedy which in most cases will allay the pain and inflammation only during the time of its application. Oil of olives, or sweet almonds, applied to it alleviates the pain. Lombard, a late French writer, in his "Manuel nécessaire au villageois pour soigner les abeilles," prescribes a better remedy. He recommends that the wound be pressed, to cleanse it as much as possible from the venomous fluid, and then rubbed with alkali, or with a little diluted quick lime, by means of which the properties of the poison will be neutralized; the wounded part, after the application of this remedy, must be well washed with cold water, when both the pain and swelling will be found to have received considerable relief.

BEES, Voice of. The bee is capable of emitting either by the mouth or motion of the wings, a variety of sounds, expressive of its anger, fear, contentment, and other passions; a circumstance hitherto but very slightly regarded by those

writers who have, in other respects, entered most minutely into the history of this animal. Mr. Hunter, in his paper on the honey-bee, inserted in the Philosophical Transactions, says a few words on this subject. Bees, he tells us, may be said to have a voice; or at least, that they are able to form several distinct sounds. They give a sound when flying, which they can vary according to circumstances. One accustomed to bees can immediately tell when a bee intends to make an attack by the sound, most likely of the wings, but that is not certain; it may issue from the mouth. The bees may be seen standing at the door of their hive, with the belly rather raised, and moving their wings, by which means a noise is occasioned. But they produce a noise independent of that made by the wings; for if a bee be smeared all over with honey, so as to cause the wings to adhere together, the bee will be perceived to make a shrill and peevish sound while the wings remain motionless. To ascertain this matter with a still greater degree of accuracy, Mr. Hunter held a bee by the leg with a pair of pincers, and very clearly observed that the creature made the same peevish noise while the wings were perfectly still. After this, he even cut the wings off, when the poor bee continued to make the same noise as before. He immersed the bee in water, but it did not then produce any noise, till it was much teized, when the same sound was heard as in the former instance: during this experiment, he could observe the water, or rather the surface of contact of the water with the air, vibrating at the orifice of an air-hole situated at the root of the wing. The same writer remarks, that the bees, or some kinds of them at least, make a noise the evening before they swarm, which is a kind of ring or sound resembling that of a small trumpet; and by comparing it with the notes of the piano-forte, it seemed to be the same with the lower *A* of the treble.—When the bees return from their daily excursions in the fields, to their hives at evening, loaded with farina and honey, they are well known to sing or hum a soft melodious tone expressive of their contentment. Entomologists are well aware that the sound emitted by the bee is susceptible of certain modulations. Some of these proceed undoubtedly from the motion of the wings, and vary in tone as they are moved with greater or less velocity, just as we observe in other insects furnished with transparent wings; and in some degree throughout the whole of the insect race, with the exception of those which have very small wings, or are entirely destitute of them. From the observation of Mr. Hunter on the emission of air from the lateral trachea, or air vessel in the side, it would seem, that a certain sound may be caused by means of these little organs: the remark of this anatomist deserves more consideration than he appeared to be himself persuaded of, since we know that the singing of the *cicada*, a noisy tribe of insects, proceeds not from the mouth, but from two lateral openings, one on each side of the abdomen; the sound being produced by means of a most singular internal organization, and transmitted through those openings at the pleasure of the creature. It is not unlikely, that many insects may be furnished with lateral organs for the purpose of making a certain noise, although not exactly of the same structure in the *cicada*, and certainly upon a much smaller scale. That a bee emits a sound from the mouth, is also believed. A gentleman within our knowledge, who has made the manners of bees his particular study, can with the utmost facility declare the sex of any bee that may chauce to pass near him, by attending only to the motion and sound emitted by it whilst in flight.

BEES, Age of. Writers are not agreed as to the duration of the term of life in the honey-bee. Among the ancients

It was thought to extend to nine or ten years. Virgil and Pliny limit it to five. Some suppose that they are annual; others, that they live many years, but the latter idea is almost exploded at this time. Of the other kind, although they may be considered as annual, a few of the females certainly live through the winter, and lay the foundation for a new society in the ensuing season. In the month of August, Mr. Hunter imagines the queen, or queens, to be impregnated by the males, and as the males do not provide for themselves, they become burdensome to the working bees, and are therefore destroyed as useless, and thrown out of the hives. When the bees sit about the business of providing their winter store, every operation ceases, excepting that of collecting honey and bee-bread for the future subsistence of the colony. At this particular crisis, it would seem as if the males were conscious of their approaching danger, for they do not rest as before on the mouth of the hive either when going in or coming out; activity is apparent in all their actions. But this avails them little, nor does it avert, though it may protract, their fate, for a short time: they are commonly attacked by the labouring bees, one, two, or three together, and seeming to be incapable of making any resistance, or anxious to avoid the contest, attempt only to ensure their safety by halting out of the way of their cruel enemies as speedily as possible. The labourers do not sting the males, Mr. Hunter tells us, but only pinch, torment, and pull them about, as if to wear them out, and hinder, by such violent treatment, the death of these hapless creatures, who would die naturally in the space of a little time after.

BEES, Economy of. When we speak in a familiar manner of the economy of bees, such as the secreting of wax, the constructing of honey-combs, ranging the fields and gardens to collect farina and nectareous juices for the preparation of wax and honey; attending, nurturing, and feeding the maggots or larvæ, covering in the chrysalides or pupæ, &c. the labouring bee alone is meant, for the females and the males are only implicated in the conduct of each, so far as relates to the well government of the colony, and generation of the future brood. Among those who have minutely treated on this subject, (the economy of bees,) many have related very wonderful and incredible circumstances; the moral virtues (as it has well been said) have, at one time or other, been attributed to the bees. They have been celebrated for their prudence, industry, mutual affection, unity, loyalty to their lovers or kings, public spirit, liberality, and chastity. The sagacity of bees in following rain, or cold has been often mentioned; this is (to say the least) idle: for a short time, at least, before we are sensible of the alteration in the state of the weather, their conduct proves that they are not ignorant of it. Mr. Hunter first properly ordered their return home in great numbers, before rain or cold was coming on, without any long stay upon the field; all some time after, the clouds in the horizon, and the stormy sky, but require a considerable degree of heat; the degree must be kept warm, and as the bees are circumspect, it must be cold, with a cold wind blowing. "Does" (says our author) seem to be the sound of the appearance of bad weather, by some particular noise. It is sometimes kept, and when they are very still, and cold, that they or a sudden cease from their work: not a single one flies out; and those that are already busy, return to each particular crowd, that the doors of their habitations are too close to admit them. On this occasion, according to the sky, and you will find a silver film of thick black clouds, which denote impending rain. Whether they feel the clouds gathering for it, as some imagine, or whether (as is much

more probable) they feel some other effects of it upon their bodies, is not yet determined; but it is alleged, that no bee is ever caught even in what we call a sudden shower, unless it have been at a very great distance from the hive, or have been injured by some accident, or been sickly, and unable to fly so fast as the rest. Cold is a great enemy to them. To defend themselves against its effects during a hard winter, they crowd together in the middle of the hive, and buzz about, and thereby excite a warmth that is often perceptible by laying the hand upon the glass window of the hive. They seem to understand one another by the motion of their wings: when the queen wants to quit the hive, she gives a little buzz; and all the others immediately follow her example, and retire along with her."

Although many of the accounts that have been given of the bee are fabulous, an intimate acquaintance with them in their domestic operations, has furnished many real facts that are as surprising as those which are apparently, or perhaps wholly, groundless. It is not to be disputed, that at certain times, when they think their stores likely to fall short, they make no scruple to kill and throw out of the hives their own offspring; the larvæ and young bees of the male or drone kind, scarcely extricated from their pupa state, have been carried away and left to perish. They may be just in some respects in their own kingdom, and to those who are to be considered as their fellow subjects, but they rob and plunder strangers whenever they have power and opportunity; and they have frequently battles in committing depredations on neighbouring colonies and hives, or in repelling the aggressions of other invaders, in their own defence, which always terminate fatally to many of their number. This indeed does not often happen, except early in the spring, or late in autumn, when honey is scarce in their hive, and there are no flowers abroad to furnish them with more. In this case, when they have ranged the fields without success, they endeavour to supply themselves at the hazard of their lives, from the stores of other hives. However, in all these conflicts, if the queen of either hive that happens to be engaged is killed, the battle ceases, and both parties unite under the survivor.

The industry and activity of bees in their domestic labour, afford a very instructive and amusing spectacle; all are busy, engaged in their several departments. While some are employed in gathering honey and wax, others repair the rotten comb; others carry out the dead, and cleanse the hive; others keep guard, placing themselves in five or six files (eight or ten deep upon the floor of the hives, so that all the bees when they enter must pass between them; some are even said to serve for bridges or ladders for others to pass over; and when they are tired with labour, they rest themselves with rest. For this purpose, they form larger or smaller clusters in the following manner: each bee with its two fore-legs, lay hold of the hinder legs of the bee that is next above it, and thus a chain is formed by the successive application of one to another, and the fifth bee supports the weight of all the rest to the bottom of the comb. The larger clusters are only a multitude of these chains, of which there are four times an hundred together. The bees, it is said, never lay hold of any part of one another, except the legs. In this way, they likewise guard themselves from the effects of cold, and continue for several weeks together in a state of torpidity.

Bees, we are told, when they begin to work in their hives, divide themselves into four companies; one of which roves in the fields in search of farina for the wax; another is employed in laying out the bottom and partitions of the cells; a third in making the food for both from the a gl; and

and corners; and the fourth in collecting and bringing food for the support of the rest, or in relieving those who return heavily laden. Neither of these four companies is kept constantly to one employment; they often change the tasks assigned them: those that have been at work, for example, in the construction of the cells, are permitted to go abroad, and those which have been in the fields already, are allowed to take their places in the hive. They are believed, and not without reason, to have certain signs, by means of which they understand each other, and one striking instance is adduced in proof of this: when any one of the bees is in want of food, the creature bends down its trunk to the bee from whom it is expected, the latter immediately opens its honey-bag, and lets some drops of honey fall into the mouth of the other, which is at that time observed open to receive it. Many other circumstances might be likewise mentioned, were they necessary to confirm this idea. These particulars relate almost exclusively to the operations of the neuter or labouring bee: the males answering no other purpose than simply that of males in their sexual capacity; and the queen or female breeder only attending to the discharge of her more important duties, the laying of eggs, and influencing, by her presence, the working bees, to persevere in their respective labours.

BEES, Generation of. These insects begin to breed in the upper part of the hive, in the cells adjoining to those which are filled with honey, and they descend gradually into the lower parts, as the flowers which furnish them with wax increase in plenty. The cells designed for the working bees, are commonly half an inch deep; those for the drones, three quarters of an inch; and those intended to contain the honey only, still deeper. The queen bee is generally concealed in the most secret part of the hive, and is never visible, except when she happens to lay her eggs in such combs as are exposed to sight. When she does appear, she is always attended by ten or a dozen of the common sort, who form a kind of retinue, to follow and guard her wherever she goes. Before she lays her eggs, she examines the cells where she designs to lay them; and if she finds they contain neither honey, wax, nor embryo, she introduces the posterior part of her body into the cell, and fixes to the bottom of it a small white egg, which is composed of a thin membrane, filled with a whitish liquor. In this manner she proceeds on, till she fills as many cells as she has eggs to lay, which are generally many thousands. Sometimes more than one egg has been deposited in the same cell; when this is the case, the working bees remove the super-numerary eggs, and leave only one in each cell. On the first or second day after the eggs are lodged in the cells, the drone bee is supposed by many to inject a small quantity of whitish liquid, which in about the course of a day is absorbed by the egg. On the third or fourth day is produced a maggot, which, when it is grown so as to touch the opposite angle of the cell, coils itself up in the shape of a semicircle, and floats in a certain liquid whereby it is nourished, and enlarged in its dimensions: this liquid is of a whitish colour, of the thickness of cream, and of an insipid taste, like flour and water. The origin and qualities of this liquid are not correctly explained: some have supposed that it consists of some generative matter injected by the male or drone bee into each cell, in order to give fecundity to the egg: a more probable opinion is, that it is the same with what several writers call the *bee-bread*; and that it is a mixture of water with the juices of plants and flowers, collected merely for the nutrition of the young while they are in a weak and helpless state. Whatever may be the nature of this aliment, it is certain the bees are very industrious in supplying the worms with it. The larva, or

maggot, is fed by the working bees for about eight or ten days, till one end touches the other in the form of a ring, and when it begins to find itself uneasy in its first posture, it ceases to eat, and begins to unroll itself, thrusting the head forwards towards the mouth of the cell. The attendant bees, observing these symptoms of approaching transformation, desist from their labours in carrying food, and employ themselves in fastening up the top of the cell with a lid of wax formed in concentric circles, and by their natural heat assist in cherishing the brood, and hastening the birth. In this state, the larva extends itself at full length, and prepares a kind of silky covering, which forms a complete lining for the cell, and affords a convenient receptacle for the transformation of the larva to the pupa state. Some naturalists suppose, that as each cell is destined to the successive breeding of several larvæ, the whole web, which is composed of many crusts or doubles, is, in reality, a collection of as many webs as there have been larvæ. M. Maraldi apprehends, that this lining is formed of the skin of the larva, thrown off at its entrance into the nymph or pupa state; but it is urged by others, that if the cells are opened when recently covered by the bees, the larva within will be found in its own form, and detected in the act of spinning its web; and by means of glasses, it will be found composed of fine threads, regularly woven together, like those of other spinning animals.

In the space of eighteen or twenty days, the whole process of transformation is finished, and the bee endeavours to discharge itself from confinement, by forcing an aperture with its jaws through the covering of the cell; the passage is gradually dilated; so that one of the maxillæ or jaws appears first; then the head, and afterwards the whole body; this is usually the work of three hours, and sometimes of half a day. The bee, after it has disengaged itself, stands on the surface of the comb, till it has acquired its natural complexion, and full maturity and strength, so as to become fit for labour. The rest of the bees gather round it in this state, congratulate its birth, and offer it honey out of their own mouths. The exuviae, and scattered pieces of wax which are left in the cell, are removed by the working bees; and the cavity is no sooner cleaned, and fit for new fecundation, but the queen deposits another egg in it; inasmuch, that M. Maraldi says, he has seen five bees produced in the same cell, in the space of three months. The young bees, it is said, are easily distinguished from the others by their colour: they are grey instead of the yellow brown of the common bees, the reason of which is, that their body is black, and the hairs that grow upon it are white; from the mixture of these that are seen together, results a grey; but this colour forms itself into brownish by degrees; the rings of the body becoming more brown, and the hairs yellower.

Reaumur supposed, before the time of Linnæus, the queen bee to be the only female in the hive, and consequently, the mother of the next generation: that the drones are the males by which she is fecundated; and that the working bees, or those which collect wax on the flowers that knead it, and form the combs and cells, and afterwards fill them with honey, are the neuters.

Schirach, in his "Histoire Naturelle de la Reine des Abeilles, &c." published in 1772, has advanced a different opinion upon this subject. He supposes, that all the common, or honey bees, are females in disguise, in which the organs that distinguish the sex, and particularly the ovaria, are obliterated, or at least from their extreme minuteness, have escaped the observer's eye; that every one of these bees, in the earlier period of existence, is capable of becoming a queen bee, if the whole community should think proper to nurse it in a particular manner, and raise it to that rank;

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rank; in short, that the queen bee lays only two kinds of eggs, those which are to produce the drones, and those from which the working bees are to proceed. This author made his experiments not only in the spring months, but even as late as November. He cut off from an old hive a piece of the brood comb, taking care that it contained larvæ (or worms as they are termed) which had been hatched about three days. This he fixed in an empty hive, together with a piece of honey-comb for food to his bees, and then introduced a number of common bees into the hive. As soon as the bees found themselves deprived of their queen, and liberty, a dreadful uproar took place, which lasted twenty-four hours. On the cessation of this tumult, they took themselves to work, full proceeding to construct a royal cell, and then taking the proper measures for feeding and hatching the brood inclosed within them; sometimes, even on the second day, the foundations of one or more royal cells were to be perceived, which proved a certain indication that they had elected one of the inclosed larvæ to the sovereignty.

The final result of these experiments seemed to be, that the colony of working bees being thus shut up with a piece of brood comb, not only hatch, but at the end of eighteen or twenty days, produce from thence one or two queens, which, it was supposed, proceeded from the larvæ of the common working bee, and which had been converted by the colony into a queen, merely because they wanted one. — From these, and other experiments repeated, Mr. Schirach concluded, that all the common working bees must be originally of the female sex; although, if they are not fed, lodged, and brought up in a particular manner while in the larva state, their organs are not developed; and that it is this circumstance attending the bringing up of the queen, that allows the full extension in the female organs in the first instance, and produced afterwards that difference in her size and aspect, so dissimilar to that of the working bee.

Mr. Debraw, an ingenious apothecary of Cambridge, made many experimental remarks on bees, which are inserted in the Philosophical Transactions for 1776. He professes to have detected the impregnation of the eggs by the males, as well as to have discovered the difference in size among the drones or males, of which Maraldi and Reaumur, besides some others, had conceived there might be two distinct kinds. Mr. Debraw says, he watched the glass hives with indefatigable attention from the moment the bees (among which he took care there should be a large number of drones) were put into them, to the time of the queen's laying her eggs, which generally happens the fourth or fifth day. He observed, that on the first or second days, (always before the third) from the time the eggs are placed in the cells, a great number of bees fastening themselves to one another, hung down in the form of a curtain from the top to the bottom of the hive. They had done the same at the time the queen bee deposited her eggs, an operation which seems contrived on purpose to conceal what is transacting; however, through some parts of the veil he was enabled to see some of the bees inserting the posterior part of their bodies, each into a cell, but continuing there only a short time. When they had retired, it was easy to discover a whitish liquor left in the angle of the basis of each cell which contained an egg. In a day or two this liquor was absorbed into the embryo, which, on the fourth day, assumes its larva state, and is attended by the working bee, who brings it a little honey for nourishment, and continues to feed it for the space of eight or ten days after its birth. When the bees find that the larva has attained its full size, they desist from bringing any more food,

knowing that the larva has no more occasion for it while in that state; but they have still another service to bestow upon it, in which they never fail to perform their duty: this is to shut up the top of the cell in which the larva is enclosed; for eight days longer it remains within the cell after being thus immured, during which time a further change takes place; the larva, which was before idle, begins to work as soon as the bees commence their operation of closing up the cell; while the latter are employed in making the covering of wax, the larva is at work within the cell, which it lines with a fine silk. The larva thus concealed, voids its excrements, quits its skin, and assumes the pupa form; at the end of some days, the young bee acquires sufficient strength to quit the covering of the pupa, tear through the waxy enclosure of its cell, and proceed from thence a perfect winged insect.

To prove still further that the eggs are fecundated by the males, and that their presence is necessary at the time of breeding, Mr. Debraw made the following experiments: he left in the hive the queen, with only the common or working bees, without any drones, to see whether the eggs she laid would be prolific: for this purpose, he took a swarm, and shook all the bees into a tub of water, leaving them there till they were quite senseless, by which means he was able to discover the drones without any fear of being stung by the others; he then restored the queen and working bees to their former state by spreading them on a brown paper in the sun, after which he placed them in a glass hive, and they began very soon to work as usual. The queen laid eggs, which to his great surprise were impregnated; for he imagined he had separated all the drones, or males, and therefore omitted watching them. At the end of twenty days, he found several of the eggs had, in the usual course of changes, produced bees, while some had withered away and others were covered with honey. Hence he inferred that some of the males had escaped his notice, and impregnated part of the eggs. To convince himself of this, he took away all the brood comb that was in the hive, in order to compel the bees to provide a fresh quantity, being determined to watch narrowly their motions after the new eggs should be laid in the cells. On the second day after the eggs were placed in the cells, he perceived the same operation that was mentioned before, namely, that of the bees hanging down in the form of a curtain, while others thrust their posterior end of the body into the hive. He broke off a piece of the comb in which were two of these insects, and found in neither of them any sting; (a circumstance peculiar to the drones;) upon dissection, with the assistance of a microscope, he discovered the four cylindrical bodies which contain the glutinous liquor, of a whitish colour, as observed by Maraldi in the large drones. He was therefore now under the necessity of repeating his experiments, after destroying the males, and even those which might be suspected to be such.

He once more immersed the same bees in water, and when they appeared to be in a senseless state, he gently pressed every one, in order to distinguish those armed with a sting from those which had none, and which of course he supposed to be males. He replaced the same swarm in a glass hive, where they immediately applied themselves again to the work of making cells, and on the fourth and fifth day, very early in the morning, he had the pleasure to see the queen bee deposit her eggs in those cells; he continued watching most part of the ensuing days, but could discover nothing of what he had seen before.

The eggs, after the fourth day, were found in the same state as on the first day, except that some of them were covered with honey. A singular event happened next day

about noon; all the bees left their hive, and were seen attempting to get into a neighbouring one, on the stool of which the queen bee was found dead, being, no doubt, slain in an engagement. This event Mr. Debraw supposes to have arisen from the desire of the bees to perpetuate their species, to the concurrence of which the males were necessary, and that this consideration alone induced them to desert their habitation where no males were left, and to fix their residence in a new one, where there was a stock of them.

To be more fully satisfied in this respect, Mr. Debraw took the brood comb which had been impregnated, and divided it into two parts; one of which he placed under a bell glass with honey-comb, for the food of the bees, taking care to leave a queen, but no drones among the bees confined in it; the other piece of brood-comb, he placed in another bell glass with a few drones, a queen, and proportionable number of common bees. The result was, that in the piece put into the first glass there was no impregnation, the eggs remaining in the same state as they were when first placed in it, and on giving the bees their liberty on the seventh day they all flew away; whereas in the other glass, which contained the second piece of brood-comb, the very day after the bees had been put into it, the eggs were impregnated by the drones, and the bees did not shew the least inclination to abandon their new habitation when the glass was left open to allow them to escape.

Such are briefly the different opinions of those experienced observers of the bee, Reaumur, Maraldi, Schirach, and Debraw, whose several ideas founded, as it must appear, upon the most laborious, indefatigable, and minute investigation, have met with many advocates. On a subject of this interest we ought not to assume any opinion hastily, or in an affair so mysterious, obtrude our own without a considerable degree of caution. Some writers of no mean celebrity have treated, since the time of these observers, upon the same topic, whose remarks deserve to be impartially considered. To the foregoing observations, and some others made by Schirach in particular, the late Mr. Hunter has replied, in a paper written by him expressly on bees, and inserted in the *Philosophical Transactions* for 1792, of which we are to avail ourselves. The experiments performed by Schirach, Mr. Hunter is disposed to think inaccurate, and the result inferred from them of course unworthy of credit: how far the arguments of the latter are likely to refute the observations of Schirach, remains to be decided, when we have considered them in his own words. The criticisms of this anatomist are introduced to notice, in speaking of the queen bee. "The queen bee, as she is termed, (says Mr. Hunter) has excited more curiosity than all the others, although much more belongs to the labourers. From the number of these, and from their exposing themselves, they have their history much better made out; but as there is only one queen, and she is scarcely ever seen, it being only the effect of her labour we can come at, an opportunity has been given to the ingenuity of conjecture, and more has been said than can well be proved. She is allowed to be bred in the common way, only there is a peculiar cell for her in her first stage, and Reaumur says, "her food is different when in the maggot state;" but there is probably but one queen, and that the whole might not depend on one life, it is asserted that the labourers have a power of forming a common maggot into a queen. If authors had given this as an opinion only, we might have passed it over as improbable, but they have endeavoured to prove it by experiments, which require to be examined; and for that purpose I shall give what they say on that head, with my remarks upon it."

Abstracts from Schirach — "In twelve wooden boxes

were placed twelve pieces of the comb; in each box was shut up a handful of working bees. Knowing that when bees are forming a queen, they should be confined, the boxes were kept shut for two days. When examined at the end of that period," (six boxes only were opened) "in all of them royal cells were begun, one, two, or three in each, all of these containing maggots four days old. In four days, the other six boxes were opened, and royal cells were found in each containing maggots five days old, surrounded by a large provision of jelly, and one of these maggots, examined in the microscope, in every respect resembled a working bee."

"This experiment was repeated, and the maggots selected to be made queens were three days old; and in seventeen days there were found in twelve boxes fifteen lively handsome queens. These experiments were made in May, and the bees were allowed to work great part of the summer. The bees were examined one by one, but no drone could be discovered, and yet the queens were impregnated, and laid their eggs." [Here is a wonder! queens laying eggs, (which we must suppose Mr. Schirach meant we should believe) and they hatched without the influence of the male.]

"The above experiment was repeated with pieces of comb, containing eggs only, in six boxes, but no preparation was made towards producing a queen.

"The experiment of producing a queen bee from a maggot was repeated every month of the year, even in November."

"A maggot of three days old was procured from a friend enclosed in an ordinary cell, and shut up with a piece of comb containing eggs and maggots. That, three days old, was formed into a queen, and all the other maggots and eggs were destroyed.

"In above a hundred experiments a queen bee has been formed from maggots three days old. [The working bees, as all females, although the ovaria is too small for examination," &c. Vide *Phil. Trans.*]

Mr. Hunter next proceeds to speak of another author who repeated the experiments of Schirach. "Wilhelmi (he says) observes that a queen cell, which is made while the bees are shut up, is formed by breaking down three common cells into one, when the sides are repaired."—"A young queen was put into a hive which had been previously ascertained to contain no drones, and whose queen was removed, and yet the young queen laid eggs." [Probable.] In repeating Mr. Schirach's experiment, he shut up four pieces of comb with one maggot in each: after two days the maggots were all dead, and the bees had desisted from labour. [There is no mystery in this: but did they hatch?—"A piece of comb, from which all the eggs and maggots had been removed, was shut up with some honey, and a certain number of workers: in a short time they became very busy, and upon the evening of the second day 300 eggs were found in the cells. [This would shew that labourers can be changed into queens at will, and that neither they nor their eggs require to be impregnated; if this was the case, there would be no occasion for all the push in making a queen or a male.] He repeated this experiment with the same result, and the bees were left to themselves: they placed the queen maggots in the queen cells newly constructed, and others in male cells, the rest was left undisturbed. He again took two pieces of comb, which contained neither eggs nor maggots, and shut them up with a certain number of workers, and carried the box into a stove; next evening one of the pieces of comb contained several eggs, and the beginning of a royal cell was empty."

Besides these short observations contained in the brackets, Mr. Hunter tells us he has his doubts respecting the whole

of these experiments of Schirach, &c. from several circumstances that occurred in the course of his experiments. The three following facts appear in his mind, much against their probability. First, a summer's evening in England is commonly too cold for so small a parcel of bees to be lively, so as to let about new operators; they get so benumbed that they could hardly recover in the day, and he suspects, where these experiments were made, it also was too cold; and indeed some even are said to have been tried in this country. Secondly, if the weather should be so warm as to prevent this effect, then they are so restless that they commonly destroy themselves, or weary themselves out; at least, after a few days confinement we find them mostly dead; and, thirdly, the account given of the formation of a royal cell, without mentioning the above inconvenience, which is natural to the experiment, leads him to surmise the whole to be fabricated. To obviate the first objection, which he found from experiment would prevent a success that might otherwise arise, he put parcels of bees with their comb, in which were eggs and maggots, (and in some trials chrysalises besides) into a warmer place, such as a glass frame over tan, the surface of which was covered with mould to prevent the ill effects of the unwholesome effluvia arising from it; but from knowing that the maggot was fed with bee-bread, or farina, he took care to introduce a cell or two with this substance, and also the flowers of plants that produce a great deal of farina, together with some honey for the old bees. In this manner his bees were preserved from the cold, and also provided with necessaries; but after being confined for several days, upon opening the doors of the hive, those which remained alive came to the door-way, walked and flew about, but gradually left it, and on examining the combs, &c. he found the maggots dead, and nothing like an operation going on. He chose to have some chrysalises in the comb, supposing that if the bees died or flew away, those newly hatched afterwards from those chrysalises, which would happen in a few days, not knowing where to go, might stay and take care of the maggots that would be hatched from the eggs; but to his surprize he found on opening the box that neither the eggs hatched; nor the chrysalises came forth, all died; from which he began to suspect that the presence of the bees was necessary for both. "The queen, the mother of all, (he concludes) with saying in whatever manner produced, is a true female, and distinct from the labourers and the male." He describes the difference between the female and the male, observing that he believes a hive has only one queen; and mentions Rees, who asserts that there are many numerous queens, which he has seen killed both by labourers and the male.

With due respect to the memory of so great a man, we had expected better reasoning, and a more copious and extensive investigation of this mysterious affair, from the pen of Mr. John Hunter. After following him through his various remarks, we are almost at a point to lose to conceive their tendency. He sets forward with expressing his doubts as to the accuracy of Schirach's experiments, who had, it seems, endeavoured to prove, that a queen bee might be reared from the humble condition of the larva of a common worker; the suggestion meets his ridicule, a strong vein of which is apparent throughout his notes; and in the true spirit of critical analysis, he proceeds to examine the experiments by which this suggestion has been supported. Some few inadvertencies of expression in the statement of particulars, are mentioned by him, and after relating two or three unsatisfactory experiments, made in order to rival late the observations of Schirach, he tells us, that "the queen bee, the mother of all, in whatever manner produced, is a true female," an inference so logical, that no one would be inclined, we may presume,

to dispute it; but surely it could require no matter of argument, nor criticism, nor series of experiments, to prove, that the mother of all must be a female; nay, still less was it incumbent upon him to support, by the use of many words, that this female was produced in some manner or another; this is apparent enough; we need not be therefore solicitous to enquire whether she is produced, but to know in what manner that production is accomplished; and here we are left in uncertainty. If Mr. Hunter was convinced that the observations of Schirach were erroneous, he could not, we apprehend, be ignorant of the manner in which she is produced; or, if he was, he must have been unauthorized to censure Schirach. In a word, it ought to be acknowledged in candour, between the two parties, that we had expected, in the outset, Mr. Hunter would have fairly controverted the arguments of his opponent, but in the conclusion perceive, too evidently, that he is content to contradict them only.

But the experiments of Schirach have been found in many respects consistent with the discoveries of later naturalists; experience has proved that in many points he is correct. It is almost enough to say that they are in part confirmed by Huber. The latter writer, after professing his opinion, that there are no such creatures as mules or neuters in the society of bees, endeavours to shew that the working bees are all originally of the female sex; and that each is consequently provided with an *ovaria*, or womb, which neither Swammerdam, Reaumur, and perhaps no other before him, had ever seen, although they had conjectured it must be so. He cites in proof of the position that they must be females, the discovery of Schirach; who, although he had not detected the ovaries, had seen the larvæ of the working bees converted into queen's, when the necessities of the state required it; a fact of which Huber had been occasionally himself a witness. Huber is persuaded, that however strange it may appear, it depends entirely on the manner in which the larva is treated while remaining in the comb, whether the individual will become a perfect female, fitted for the purpose of perpetuating the race, the mother of the future swarm; and of being invested with the powers of sovereignty; or be doomed to a life of labour as a common working bee. If the larva be intended for the latter condition, the egg is lodged within the confines of a narrow cell; which, when the larva hatched from it attains a certain size, effectually prevents the distension of those organs of the ovaria that are necessary to the great purpose of rendering the creature prolific in the last stage of being. Thus it happens, that unless the larva be allowed sufficient room for these organs to expand, they continue to be crippled, compressed, and afterwards incapable of that expansion which is absolutely requisite in impregnation. Hence we perceive the motives for that special care which the working bees bestow on the enlargement of the cell of those larvae which as a fortuitous accident may induce them to adopt for the female parent of the future brood. If the larva of a working bee is to be converted into a prolific female, the cell in which it has been lodged is broken into a wide more capacious than before; this permits the creature to attain its full and proper size; the ovaria, no longer straggled by the compression of its cell, assume a new and more expanded form; and when the insect comes forth in the winged state, the sexual organs are found to have acquired that degree of maturity which can alone render it capable of fulfilling the ordinary function for which they were designed. There is also another cause to which the labourers of the working bee is attributed, the quantity of aliment which it receives in the larva form. At this time the creature is kept up within its narrow cell, and is allowed only a certain portion of the

palette

paste destined for food; the queens, on the contrary, are more liberally supported; they are cherished with the utmost care, and their growth is promoted by every means possible. There are sometimes several worms, or at any rate two or three reared in every comb for queens; and for the reception of which, if the royal chambers had not been before constructed, several common cells are broken down to effect an enlargement suitable for the purpose. These larvæ are supplied with what is called by some the royal jelly, the powerful properties of which are sometimes observed to operate on the larvæ of the common workers; for when it happens that the eggs and worms of such, contained within the cells adjacent to the royal chambers, receive by accident a quantity of this jelly, we are told they produce prolific working bees, although such are very rarely observed; but the reason of which is obvious; the queen bees are no sooner hatched than they attack these prolific workers without mercy, and destroy them. The same fate, as is well known, attends all the queen bees, with the exception of the queen bee elect, who must support her claim in the first instance by conquering and destroying her rivals, who would aspire to the same honours.

There have been many very strange conceits indulged respecting the impregnation of the eggs of bees by the drones, or male bees. Among the ancients, as well as the moderns, it was, and is still believed, that the eggs are fecundated like those of fishes by the males diffusing a prolific fluid over them, corresponding with the milt in the finny tribe. Butler, Swammerdam, Maraldi, &c. carried matters to a much higher pitch of extravagance; they imagined even that it was sufficient for the female to be for some short time in the company of the males to become fruitful, conceiving that the fumes she would imbibe from them would vivify the eggs within her womb. Reaumur thought he discovered the union of the drone with the female, as in most other animals; his observations are not however completely satisfactory on this head, although his conjecture has received at length the sanction of indubitable authority. The discoveries of Huber prove him to have been in the right. Huber, dissenting from the absurd conceptions of some preceding writers, affirms that the intimate assistance of the male is required in this affair. He tells us, that the eggs are impregnated by the male, while in the ovaria of the female bees: and gives as a reason why this connection of the sexes has not been observed before, that it never takes place within the hive. For this purpose the bees resort into the fields, first the female escapes from the hive upon a certain signal, and the swarm immediately follows. If in the first flight the female be not impregnated by some one of the male attendants, she returns to the hive, and takes a second flight precisely in the same manner, but does not afterwards return without being fecundated. Huber supposes that this single consummation of its desire is sufficient to vivify all the eggs she may lay for the space of two years after, or even of those laid by her during life, which must amount to many millions, since she lays four or five thousand at once, or even ten thousand in a month. But the male, who contributes his assistance to give life to this numerous brood, has never the pleasure of seeing his posterity, for he dies in the accomplishment of the duty imposed on him by nature; the sexual organs remaining too firmly fixed in the body of the female to be withdrawn, he is deprived of them in his separation from her, and left to perish miserably.

One of the most persuasive arguments in favour of Huber's idea respecting the working-bees being originally of the female sex, and not neuters, as is almost universally believed, may be drawn from the recent discovery of Mr.

Kirby, who found that the antennæ in both the female and the neuter contain the same number of joints. While we tacitly admitted the assertion of Linnæus, that there were no less than five articulations more in the antennæ of the neuter than the female bee, it required no small share of credulity to believe that such an astonishing difference in the formation of these organs could be produced by the mere effect of feeding the creature under the larva form in one particular manner instead of another; but this mistake being ascertained, removes one difficulty most certainly, namely, the impossibility of the working bee having been transformed into a queen, if it does not go very far to prove the fact itself. There are, it must be owned, however, some other objections of a similar nature, which still remain to be removed. Mr. Kirby, than whom we know no firmer advocate for the opinion of the working bees being strictly neuter from their origin, does not appear to have been aware, when he corrected this misstatement of Linnæus, that his remark would tend, in one material point, to support an idea so contrary to that which he entertains himself in this respect.

Mr. Wildman, who, from his constant habit of rearing bees, was perfectly conversant with their attachment to the female, or queen bee, relates one curious particular; the manner in which he could cause a swarm of bees to follow him, and alight in any particular spot he might think proper. "Long experience," says this writer, "has taught me, that as soon as I turn up the hive, and give it some taps on the sides and bottom, the queen immediately appears to know the cause of this alarm, but soon retires again among her people. Being accustomed to see her so often, I readily perceive her at first glance; and long practice has enabled me to seize her instantly with a tenderness that does not in the least endanger her person; this is of the utmost importance; for the least injury done to her brings immediate destruction to the hive, if you have not a spare queen to put in her place, as I have too often experienced in my first attempts. When possessed of her, I can, without injury to her, or exciting that degree of resentment that may tempt her to sting me, slip her into my other hand, and returning the hive to its place, hold her there, till the bees, missing her, are all on wing, and in the utmost confusion. When the bees are thus distressed, I place the queen wherever I would have the bees to settle. The moment a few of them discover her, they give notice to those near them, and these to the rest; the knowledge of which soon becomes so general, that in a few minutes they all collect themselves around her, and are so happy in having recovered this sole support of their state, that they will long remain quiet in their situation. Nay, the scent of her body is so attractive to them that the slightest touch of her along any place or substance, will attach the bees to it, and induce them to take any path she takes."

BEES, Preservation of. The preservation of these industrious and useful creatures deserves every consideration. This depends chiefly on supplying them with a sufficient quantity of food, guarding them from their enemies, and despoiling them of the produce of their labour without destroying them. Besides the attention which should be bestowed upon the necessities of bees, in the choice of an eligible situation for the *APIARY*, it may be necessary to feed them towards the close of autumn, in the winter, or in the spring, when they have consumed their winter stock. This should be done, especially in cloudy, misty weather, when they go abroad but little, and when several days of bad weather immediately follow their swarming. Mr. Thorley directs, that no hive should be kept which does not weigh twenty pounds; and that the supply should be given in quantities of honey, which

which is their proper food, not less than a pound and a half or two pounds at a time. The honey should be first diluted with water, or small beer, and then poured into an empty comb. A drone comb is the strongest and best for the purpose; and in the evening, when the bees are quiet, the hive should be gently raised on one side, and the comb put under it, the contents of which will be conveyed away the next day into the several magazines.

Reaumur recommends a plate of liquid honey unmix'd with water, cross'd with straws, and cover'd with a paper full of holes, through which the bees will suck the honey without disturbing themselves. But care should be taken that the hive be well guarded from robbers, whenever it is provided with a fresh supply. The winter quarters of the bees should likewise be well secured, both against the weather and the enemies that would annoy them. Mild winters, as well as severe cold, are injurious; sunshine in winter tempts them to go abroad, and expos's them to the fatal effects of sudden changes either of cold or rain. Bees are most likely to survive in cold winters, because they are then in a torpid state, and require very little nourishment, provided the apiary be well secured from the keen effects of northerly and easterly winds; whereas a small degree of warmth enlivens them, when they too often consume their winter stock, and are left destitute of food in a wet unfavourable spring. When bees are chilled with cold, and to all appearance dying with cold, and the clusters of them are broken, so that they drop down in the hive, they may be recover'd oftentimes by the means of heat. Some have advis'd the application of hot or warm ashes to be laid about the hives, or sprinkled over the clusters of bees which lie seemingly dead at the bottom of the hive. A sufficient warmth may be given them by putting them into an handkerchief, and breathing upon them, or by laying them before a fire. This precaution should be taken immediately when the symptoms of disease are shewn, otherwise their vitals may be impaired, and the bees be irrecoverably lost. Reaumur made many attempts to preserve the bees from the ill effects of cold in the winter without removing the hives out of the places where they stand in the summer. With this view, he cover'd some of the hives with straw, by means of sticks fix'd round them, and reaching a few inches above the top; but the most successful method he found to be that of preserving them in large tubs, with earth or hay, covering at the same time to convey air to them through a square tube of wood two inches in width, and half an inch in diameter, which pass'd through the side of the tub, and was of such a length as to reach the mouth of the hive, projecting at the same time three or four inches beyond the sides of the tub. In the time of Reaumur many ingenious contrivances have been advis'd to obviate this, and other objections, against the hives that were formerly in use. A new kind of hive contriv'd by M. Hubert de Goxxa, found to be most obtain'd success upon, or the most contented this time. There are also others contriv'd by Peltan, Missie, Benjagat, Blacq, Barbet, Foy, Raveil, &c. well deserving the attention of the farmer. The agricultural committee in Paris has been recently employ'd in the examination of the best most economical and advantag'ous kinds of hives, when M. Larcher, a gentleman near that city, presented one for their inspection on a plate entirely new, under the name of "*cube villigerose*," the construction of which was very much improv'd. For the sake of preserving the bees, due attention should be paid to the situation in which the hives are plac'd; they ought not to be plac'd in gardens stor'd with sweet-scented plants, fruit trees, and the like. The hives should not be plac'd too near to these, because they harbour vermin injurious to the bees, and still more, weeds must not be allow'd

to flourish close to the hives, since they nourish others far more detrimental to the bees than the former.

It is no unusual circumstance for one colony of bees to attack and plunder the hive of another. This happens chiefly in the spring and autumn. The most effectual way to guard against their incursions, is to lessen the entrance into the hive, so as to leave room for only two or three bees to pass a-breast, or to stop up the hives that are attacked, till the robbers disappear; or if strangers have gain'd admittance, the proper inhabitants of the hive may be rous'd to self-defence by disturbing them with a bunch of stinking madder fasten'd to the end of a small stick, which will instantly raise their resentment, and make them seize upon the robbers. This is indeed needless while the queen of the hive attacked is safe.

BEES, Enemies of. In the domestic state the bee has many enemies; but in a state of nature these are far more numerous. While in the apiary, wasps and hornets are among the most formidable of those enemies; they will often contrive to enter the hive, and build their nests in it, and harass the bees without mercy, till they leave their habitation, unless proper care be taken to prevent such encroachments. The fox is a dangerous enemy in the winter, as he is able to make a passage into the hive, and devour the honey. Rats are equally injurious; the house and field-mice should also be guarded against, by diminishing the entrance into the hive, as the cold comes on, when the bees become less able to defend themselves. The hives may be placed in such a manner that it will be impossible for the mice to reach them. Birds are bitter enemies to the bees; the sparrow, house-lark, and swallows in particular. Toads and frogs will place themselves at the entrance of the hive, and devour many. Spiders will expand their snares near the hive, and destroy numbers. The species *aranea calcina* lies in ambush for the bees in the corolla of flowers, and fastens upon them when they come to sip the nectareous fluids. Ants of almost every kind penetrate into the hive, attack the young brood, and plunder the combs of the honey. The stink of certain species of ants is so offensive to bees, that they will quit their hives to avoid it, or if they remain, become sickly. Some larvae, or caterpillars, are likewise exceedingly injurious to the bees, the honey, the comb, and hive. *Phalena melibonella*, or honey moth, too frequently secures its residence in the hive, and deposits its eggs; which hatching produces a larva of a pale flesh colour, that subsists entirely on the honey. The eggs of another phalena, the wax moth, *P. caryofagata*, hatch sooner and produce larvae than the former; for these do not emerge from the eggs, than their operation commences; they attack the comb, which they perforate in a variety of intricate passages, burrowing and feeding as they proceed, till they reach the bottom of the cells in which they are bred, here they remain in security, and do not uncommonly compel the colony of bees to leave their residence. The old combs are those that are generally infested by these insects. A third sort of moth, *phalena sociella*, breeds likewise in the honey-combs of some bees. Hives of bees that have swarmed more than once, and such also as contain but little honey, are most expos'd to the depredations of these insects; for the half-draught combs serve to shelter them, and the scanty store of honey or wax supplies them at least with food to the detriment of the colony. Bees are subject also to a peculiar species of pediculus, called the bee-louse. Hives of bees that have swarmed more than once, and such as contain but little honey, are most expos'd to these troublesome vermin. The hive in this case should be clean'd at the farthest once every week, and the stools on which they stand every morning, for the latter are likely to harbour the larvae and moths, or other insects, as well as the hive.

hive. But these obnoxious creatures cannot be entirely extirpated without taking away the infected hive, removing the bees, and cleaning it, before it is restored to the former situation. The lice of bees are of a slender shape, or filiform, and of a ferruginous colour, and may be destroyed by strewing tobacco over the bees. In a wild state the common honey-bee inhabits the cavities of hollow trees, where they are unavoidably exposed to a prodigious host of enemies, especially field and wood-mice of every description, rats, and birds. Of the bird tribe in particular, some species are supposed to feed exclusively on bees, such as the honey-buzzard (*falco apivorus*), the European bee-eater (*merops apivora*), &c. woodpeckers, the kingfisher, and many others: they do not feed, indeed, exclusively on them, as is imagined, but they are formidable enemies to the bees in a wild state. The animals and birds which prey upon exotic honey-bees are numerous likewise; of this kind we might instance the various species of ant-eaters (*myrmecophaga*), the black bear (*ursus arctos*), the honey cuckoo (*cuculus indicator*), peacocks, &c.

BEES, Maladies of. In the spring the bees are subject to a kind of dysentery, which proves often fatal. The matter which they void at this time, when so affected, instead of being of a reddish yellow colour, is of a muddy black, and has an intolerable smell. Columella supposed this annual distemper to be occasioned by the bees extracting too freely the juices from the blossoms of the spurge and elm trees, or, as others believe, from the lime tree. There are writers who, dissenting from this opinion, attribute it to the quantity of new honey, of which they are known to eat to excess at that season of the year. Again, others imagine that it is caused only by their long stay in the hive during the winter, when they are constrained to feed on the coarse wax, if their honey fails to afford them a sufficient quantity of food. Madame Vicat, in the "Memoires, &c." of the Berne Society for 1764, ascribes this distemper to the honey which the cold has candied in the hive during winter. The true cause of this distemper seems to be unknown; but it is certainly contagious and very destructive. A good remedy for it was long unknown. Aristomachus recommends the removal of the vitiated combs. For the recovery of the bees affected with this distemper, a new remedy has been adopted upon the continent: they prepare a syrup composed with an equal quantity of good wine and sugar, which is administered to the bees in every hive, either by pouring it into the cells, or placing it within the hive in a saucer, or any other shallow vessel; this has been found an excellent restorative.

About the end of the spring, another disorder sometimes makes its appearance, which Du Carne de Blangy calls a "vertige," or vertigo. This is supposed to be occasioned by the venomous properties of certain plants on which they feed. The symptoms are manifested by a dizzy manner of flight, by their involuntary startings, falls, and other gestures, in attempting to perform their usual operations, or in approaching the hive, and by the lassitude that succeeds these symptoms. This distemper has been hitherto found incurable.

Bees are liable to a third distemper, the symptoms of which are a swelling at the extremity of the antennæ, which becomes also much inflamed, and of a yellow colour; the head assuming shortly after the same tint, the bees lose their vivacity, and languish till they die, unless a proper remedy be applied. In France, they give them Spanish wine for this disorder.

There is still another distemper which sometimes makes its appearance among bees, for which the continental agriculturalists administer Spanish wine, as in the former cases. This is a kind of pestilence by which many bees are cut off. It happens when the queen bee has placed the eggs carelessly in the comb, so that the larvæ perish in the cells, or that

they are killed by the cold, or bad management in nourishing and feeding them; when numbers die, and infect the rest. The only attention requisite in this case is to take away the infected combs, scent the hive with the perfume of aromatic plants, and give them the wine to sip, as above mentioned, in order to strengthen and restore them from their sickness.

For the methods of preserving bees in hives and boxes, and for collecting the produce of their labour, see HIVE, HONEY, and WAX.

HONEY-BEES, Varieties and Species of. The cultivation of the common honey-bee, in the warmer countries of Europe, being an object of the utmost consequence to the farmer, every means that ingenuity could devise to improve the breed and management of these profitable creatures have been adopted, and with success. They distinguish three kinds or varieties of the common bee (*apis mellifica*). The first is large, and of a deep brown colour; the second is smaller and blackish: those of the third sort called "the little Flemings," or "little Hollanders," are much smaller than either, and of a fine glossy yellow colour. It is the latter that is very generally cultivated on the continent at this time. *Apis mellifica* is an European insect. Mr. Hunter supposes it an inhabitant of Asia and Africa also; its appearance in America may be accounted for on the presumption that it was originally introduced there from Europe, and in the course of time has become completely habituated to that climate. It is said to have been originally peculiar to the continent of Europe, but this will admit of doubt. In those parts of Asia and Africa nearest to the south of Europe, they cultivate the same kind as ourselves. There are some other species of bees domesticated like the common bee with us, in different parts of the world; and others again, whose wax and honey are sought after by the natives, who do not care to take the charge and trouble of domesticating them. In Cayenne and Surinam, the species called by Olivier *amalthæa*, is an abundant and most profitable creature. This little bee is of a black colour, with white wings and long posterior feet. They build their nest, in the shape of a bag-pipe, upon the tops of the highest trees. The honey is very sweet and agreeable, and thin, and of a reddish colour. From the latter the Indians extract a spirituous liquor, of which they are passionately fond; of the wax they make candles. This is supposed to be the small black innocuous wood-bee of Barrère, which is called *ovano* in Cayenne. M. Latreille mentions this species, and also another, which he calls "l'abeille sociale" (*apis socialis*), among his "apiaries domestiques," an insect rather smaller than the common honey-bee (*mellifica*), that is found in India. Specimens of it, he tells us, were received at the museum of natural history in Paris, among a collection of other insects from Bengal. If we are not mistaken in the species, the same kind was likewise introduced into the cabinets of the curious in this country, about twelve months since by Mr. Fichtell, who found it to be very commonly cultivated by the inhabitants in the vicinity of Bengal.

WILD BEES. Except those species of the bee tribe which are subservient to the purposes of human life, mankind has shewn a manifest degree of inattention to this curious race of creatures. Some few naturalists have regarded them as objects of amusement: and what the common observer is content to name a wild bee, without further inquiry, is discriminated by them as forming many distinct families; each of which have their peculiar manners and mode of life, and display a greater or less proportion of economy, skill, industry, &c. by no means unworthy of being more minutely attended to. Of the wild bees there are certain natural families, whose distinctive characters, in a scientific point of view, have been described already; they are distinguished also by their man-

ners of life, the formation of their nests, and manner of particular cells. Some are called leaf-cutters, others wood-piercers, masons, earth-diggers, &c. corresponding with what the French call "abeilles coupeuses, abeilles perce-bois, abeilles maçons, abeilles qui creusent la terre," &c. Under each of these families many species are arranged by entomologists. A similar mode of nomenclature (it has been well remarked) may be adopted very often as the characteristic of a family, or that of a species; thus the cells of the different species of *Anthophora* are composed of similar materials, and resemble each other in form; and the various genuine species of the genus *Vespa* (*Harpes*) construct cells, for the most part, of the same figure, and employ the same kind of material, according to Reaumur; the mode of construction, therefore, should never be assumed as characteristic of a species, but after the most mature consideration, and the closest investigation of its history; for it generally happens that these insects which agree together in habit, and belong to the same natural divisions or subdivisions of a genus, are connected likewise by their mode of life.

Of the leaf-cutters there are several species; these are so named because they cut the leaves of trees, chiefly those of the rose, into pieces of a convenient size, compose their little cells, in which the eggs of the future brood are deposited. This description of bees is injurious; the female perforates the solid timber of trees in a surprising manner in order to place her eggs (which are carefully wrapped up in these cylindrical pellets, if they may be so termed, of leaves), within the cavity. The hollow or pipe which the bores for their reception is usually about the thickness of a small finger, but the depth is very various, being from a few inches to a foot or more; the whole cavity is filled with those little pellets, each of which contains an egg, with a provision of honey for the larva when hatched; so nicely are these pellets formed that they precisely fit the cavity in diameter, and are placed one above the other from the opening to the very bottom of the cavity. *Apis centuncularis* is one of the species belonging to this natural family. There are others which belong to the same, that construct their cells in the same manner, but place them in cylindrical cavities in the earth, instead of timber. Some line or envelop their nidus with a downy substance collected from the woolly leaves of particular plants; the tapestry bee employs the tender petals of the rose to line its cells, &c. The mason bees are also singular in their mode of construction which they adopt. Reaumur has described at length in his history, a brief account of which will suffice for general remarks upon the subject for the present, and these must be again repeated when speaking of other species, &c., or of the families to which they belong are peculiar.—"The female of these bees, for the most part, like the drone of the hive-bee, do not work, and therefore they have only two females, undertake the whole labour of the building; and at the same time both architect and mason. Her first step is to fix upon an hole, formed by any process, on the inside of a stone wall. Sometimes she content herself with a more exposed part of the surface, where the light happens to be usual, and if for her purpose. Having chosen a spot proper to form the foundation of the future mansion of her offspring, her next care is to provide materials. As her habit is to be built entirely of a kind of mortar, the basis of which must be found; she is very curious in her choice of it, she searches for a shell, or grain, from such as contains some mixture of earth. To shorten her labour, she first transports the upper part of a kind of tithy, which is very soft, from the bottom of a stream, or the contrary into a little hole, about the size of a small nail. Taking this up with her tongue, she conveys it to the spot she has fixed upon for the base of her cell.

A circular plume, composed of many of these little masses, forms the basis on which it is to be erected; it contains from three to eight cells, which are similar to each other in their form, and equal in dimensions. Each cell is about an inch in length, and six lines in diameter; and, before its orifice is closed, in form resembles a thimble. When its walls are raised to a sufficient height, our little mason lays up in it a store of pollen seasoned with honey, for the sustenance of its future inhabitants; sometimes the proportion of honey is so great that this provision is entirely liquid. This business settled, she deposits her egg, finishes and covers in the cell, and then proceeds to the erection of a second, which she finishes and finishes in the same manner, and so on with respect to the whole nest. These cells are not placed in a line, or any regular order; some are parallel with the wall, others are perpendicular to it, and others are inclined to it at different angles; this occasions some empty spaces between the cells, which this labouring insect fills up with the same kind of cement, and then blows on the whole group a common covering, made with coarser grains of sand; so that at length the nest becomes a mass of mortar, very hard, and not easily penetrated, even by the blade of a knife; its form is more or less oblong; its colour depends on the colour of the sand employed in its construction."—Another species forms its nidus, with earth intermixed with chalk, upon stone walls; and a third for the sake of greater security prefers the hollows and cavities in the stone itself for this purpose.

BEES, WILD HONEY, *Hunting of.* In the Philosophical Transactions, No. 376, Mr. Dudley speaks of a method of hunting bees in order to discover the spot in which their nests are secreted, as practised some years ago in the woods of New England in America. It consists merely in catching a bee, then letting it fly, and daily observing the way to which it directs its course; this points out to the hunter the direction in which the nest is to be sought after. To find the distance, he takes an off-set of an hundred perches, and then lets fly another bee, but which must be of the same nest; and it is asserted, that the angle or point where these two courses intersect, is the spot in which the nest is concealed.

BEES, Swarming of. See SWARM.

BEES, Writers on. Many authors have written on bees. Among the ancients, Aristomachus is said to have studied them sixty years. Phyllisus retired into a desert wood, that he might have the opportunity of observing them to better advantage; Aristotle made a great number of curious observations on this insect, which Virgil has put into Latin verse: they have been enlarged and confirmed by Pliny and others. Theophrastus has a fragment of a treatise, *De apibus, & meretricibus*; or, as it is titled in Latin, *De vita, & moribus, & generibus*.

Among the moderns, the number of writers who have treated on bees is very great, a few only of which it will be expected in this place to mention. Ponce Frederic Cetti, instructor of the Roman Academy of Science, wrote expressly on bees; did also Swammerdam, Marston, and Reaumur, each of whom have treated minutely of them. Schiwenk is a distinguished writer on this subject. Hutton's description of bees. Among the English, Pehr, Grew, Mill, Lest, Thoms, Southey, Remond, Rotten, Ward, White, Williams, Dobson, Hunter, and others, have published discourses, or treatises, on the subject of bees, &c. Various observations are to be found in the papers in their natural history works, are such as Linnaeus, Fabricius, Geoffroy, Schiffer, Villier, Poda, Rühl, De Geer, Fourcroy, Donovan, Coccetti, &c. A monograph of bees has lately appeared in this country by Kirby, and another in France about the same time by Latreille. Nor should we omit to mention several works of reputation on this subject that have

been published on the continent within the last few years : of this description are the work of Huber of Geneva ; "Le Mémoire de Bernard sur l'Education des Abeilles ;" "Le cours d'Agriculture," by Rozier ; "Abregé de l'Histoire des Insectes pour servir l'Histoire Naturelle des Abeilles," by Bazin Gilles Augustin, first published in 1747 ; "Le Manuel Nécessaire au Villageois pour soigner les Abeilles," by Lombard ; and the works of Berthaud, Duchet, Ducarne, Blangy, Della Rocca, &c.

BEE, in *Astronomy*. See APIS.

BEE is also used figuratively to denote sweetness, industry, &c. Thus Xenophon is called the Attic bee, on account of the great sweetness of his style. Antonius got the denomination *melissa*, or bee, on account of his collection of common places.

Leo Allatius gave the appellation of *apes urbanae* to the illustrious men at Rome, from the year 1630 to the year 1632.

BEE-bird, in *Ornithology*. See TROCHILUS MINIMUS ; the bee humming bird, or *le plus petit Oiseau mouche* of Buffon. Some refer this name likewise to *Trochilus Bicolor* of Gmelin, the *Colibri* of *Ferm.* Surin. N. 2.

BEE, *Black*. See ÆTHIOPS.

BEE-Blocks. See BLOCKS.

BEE-boxes. See HIVE.

BEES-bread. See BEE BREAD, FARINA, and BEE *supra*.

BEE-eater, in *Ornithology*. See FALCO APIVORUS, *Honey Buzzard*.

BEE-flower, or Orchys, in *Botany*. See OPHRYS.

BEE-glue, a soft unctuous matter employed by bees to cement the combs to the hives, and to close up the cells.

BEE-hive. See HIVE.

BEE-humble, *humming bee*, wild bee, synonymous with the Bourdon family of bees, adopted by French writers.

BEE-humble fly. See BOMBYLIUS.

BEE, *Order of*, was instituted at Sceaux in France, for men and women, in 1703, by Louise, wife of Louis of Bourbon. The ensign is a medal of gold, bearing on one side the portrait of the foundress, and on the other a bee, with this motto, "Je suis petite, mais mes pictures sont profondes."

BEE-rocks, in *Geography*, lie on the coast of France, a little to the west of North from the point of St. Maloes. They are called the Great and Little Bee ; the latter of which is west of the other, and lies N. W. from the town about a gun-shot. On each of the bee-rocks is a little house. Ships may fail within a cable's length of the outermost or Little Bee, and anchor on the south of it in 5 or 6 fathoms at low-water, when Bore tower, on the south of St. Maloes, is a little east of the small tower on the point to the south of the town.

BEECH-TREE, in *Botany*. See FAGUS.

BEECH galls, in *Natural History*, the name of a species of galls or protuberances found on the beech-tree, and serving for the lodgment of insects.

These galls are found on the leaves of the beech, and are sometimes only one upon a leaf, sometimes more ; they always grow from the same point, owing, no doubt, to the fly's having laid so many eggs in the same spot.

These galls are of an oblong figure, and somewhat flattened. They resemble the stone of a plum in shape, and are so hard that they are not to be broken between the fingers ; their substance seems of the same nature with that of a nut shell. In each gall there is only one cavity, inhabited by a white worm, which in time passes through the nymph state into that of the fly, to which it owed its origin.

BEECH-mast, the fruit of the beech-tree. It fattens hogs and deer, and has sometimes supplied men instead of bread. Chios is said to have endured a memorable siege by means of it.

BEECH, *Oil of*, *Huile de Faine*, the fruit of this tree, the beech-mast, is an oily farinaceous nut highly nutritious to hogs, poultry, and other animals, and like the other fruits

of this description may be made to yield a very large quantity of pure oil by pressure. This oil has long been prepared in several districts in the south of France. An interesting account of this manufacture is published in the *Journal de Physique* for 1781, by Mr. Verdier.

The taste of the beech-mast is mild, unctuous, and somewhat astringent. About the month of October it falls spontaneously from the tree, and is collected in this and the succeeding month. When gathered and picked it is slowly dried in the shade, or with the heat of a very gentle stove ; after which it is at any time fit to be pressed for the oil. The very finest oil is made with the best nuts picked out by hand, but for the larger quantity the mast is sifted and winnowed like corn. It is then ground by a machine similar to a stamping mill, formed of upright beams of wood alternately rising and falling, set on motion by a large wheel, and when the fruit gets too dry a little water is added. When ground sufficiently fine, it is wrapped up in a coarse hair cloth once doubled, and submitted to the same kind of press which is employed for colseed, and other oils.

The beech oil, when well made, and from the best selected fruit, is equal to the best olive oil, and with this advantage, that it will keep much longer ; olive oil beginning to grow rancid in about a year and a half, whereas the other improves by keeping, to the sixth or eighth year. It is fit for use a month after it is made. To obtain the finest oil, besides the perfection of the fruit, it is necessary that the working of the mill in which it is ground, should be very moderate, so as not to overheat it.

The water used to give the fruit a proper consistence in grinding, mixes with the oil when pressed, so that it requires some weeks repose to allow them to separate. In general the oil stands about three months to clarify, after which it is drawn off clear from the water and dregs, and packed up either in bottles or in very close casks. The general yield of oil is about ten pounds from $4\frac{1}{2}$ bushels, Paris measure.

The uses to which it is applied are all those of the common fixed vegetable oil. The best sorts are equally grateful for the table as the best olive oil. The inferior are used for lamps, for preparing leather, and other purposes of economy and manufacture.

The cakes that remain after the oil is pressed out are particularly useful in the fabrication of the oil from nuts, as this latter fruit is not alone of a proper consistence for the press, but must be mixed with some more solid substance to make it work well. Besides this, the cakes of beech-mast are proper for fattening animals, or make a very good fuel.

An attempt was made in the beginning of the last century to introduce the preparation of beech mast oil in this country. The poet and speculator, Aaron Hill, obtained a patent for this manufacture, and went to some expence in establishing it in England about the year 1714. It would appear from a letter of his to the earl of Chesterfield (in the Harleian Collection, and inserted in the *Monthly Magazine* for 1803, p. 339,) that he had formed very sanguine hopes of the success of this plan. However he was obliged soon to abandon it, probably in part from a want of a proper supply of the fruit, and certainly in a considerable degree from the very limited use of oil as an article of food in this country.

BEEF, in *Domestic Economy*, the flesh of black cattle prepared for food. The flesh of the *bos* or ox hind, says Dr. Cullen (*Mat. Med.* vol. i. p. 369,) is the most dense of all the quadrupeds ; and how far that density goes in preventing solubility, we have an instance in the bull, whose flesh is seldom chosen as a part of our diet. The flesh of the female sex is of a more soluble nature, and sufficiently fit for nourishment ; but we commonly prefer the castrated ox, in which the fat is better mixed, and as more alkalescent, the flesh is more

fapid ;

sap'le; and, unless it be from a very old animal, is generally to be preferred. The chief difference of aliment in the ox kind is that which appears between the old and young. This author observes, that beef, though of a more firm texture, is less sabbile than mutton, is equally alkaliescent, palatable and nutritious. See FOOD.

BEEF-EATER, in *Ornithology*, the English name of *Bufo Africana*, a bird found on the banks of the rivers in Senegal, and the only species of the genus known. See BUPHAGA.

BEEF-ISLAND, in *Geography*, a small island near the coast of America, in the south-east angle of the bay of Campeachy, the west end of which is washed by the eastward opening of St. Peter and Paul river. It lies close to Trieth's island, is 7 leagues long, and from 3 to 4 broad, and has a fine sandy bay, where ships may ride in 7 or 8 fathoms and be well sheltered. N. lat. 18° 30'. W. long. 91° 30'.

BEEF-ISLAND is also one of the smaller Virginian islands in the West Indies, situate between Dog island on the west, and Tortola on the east, in Sir Francis Drake's bay. It is about five miles long, and one broad. N. lat. 18° 23'. W. long. 63° 2'.

BEEHMAN, a considerable township of America in Dutchess county, New York, containing 3,597 inhabitants, including 106 slaves. In the State census of 1796, there appear to be 52 electors in this township.

BEELE, in *Mining*, an instrument used by the workmen to break and pick out the ore from the rocks in which it lies. This instrument is called by the tinmen in Cornwall a "tubber." It is an iron instrument of eight or ten pounds weight, made sharp, and steel'd at both ends, and having a hole in the middle, where the handle is fixed in. When the ore lies in hard rock, this instrument wears out so fast, that it must have new points made to it every fortnight. The miners who dig up the ore in the mines, are, from the use of this instrument, called beele-men; and those who attend them, and whose business it is to take up the matter the others loose or break up, are, from their instrument, which is a broad and hollow iron shovel, or a wooden one, with a very strong iron lip, called the "shovellers." In Cornwall, when the ore lies in a hard bed, they allow two shovellers to three beele-men; and when it lies in a soft and earthy matter, two beele-men and three shovellers are the proportion. Phil. Trans. N. 69. p. 2104.

BEELIKE, in *Geography*, a town of Germany, in the circle of the Lower Rhine, and duchy of Westphalia, 4 miles west of Rhiden, and 10 E.N.E. of Arelberg.

BEELEZEBUB, or **BAALZEBUB**, i. e. *the lord of a fly*, in *Ancient Mythology*, was a god of the Philistines, and had a temple and oracle at Ekron. (2 Kings, i. 2.) From this passage it is evident, that the name was not given to this object of idolatrous worship by way of contempt; because it was used by Achish at the very time when he was acknowledging his divinity, and desirous of consulting him concerning his recovery. This is farther evident, from the meaning of the appellation, and the reason of it being given. History informs us, that those who lived in hot climates, and where the soil was moist, which was the case with the Ekronites, who bordered upon the sea, were exceedingly infested with flies; and these insects were thought to occasion contagious distempers. Pliny (N. H. l. x. c. 28. § 40.) mentions a people who stopped a pestilence which had been their calamity, by sacrificing to the "fly-hunting-god." It is not improbable that some magical cure of this kind, or a general persuasion of his power of driving away flies from the places they frequented, might be the reason why the god of Ekron was called Beelzebub. For it was customary with the heathens, to call their gods by the name of those insects, from which they were believed to deliver their worshippers. The "god of flies," *Muzza*, and

the "fly-hunter," *Muzza*, were titles ascribed to Jupiter as well as to Hercules. Indeed, some of the Greek fathers thought, that this "fly-god" was worshipped under the form of a fly; and it is observed by Mr. Young (on Idolatry, vol. ii. p. 91, 92.) that it was customary with the heathens to represent their gods by insect creatures that were sacred to them. However, the supposed power of this god over that noxious insect, the fly, seems to be the most probable reason of the name of Beelzebub. Beelzebub, therefore, being a title of honour, and as such applied by his worshippers to the god of Ekron, there is no reason for doubting, that it was in use among the Philistines, as well as among the Jews. (Bochart, vol. ii. p. 36, &c. Op. vol. iii. p. 500. Selden de Dus. Syr. Swaug. i. c. 6. p. 227. ed. Amd. 1680.) Among the Jews, the appellation Beelzebub, notwithstanding its seeming reproaches, could not be used as a term of derision. For the Jews had learned of the heathens to regard a power of driving away flies, as a divine prerogative: and availing to persuade men, that the temple of Jerusalem, though so many sacrifices were daily offered there, never had a fly upon it: thus copying, rather than deriding, what the heathens fabled concerning some of their temples, into which, according to Pliny, Solinus, and others, no fly could enter. It has been said, indeed, that the Greek word used in the New Testament, is not "Beelzebub," but "Beelzeboul," which signifies the "lord of a dunghill;" and hence it has been inferred, that this name could not have been used by the heathens; but must have been given by the Jews in derision. Jerom, however, not understanding the common idiom, changed *Beelzeboul* into *Beelzebub*; and this substitution has been approved by several critics, has been adopted in the vulgate, and thence transferred into Luther's translation. In the ancient language it was not uncommon to change *b* into *l* (see letter B;) and, on this supposition, the Greek word will agree with the Hebrew, (2 Kings, i. 2.) But if Beelzeboul be used as a different name from Beelzebub, there will be no reason for supposing that it was used by the Jews as an expression of contempt. The Hebrew word *Beelzeboul*, properly signifies "a habitation," and as Stockius observes, is applied to the heavens, the mansion of the deity. In this sense it will agree with the title of Beelshamin, or Beelshamen, "the lord of heaven," which the Ekronites, and other Phoenicians, gave to their supreme nomen. Whether, therefore, Beelzebub and Beelzeboul be different names, or the same name with different terminations, they describe the person whom the heathens regarded as their chief deity.

Beelzebub, in the New Testament, (Matt. xii. 24. Mark, iii. 22.) is called *the prince of devils*, the prince of demons, (prince of the devil, Engl. Transl.); and it has been commonly apprehended, that demons and the prince are the same spirit as the devil and his angels. Satan and Beelzebub, say those that adopt this opinion, (See Doddridge on Matt. xii. 25. Fan. Lect. vol. i. p. 291, not 30. and Pegge's Answer to Sykes) are names for the same person, for when Christ was reproach'd with calling out demons by the assistance of the prince of devils, he replied, "How can Satan cast out Satan?" (Matt. xii. 26. Mark, iii. 23. Luke, xi. 17.) Now if Satan, who is considered as the same person with the devil (Rev. ix. 12. Matt. iv. i. compared with Mark, i. 12.), was the prince of these devils who were cast out by Christ; then demons are the same spirit as the devil's angels. And in this supposition, there can be no other difference between a demon and the devil than that which distinguishes between a prince and his subjects, who both partake of one common nature, though the prince, as presiding over the rest, hath a peculiar name of his own. Dr. Lardner (Case of Demons, p. 42. Works, vol. i. p. 448.)

p. 448.) admits, that the devil, who is supposed to be the chief or prince of the fallen angels, is often called Satan and Beelzebub. Mr. Farmer is of opinion (Essay on the Demoniacs of the N. T. p. 16.) that it doth not follow from the above cited passage, that the devil is ever called Beelzebub. The term "Satan," he says, is not appropriated to one particular person or spirit, but signifies "an adversary" or opponent, in general. The Jews called every demon by this name, and used it in the plural number; and the words of our Saviour, "How can Satan cast out Satan," taken in their strictest sense, imply that there were several Satans: so that our Lord might only mean, "that it was unreasonable to suppose that one demon would cast out another." Or if you understand him to the following purpose: "were Beelzebub, whom you regard as the chief of the *possessing* demons, to expel himself, which would in effect be the case were he to expel his agents and instruments, he would act against his own interest, and defeat his own schemes;" it will not follow, that Beelzebub was considered as the same person with the devil. There seems to be no reference to the latter. He and Beelzebub might be regarded as two distinct persons; and yet each be called "Satan," an adversary, or opponent. "If Beelzebub and his demons were, in our Saviour's time, conceived to be the very same persons as the devil and his angels, is it not very surprising," says this author, "that the New Testament, in its original language, should always speak of the diseased persons under consideration as possessed by a "demon" or "demons," and never by "the devil" or "devils?" a word, as all must allow, that is never there applied to evil spirits in the plural number, whatever its use may be in the singular. He adds, "inasmuch as Christ is here replying to the Pharisees, and reasoning with them on their own principles, he cannot be supposed to speak of a different order of beings from what they did. Satan, therefore, must be equivalent to demon, in the sense in which demon was used by them." See DEMON. "Should it then appear," says Mr. Farmer, "that by demons and their prince they understood human spirits, it will from hence follow, that Christ cannot be speaking of spirits of a celestial origin." If by the devil, we are to understand a fallen angel, this writer thinks that he could not be the same with Beelzebub. The Jews, in their ancient writings, were not accustomed to call the devil by this name, but by that of Asmodeus, or Samael; as Bochart, (Oper. vol. iii. p. 501.) Selden, (ubi supra, p. 231.) and others allow. Beelzebub, in the estimation of the Pharisees, was the prince of the "possessing demons," and therefore, as Mr. Farmer supposes, he was, in their estimation, a human spirit; and in proof of this he alleges the testimony of Josephus (De Bell. Jud. l. vii. c. 6. § 3). Besides Beelzebub was, as we have already stated, a heathen deity; expressly denominated in the Old Testament, the god of Ekron; and represented by the Pharisees under the same title and character as the heathens themselves ascribed to their gods. "If Beelzebub," subjoins Mr. Farmer, "was a heathen demon, or deity, he was no other than a deified human spirit: for such were all the heathen demons, who were the more immediate objects of the public established worship; and those in particular to whom divination and oracles were ascribed. And if the prince of demons was of human extract, no doubt his subjects were so likewise.

BEELZEBUL, in *Entomology*, a species of SCARABÆUS that inhabits America. On the thorax is a triple prominence; and three horns on the head, the middle one larger than the others. Fabricius.

BEELZEBUL, in *Zoology*, a species of SIMIA that inhabits South America; and is tailed, bearded, and black; tail prehensile; tip, with the feet, brown. Linnæus. This

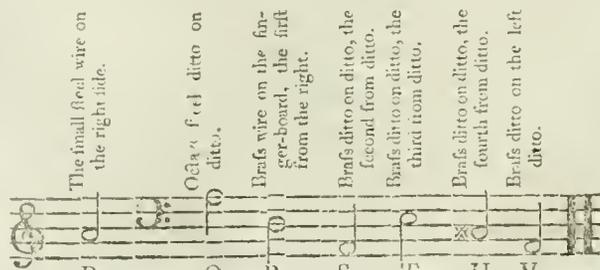
appears to be the *guariba* of Maregrave; *howling baboon* of Bancroft; *preacher monkey* of Pennant; and *Pouarine* of Buffon. It is said to be about the size of a fox, of a black colour, and the hair of its fur long, glossy, and remarkably smooth. This is a fierce animal, and inhabits the woods of Brasil, and Guiana, in vast numbers; wanders in large flocks in the night time, and howls hideously. Dr. Shaw observes, that this howling faculty is owing to the conformation of the os hyoides, or throat bone, which is dilated into a bottle-shaped cavity. Maregrave, in speaking of the *guariba*, acquaints us that one sometimes mounts the top of a branch, and assembles a multitude below; he then sets up a howl so loud and horrible, that a person at a distance would imagine that a hundred joined in the cry; after a certain space, he gives a signal with his hand, when the whole assembly join in chorus, but on another signal, a sudden silence prevails, and then the orator finishes his harangue. Virey calls this animal Beelzebub, retaining however at the same time the name *Pouarine*, under which it is described by Buffon.

BEEMAH, in *Geography*, a river of Hindoostan, which is a principal branch of the Kistnah, joining it near Edghir, rises in the mountains, on the north of Poonah, probably not far from the sources of the Godavery, and passes within 30 miles of the east side of Poonah, where it is named Bewrah as well as Beemah. It forms the eastern boundary of Vishapour, and passes about 80 or 82 geographical miles to the west of Golconda, crossing the road from it to Ralicote. The Beemah, according to Mr. Orme, possesses virtues similar to those of the rivers esteemed sacred by the Hindoos: that is, ablutions performed in its stream have a religious efficacy superior to those performed in ordinary streams. Rennell's Memoir, p. 244, &c.

BEEMEN, or **SHEEMEN**, in *Astronomy*, seven stars of the fourth magnitude, following each other, in the fourth flexure of the constellation Eridanus.

BEEMSTER, in *Geography*, a large drained lake or marsh of North Holland. It was formerly a lake, covering a great extent of country, which, by the industry of the Hollanders, who, by means of various canals, have drained the waters, is converted into an excellent pasture ground. It has neither towns nor villages, but a great number of houses, which are dispersed along the sides of the canals and roads.

BEEN, in *Musie*, the name of an Indian fretted instrument of the guitar kind. The finger-board is 21 $\frac{1}{2}$ inches long. A little beyond each end of the finger-board are two gourds, and beyond these are the pegs and tail-piece which hold the wires. The whole length of the instrument is three feet seven inches. The first gourd is fixed at ten inches from the top, and the second at about two feet 11 $\frac{1}{2}$. The gourds are very large, about fourteen inches diameter, and have a round piece cut out of the bottom, about five inches diameter. The finger-board is about two inches wide. The wires are seven in number, and consist of two steel ones, very close together, in the right side; four brass ones on the finger-board; and one brass one on the left side. They are tuned in the following manner.



The

The great singularity of this instrument is the height of the frets: that nearest the nut is one inch $\frac{1}{2}$, and that at the other extremity about $\frac{2}{3}$ ths of an inch, and the decrease is pretty gradual. By this means the finger never touches the finger-board itself. The frets are fixed on with wax by the performer himself, which he does entirely by ear.

The frets are nineteen in number. On the wires R and S, which are those principally used, there is an extent of two octaves, a whole note with all the half notes complete in the first octave, but the g \sharp , and b b wanting in the second. The performer's apology for this was, that he could easily get those notes by pressing the string a little hard upon the frets; but he asserted that this was no defect in his particular instrument, but that all beers were made so. The wires, T, U, are seldom used, except open.

The beer is held over the left shoulder, the upper gourd resting on that shoulder, and the lower one on the right knee.

The frets are stopped with the left-hand; the first and second fingers are principally used. The little finger of this hand is sometimes used to strike the note V. The third finger is seldom used, the hand shifting up and down the finger-board with great rapidity. The fingers of the right hand are used to strike the strings of this hand; the third finger is never used. The two first fingers strike the wires on the finger-board, and the little finger strikes the two wires. The two first fingers of this hand are defended by a piece of wire put on the tops of them in the manner of a thimble: when the performer plays strong, this causes a very jarring disagreeable sound; whereas, when he plays softly, the tone of the instrument is remarkably pleasing.

The style of music on this instrument is in general that of great execution. I could hardly ever discover, says Mr. Fowke, any regular air or subject. The music seems to consist of a number of detached passages, some very regular in their ascent and descent: and those that are played softly, are most of them both uncommon and pleasing. Asiatic Researches, vol. i. p. 295, &c. See *Plates of Music*.

BEER, a spirituous liquor, made from any farinaceous grain; but generally from barley. Accordingly, it is a liquor of very ancient and general use. See ALE.

The word is Saxon, formed from the German *bier*, of the Latin *bibere*.

Several authors have maintained, that there was no malt liquor known by the appellation of beer, as distinguished from the ancient liquor called ale, till the use of hops was introduced. See HOPS. However, we find, by a statute of the twelfth parliament of the 23d year of king James III. of Scotland, (c. 88.) that it was enacted, that no persons should mix wine or "beer," under pain of death. Besides this instance, occurring in 1472, many others might be produced confuting the vulgar tradition, that beer, as a liquor, distinct from ale, was not known in England till the reign of Henry VIII. In the year 1492, we find a licence from king Henry VII. to a Fleming (cited in the 12th volume of the "Fœdera," p. 471.) for exporting fifty tons of it, called "beer" or "br." and in the same year one of the king's attendants into France was a beer-brewer of Greenwich in Kent. Although it may probably be true, that beer, brewed with hops, was not known in England till after this time; yet other materials were used, before hops were known, for making the liquor that was called "beer," such as wormwood, and other plants, which served instead of hops, for preserving malt-liquor, either by sea or land.

Beer is made from malt by extraction with water and fermentation. With this view, a quantity of malt, freed from its germs, and sufficient for one intended brewing, is coarsely bruised by grinding, and in the mash-tub, first well mixed with some cold, then scalded with hot water drawn upon it from the boiler. It is afterwards strongly and uniformly stirred. When the whole mass has stood quietly for a certain time, the extract (mash), or sweet-wort, is brought into the boiler; and the malt remaining in the tub is once more extracted by infusion with hot water. This second extract, treated in like manner, is added to the first, and both are boiled together. This clear decoction is now drawn off, and called boiled wort. To make the beer more fit for digestion, and at the same time to deprive it of its too great and unpleasant sweetness, the wort is mixed with a decoction of hops, or else these are boiled with it. After which it ought to be quickly cooled, to prevent its transition into acetous fermentation, which would ensue, if it were kept too long in a high temperature. On this account, the wort is transferred into the cooler; where it is exposed with a large surface to cold air, and from this to the fermenting tub, that by addition of a sufficient portion of recent yeast it may begin to ferment. When this fermentation has proceeded to a due degree, and the yeast ceases to rise, the beer is conveyed into casks, placed in cool cellars, where it finishes its fermentation, and where it is well kept and preserved under the name of "barrelled beer," with the precaution of occasionally filling up the vacancy caused in the vessels by evaporation. Or, the beer is bottled before it has done fermenting; and the bottles are stopped a little before the fermentation is completely over. By so doing, the bottled beer is rendered sparkling. In this state it frequently bursts the bottles, by the disengagement of the carbonic acid gas which it contains: and it strongly froths, like champagne, when brought into contact with air on being poured into another vessel. Gren's Chymistry, vol. ii. p. 63. For the process of brewing, particularly according to the English mode; see BREWING.

Beer, well prepared, should be limpid and clear, possess a due quantity of spirit, excite no disagreeable sweet taste, and contain no disengaged acid. By these properties, it is a species of vinous beverage, and is distinguished from wine, in the strict sense, and other liquors of that kind, by the much greater quantity of mucilaginous matter which it has received by extraction from the melted grains; but which also renders it more nourishing. "Brown beer" derives its colour from malt strongly roasted in the kiln, and its bitterish taste from the hops. "Pale beer" is brewed from malt dried in the air, or but slightly roasted, with but little or no hops at all.

Tacitus, in speaking of the ancient Germans, as also Dioscorides, Galen, &c. condemn beer, as prejudicial to the head, nerves, and membranous parts, as occasioning a more lasting and more uneasy drunkness than wine, and as promoting a suppression of urine, and sometimes a leprosy.

Mess. Perrault, Raoussant, and others, defend the modern beer: urging, that the hops used with us, and which the ancients were strangers to, having a faculty of purifying the blood, and removing obstructions, serve as a corrective, and free our drink from the inconveniences objected to that of the ancients. For the qualities of beer, see MALT-LIQUOR.

In new England they make beer from maize, or even the bread made thereof. Some physicians recommend beer made of oats and birch-water, as preferable, in nephritic cases,

cafes, to that made of barley. Phil. Trans. N^o 97. p. 6135. N^o 138.

Mr. Park, in the account of his travels through Africa, informs us, that the negroes make excellent beer of one species of their corn, by malting the feeds nearly in the same manner as barley is malted in England; and he says, that the beer, thus made, was to his taste equal to the best strong beer he had ever tasted in his native country.

Sour or decayed beer may be restored divers ways; as by salt made of the ashes of barley-straw, put into the vessel, and stirred; or by three or four handfuls of beech-ashes thrown into the vessel, and stirred; or, where the liquor is not very sour, by a little put into a bag, without stirring; chalk calcined, oyster-shells, egg-shells burnt, sea-shells, crabs eyes, alkalized coral, &c. do the same, as they imbibe the acidity, and unite with it into a sweetness. Beer, it is said, may be kept from turning sour in summer by hanging into the vessel a bag containing a new-laid egg, pricked full of little pin-holes, some laurel-berries, and a few barley-grains; or by a new-laid egg and walnut-tree leaves. Laurel berries alone, their skin being peeled off, will keep beer from deadness; and the throwing fixed air into it will restore it. Glauber commends his sal mirabile and fixed nitre, put into a linen bag, and hung on the top of the cask, so as to reach the liquor, not only for recovering sour beer, but for preserving and strengthening it. See ALE.

Beer tasting of the cask, may be freed from it, by putting a handful of wheat in a bag, and hanging it to the vessel. The grounds of beer form a very rich manure.

BEER *Poffet*. See ZYTHOGALA.

BEER, *Eager*, is used by calico-printers, chemists, lapidaries, scarlet-dyers, vinegar merchants, white-lead-men, &c.

BEER-*Measure*. See MEASURE.

BEER-*Vinegar*. See VINEGAR.

BEER-*Haven*, in *Geography*. See BEAR-HAVEN.

BEERING, BEHRING, or BERING, VITUS, in *Biography*, an eminent navigator, was a native of Denmark, and born towards the conclusion of the 17th century. After having made two voyages to India, he entered in 1704, as a lieutenant in the Russian navy, in which he afterwards rose to the rank of captain and commodore. In pursuance of a plan conceived by Peter I., and communicated on his death-bed to Beering, for making discoveries in that tempestuous sea which lies between Kamtschatka and America, this adventurous navigator set sail in 1728, accompanied by Tschirikof, from the mouth of the Kamtschatka river, with a view of ascertaining whether the two continents of Asia and America were separated, according to the instructions prepared by Peter I. on his death-bed for this purpose. Coasting along the eastern shore of Siberia, he arrived at the latitude of 67° 18', but made no discovery of the opposite continent. In 1729, soon after his return, he sailed again in prosecution of the same design, but without success. A third expedition was planned in 1741, and the conduct of it was entrusted with Beering and Tschirikof, who encountered many disasters, and paved the way to all the important discoveries afterwards made by the Russians. Two vessels, named the St. Peter, and St. Paul, were destined for this enterprise: the former was commanded by capt. Beering, and had on board 76 persons, including officers, and the latter by capt. Tschirikof, accompanied by Delile, professor of astronomy, and the same number of mariners. From the bay of Awatscha, which they left on the 4th of June, they proceeded northwards; and the vessels parted in a storm, and never more saw one another during the voyage. Beering steered in a southern direction from the 50th to the 46th degree of latitude in

search of Tschirikof, but finding the search to be fruitless he directed his course eastwards, and at the end of six weeks from the time of first sailing, discovered land in the latitude of 59° and some minutes, and in the longitude of 40° from Awatscha. On the 20th of July they anchored among some islands, on one of which they landed; but they neglected to accomplish the main object of their mission, which was the discovery of the American coast, which afterwards appeared to be so near their present station. This, however, seems to have been owing to the discontent and insubordination that prevailed among the crew and officers of the ship. Having observed several islands in the course of their voyage, they, at length, viz. on the 5th of November, found themselves, as they apprehended, on the coast of Kamtschatka, near the bay of Awatscha; but the land which they perceived proved to be an island, on which the ship was wrecked, and where the commander, and several of the crew, died soon after their landing, of the scurvy, famine, and fatigue. Steller, who accompanied Beering, and wrote a journal of the voyage, observes, in justice to the commodore, that he exerted himself to the utmost of his ability in executing the design of his mission, but that he was himself conscious of his unfitness for the arduous task on account of his age and irresolution. His temper was too mild for the government of a disorderly crew: and his deference to his officers led them to presume on their own importance, and to despise his authority. Worn out at last with hunger, thirst, cold, weakness, and anxiety, the oedematous tumours in his feet, from which he had long suffered, increased by the severity of the weather, and a mortification of the belly taking place, he breathed his last on the 8th of December, and was buried between his adjutant commissary and two grenadiers. "On our departure from the island," says Steller, "we erected over the grave a wooden cross to serve as a monument, and at the same time to be a testimony of our having taken possession of the country." Steller alleges several arguments to prove that Beering discovered the continent of America, at cape St. Elias, lying, according to his estimation, in N. lat. 58° 28', and in longitude from Ferro 236°; and that the coast touched at by Tschirikof was situated in lat. 56°. long. 241°. The coasts, says Steller, were bold, projecting chains of high mountains, some of which were covered with snow, and their sides clothed from the bottom to the top with large trunks of thick and fine wood. Steller went on shore and observed several species of birds not known in Siberia, and one in particular, described by Catesby under the name of the blue jay, peculiar to North America. The soil was different from that of Kamtschatka, and of the neighbouring islands, and he found several plants which botanists deem peculiar to America. Besides, it has been alleged that they must at least have approached very near that continent; as the natives of the islands on which they touched, presented to them the "calumet" or pipe of peace, which is a symbol of friendship universal among the people of North America, and an usage of arbitrary institution peculiar to them. Soon after the return of Beering's crew from the island, where he was shipwrecked and died, the inhabitants of Kamtschatka ventured over to that island, to which the sea-otters and other sea-animals were accustomed to resort in great numbers. Steller's Journal apud Pallas. Coxe's Russian Discoveries, p. 20. p. 277, &c. Tooke's View of the Russian Empire, vol. i. p. 156. vol. iii. p. 40. p. 499. See ASIA, and the following articles, BEERING'S *basin*, &c.

BEERING'S *Basin*, in *Geography*, a name given in honour of commodore Beering, to that part of the North Pacific Ocean, compre-

comprehending about 1200 leagues incircuit, which is formed by the Archipelago, called the Aleutian or Aleoutikie islands, with the north-west coast of America, and the north-east coast of Asia, and which communicates towards the south with the great Boreal ocean by as many straits as the islands form channels between them, and towards the north, under the 66th parallel, with the Arctic Frozen ocean, by Beering's Straits alone. See ALEUTIAN.

BEERING'S, or BERRING'S *Bay*, a bay on the north-west coast of America, situated between cape Suckling and cape Fair-weather, and so called in honour of commodore Beering, who, in 1741, discovered this bay, and anchored in it. The extreme points of this bay, in Vancouver's chart, are port Manby and port Turner; cape Phipps lies to the south of it, and port Mulgrave, formed by islands, and affording a convenient anchoring place secure from all winds, is situated within the bay. In this part of the bay, Beering is supposed to have anchored. Beering's mount, St. Elias, lies at a small distance to the north of this bay. Mr. Dixon called it Admiralty bay. La Perouse describes it under the denomination of Behring's river. According to captain Cook, the opening of this bay was in N. lat. $59^{\circ} 18'$; and La Perouse makes it $59^{\circ} 20'$. Cook's longitude was $220^{\circ} 19' E.$ or $139^{\circ} 41' W.$ $142^{\circ} 1' W.$ from the meridian of Paris. La Perouse fixes his longitude at $142^{\circ} 2'$, making only a difference of 1' from that of Cook. Vancouver, who reconnoitred this coast more accurately than capt. Cook had an opportunity of doing, as he passed it at some distance from the shore, places it further to the north and west, its opening being about $59^{\circ} 32'$, and E. long. $220 35$.

BEERING'S *Island*, an island in the north Pacific ocean on the north-east of Kamtschatka, which some have considered as one of the groups, called the Aleutian isles, (see ALEUTIAN) and others have separated from it. This island was discovered by Beering in 1741. This adventurous navigator, having been for some time in a state of indisposition and decay, was unable to concern himself about the management of his ship, and his crew were generally attacked by the scurvy, and in a sickly, enfeebled condition. Pursuing their navigation, they were at length driven by the winds and seas on this island, with the position of which, with regard to the two continents, they were unacquainted, and here the ship was cast away. On the 8th of December, Beering died on this island, which has very properly assumed the name of the first navigator who ventured into these seas, and who discovered the west continent of America, in a latitude which, before him, no known voyager had attained. In the following year, the surviving crew contrived, with great trouble, to construct a boat, which conveyed them to Kamtschatka. This island is situated between the north latitude of 55° and 56° , and E. long. $167^{\circ} 20'$, about 50 league from the east of Kamtschatka. It is 165 miles in length, and of various breadths, the greatest breadth being 23 miles; and it consists of a range of bold cliffs and hills, which, separated by several very narrow valleys, rise to the north and south, seem to rise from the sea like a single rock. The highest of these mountains are elevated perpendicularly, not above a thousand fathoms, covered with a yellow clay, and much exposed by winds and weather. The mountains consist of granite, these rocks excepted that stand nearest the sea, which are commonly of sandstone, and form, not unfrequently, steep walls, that are very steep. In these mountains there are many caverns. In the year 1741, three smart shocks of earthquakes were perceived in this island; the sea about it is not covered with ice, and the cold is very temperate moderate; although there are mountains on a volcano flow out of the sea. Neither thunder nor the

aurora borealis has been observed here. The island has springs of excellent water, and beautiful cataracts. Of animals there are only ice foxes, seals, sea-bears, sea-lions, sea-cows, &c. No wood grows upon this island; but several kinds of plants are found upon it. It is uninhabited. The ships which have been accustomed to navigate these seas have frequently wintered on this island, in order to procure a stock of salted provisions from the sea-cows and other amphibious animals, that are found here in great abundance. Tooke's View of the Russian Empire, vol. i. p. 156, &c. Marchand's Voyage, vol. i. Intro. p. 33.

BEERING'S *Straits*, separate Asia from America, being bounded on the American side, by cape Prince of Wales, in N. lat. $65^{\circ} 50'$. E. long. $191^{\circ} 50'$, and on the side of Asia, by the east cape in N. lat. $66^{\circ} 6'$ and E. long. $190^{\circ} 22'$. The breadth of this strait is about 13 leagues, or near 40 miles, its depth is from 12 to 30 fathoms. It was discovered first by Beering, and afterwards by captain Cook. Beering, in his voyage of 1718, is said to have proceeded as far north as $67^{\circ} 18'$, and therefore must have reached a latitude more northerly by about a degree and a quarter than that of the most eastern part of the old continent. He had, therefore, entered the Frozen Ocean, and must have actually passed this strait, probably in the usual fogs of the climate, without discovering land to the east; however, our great navigator, captain Cook, gave the name of the Danish adventurer to these straits, when with his usual accuracy, he afterwards explored them. To the north of these straits the Asiatic shore leads rapidly to the westward; but the American proceeds nearly in a northern direction, till, at the distance of about 4 or 5 degrees, the continents are joined by solid and impenetrable bonds of ice. The sea from the south of these straits to the crescent of isles between Asia and America, is very shallow, and deepens from these straits till foundings are lost in the Pacific ocean, south of these isles. Between them and the straits there is said to be an increase from 12 to 54 fathoms, excepting off cape Thaddeus, where the channel is of greater depth. From this, and other circumstances, it has been thought not improbable that a separation of the continents may have taken place in some unknown period, at these straits, and that the whole space from the isles to that small opening might once have been dry land; and that the fury of the watery element, actuated by that of fire, might have subverted and overwhelmed the tract, and left the islands as volcanic remains of this great eruption. The famous Japanese map places some islands apparently within these straits, denominated "Ya Zue," or the kingdom of the dwarfs. Hence it has been imagined, that America was not unknown to the Japanese, and that they had, as Kiepmper and Charlevoix have suggested, made voyages of discovery; and according to the last writer, that they had actually wintered upon the continent, where probably meeting with the Esquimaux, they might, in comparison with themselves, justly distinguish them by the name of dwarfs. See ASIA.

BEERO, a Moorish kingdom of Africa, lying to the north of Bambara, and north-west of a Foulah state, called Massina. Its capital is Walet, situated, according to Mr. Park's information, about 240 geographical miles to the east of Benowm. In Rennel's map of North Africa, Wallet is in N. lat. $15^{\circ} 45'$, and W. long. $2^{\circ} 45'$. The kingdom of Beero borders on Sahara, or the Great Desert.

BEEROTH, in *Ancient Geography*, a city of the Gadenites, afterwards of the tribe of Benjamin, Josh. ix. 17. According to Eusebius, it was distant 7 miles from Jerusalem, in the way towards Nicopolis.

BEEROTH, of the children of Juakan, was a station of the

Israelites (Deut. x. 6.), placed by Eusebius 10 miles from the city of Petra.

BEER-SHEBA, called also **BERSABE** and **BARSHEBA**, a city given by Joshua to the tribe of Judah, and afterwards transferred to Simeon. Josh. xv. 28. It derived its name from **באר-שבע** *beer-sheba*, the well of an oath, from the well on which Abraham and Isaac ratified their alliance by an oath with Abimelech. It was distant south from Hebron 20 miles, and had a Roman garrison in the time of Eusebius and Jerom. The limits of the Holy Land are often expressed in Scripture by the terms "from Dan to Beer-sheba" (2 Sam. xvii. 11. &c.); Dan being the northern and Beer-sheba the southern extremities of the land. It is now a poor village, adjoining a large, sandy, barren desert, altogether uninhabited, except towards the sea-coast.

BEEES, in *Naval Architecture*, denote pieces of elm-plank bolted to the outer ends of bowsprits.

BEESENSTADT, in *Geography*, a town of Germany, in the circle of Upper Saxony, and county of Mansfield, 6 miles east of Eifzleben.

BEEES-HEAD, *Str.* a cape of England, in the western extremity of the county of Cumberland, in the Irish sea, about 10 leagues E. by N. from the Isle of Man, and 2 S. of Whitehaven. It has a light-house, and is a noted promontory for sea-fowl. N. lat. 54° 31'. W. long. 30° 43'.

BEEESHEN, a town in Germany, in the circle of Westphalia, and county of Lingen.

BEEESKOW, a town of Germany, in the circle of Upper Saxony and Uckermark of Brandenburg, and capital of a lordship, to which it gives name, seated on the Spree; 16 miles S. W. of Frankfort on the Oder, and 34 E. S. E. of Berlin. A cloth manufacture is carried on in this town.

BEEES-WAX. See **WAX**.

BEEESTINGS, or **BREASTINGS**, denote the finest milk taken from a cow after calving.

The beestings are of a thick consistence and yellow colour, seemingly impregnated with sulphur. Dr. Morgan imagines them peculiarly fitted and intended by nature to cleanse the young animal from the recrimens gathered in its stomach and intestines during its long habitation *in utero*. The like quality and virtues he supposes in women's first milk after delivery; and hence infers the necessity of the mother's suckling her own child, rather than committing it to a nurse, whose first milk is gone.

BHEET, in *Botany*. See **BETA**.

BHEET, *her's*, *beta leporina*, a name given by some of the old Latin writers to a small green plant of an acrid taste.

BHEET-gall-infest. See **GALL-infest.**

BEEETLE, in *Entomology*, a common English name for all insects that are furnished with shelly-wing-cases: those which have them divided by a straight suture are properly beetles, and belong to the coleoptera order; but the blattæ, or cock-roaches, are also called beetles, though the suture is oblique, or in other words one wing-case crosses the other; and therefore it belongs to the hemiptera order. See **COLEOPTERA**. The scarabæi are beetles in the strictest sense of the word.

BEEETLES, *water*, is likewise a common name for most insects that have wing-cases that inhabit the water including the dytisci, and some other aquatic insects, that are truly beetles, with such as are not of the same order, such as the nepæ, notonectæ, &c. See **HEMIPTERA**.

BEEETLE, in a *Mechanical Sense*, denotes a large wooden instrument, formed after the manner of the mallet, having each face bound with a strong iron hoop, to keep it from spreading, and used for driving piles, flakes, palisades, wedges, and the like.

In this sense, the word is corruptly written in some places

boyle. Skinner derives it from the English *beating*. For the military use, beetles called also stampers, are thick round pieces of wood, a foot and a half long, and eight or ten inches in diameter, having a handle of about four feet long. Their use is for beating or settling the earth of a parapet, or about palisades; which is done by lifting up the beetle a foot or two, and letting it fall with its own weight. The name beetle is also given to the paviour's rammer, or instrument wherewith the stones are beaten down, and fastened.

BEEEVES, a general name for oxen.

BEFARIA, in *Botany*. See **BEJARIA**.

BEFORT, in *Geography*, a town of France, and principal place of a district, in the department of the Upper Rhine, ceded to France by the house of Austria in the year 1648, at the treaty of Westphalia. It was fortified by Vauban. In this town several forges are employed in the manufacture of iron. The place contains 4,400, and the canton 11,439 inhabitants; the country includes 152½ kilometres and 32 communes. N. lat. 47° 9'. E. long. 6° 46'.

BEFROI, **GRAND BEFROI**, and **PETIT BEFROI**, in *Ornithology*, the names of the two species of **TURDUS**, called *tinnius* and *lineatus* by Gmelin, in Buffon's Hist. Birds.

BEG, or **BEY**, in the *Turkish Government*. See **BEY**.

BEG, *Lough*, in *Geography*, or the Little Lough, in the province of Ulster, Ireland, a small lake into which the waters from Lough Neagh again expand, after a course of about a mile, through a very narrow channel. The form of Lough-beg, its islands, some wooded points of land with intervening lawns and rocks, a magnificent rotunda at Ballyscullen, and the beautiful lightness of Toome-bridge, produce the most happy effect. It is situated between the counties of Armagh and Londonderry.

BEGA, or **BEGEYN**, **CORNELIUS**, in *Biography*, a painter and engraver, was born at Haerlem in 1620, and became the disciple of Adrian Ostade, whose manner he imitated, and by whose instructions he profited, so as to acquire considerable reputation as a painter. But contracting habits of dissipation and licentiousness, he was disowned by his father, and resenting the indignity, he assumed the name of Bega instead of Begeyn, which was that of his family. He had a fine pencil, and a delicate mode of handling his colours, so as to give them a neat and transparent appearance; and his performances are so much esteemed in the Low Countries, as to be placed among the works of the best artists. He also etched several drolleries, and a set of 34 prints, representing ale-house scenes, &c. His death, which happened in 1664, was occasioned by the plague, which he caught from a favourite female, to whom he was so strongly attached that he visited her, against the remonstrances of his friends and physicians, to the last moments of her life; and he outlived her only a few days. Pilkington and Strutt.

BEGA, or *Vega*, in *Geography*, a river in Germany, which runs into the Werra, 4 miles N. W. of Lemgo, in the circle of Westphalia.

BEGANNA, in *Ancient Geography*, a town of Arabia Deserta, in the neighbourhood of Mesopotamia. Ptolemy.

BEGARD, in *Geography*, a town of France, in the department of the Northern coasts, and chief place of a canton in the district of Guingamp; the place contains 2394 and the canton 7864 inhabitants: the territory includes 102½ kilometres, and 7 communes.

BEGARMEE, or **BACHERMI**, supposed to be the "Begama" of Edrifi, and the "Gorham" of D'Anville, an extensive kingdom of Africa, situate S. E. of Bornou, at the distance of about 20 days' travelling, or allowing, with major Rennell, 15 miles for a day's journey, 300 miles, and separated from it by several small deserts. The extent, according to Browne's Travels in Africa, p. 468, is from

from E. to W. 12 days, and from N. to S. 15 days, allowing $12\frac{1}{2}$ geographical miles per day. The inhabitants are rigid Mahometans, and though perfectly black in their complexions are not of the Negro cast. Beyond this kingdom to the east, (see Proceedings of the Association for promoting the discovery of the Interior Parts of Africa, p. 155.) are several tribes of Negroes, idolaters in their religion, savage in their manners, and accustomed, it is said, to feed on human flesh. They are called the Kardee, the Serrowah, the Showah, the Battah, and the Mulgui. These nations, the Bergameese, who fight on horseback, and are great warriors, annually invade; and when they have taken as many prisoners as opportunity affords, or their purpose may require, they drive the captives like cattle to Bergamee. It is said, that if any of them, weakened by age, or exhausted by fatigue, happen to linger in their pace, one of the horsemen seizes on the oldest, and cutting off his arm, uses it as a club to drive on the rest. From Bergamee they are sent to Borrou, where they are sold at a low price; and from thence many of them are conveyed to Fezzai, where they generally embrace the Mussulman faith, and are afterwards exported by the way of Tripoli to different parts of the Levant. Bergamee, the capital of the kingdom, lies in N. lat. 15. E. long. $26^{\circ} 30'$; according to Rennell's Map; but according to Browne, N. lat. $16^{\circ} 40'$. E. long. $22^{\circ} 25'$.

BEGARRA, a town of Spain in New Castile, 4 leagues from Alcaez.

BEGEMDER, a province of Abyssinia, north-east of Tigre, bordering upon Angot, and separated from Amhara, which runs parallel to it on the south, by the river Bahilo. Both these provinces are bounded by the river Nile on the west. The greatest length of Begemder is about 180 miles, and its breadth 60; and it comprehends "Lalta," a mountainous province, sometimes depending upon Begemder, and often in rebellion. The inhabitants are esteemed the best soldiers in Abyssinia, being men of great strength and stature, but cruel and uncivilized; so that they are called, in common conversation and writing, the peasants or barbarians of Lalta. They pay to the king 1000 ounces of gold.

Several small provinces are now dismembered from Begemder, such as Foggora, a small stripe of land reaching south and north about 35 miles between Emfras and Dara, and about 12 miles broad from east to west, from the mountains of Begemder to the lake Tzana. On the north end of this are two small governments, Dreedra and Karoota, the only territory in Abyssinia that produces wine; the merchants trade to Caffa and Narea, in the country of the Galla.

Begemder is the strength of Abyssinia in horsemen. It is said that, with Lalta, it can bring out 45,000 men; but this account Bruce thinks to be much exaggerated. It is well stocked with cattle of every kind, that are very beautiful. The mountains are full of iron mine; they are not so steep and rocky as in other provinces, if we except Lalta, and abound in all sorts of wild fowl and game. The south end of the province near Nefas Musa is cut into prodigious gulches, apparently by floods, of which no history remains. It is the great barrier against the encroachments of the Galla, who have made many attempts to obtain a settlement here, but without success; and they have lost whole tribes in these ineffectual efforts. Begemder is a province of such consequence to the state, reaching so near the metropolis, and regularly supplying it with all sorts of provisions, that none but noblemen of rank, family, and character, able to maintain a large number of troops always on foot, and in good order, are trusted with its government. It lies in about N. lat. $11^{\circ} 45'$, and from $37^{\circ} 30'$ to $38^{\circ} 30'$ E. long.

BEGER, LAURENCE, in Biography, a German antiquarian, was the son of a tanner at Heidelberg, and born in 1653. At the request of his father he first studied theo-

logy, and afterwards gratified his own inclination by the study of the law. Devoting himself to classical literature and antiquities, he acquired such reputation that, in 1677, he was appointed librarian and keeper of the cabinet of antiquities by Charles Lewis, elector Palatine; and he retained the same office under Frederick William, elector of Brandenburg, to whom the cabinet was transferred in 1685. He was a member of the Society of Berlin from its institution, and died there in 1705. He was the author of various learned works. His "Considerations on Marriage, by Daphneus Arcuarius," was written in German, as a defence of polygamy, to gratify the elector Palatine, who wished to marry another lady, to whom he was attached, whilst his wife was living. He afterwards gratified the son by composing a refutation of this work, which was never printed. The principal of his other works, which relate to history and antiquities, are "Thesaurus ex Thesauris Palatino Selectus," 1685, fol.; "Thesaurus Reg. elect. Brandenburgicus Selectus," 3 vols. fol.; "Regum et Imperator. Roman. Numismata," 1700, fol.; "De Nummis Cretensium serpenteferis," 1702, fol.; "Lucerne Veterum sepulchrales," 1702; "Numismata Pontif. Roman. aliorumque rariora," 1703, fol.; "Melagrades et Ætolia," 1696, 4to.; "Crææ insula Laconica," 1696, 4to.; "Bellum et Excidium, Trojannum illust." 1699, 4to.; Moreri.

Laurentius Beger, the nephew of this famous antiquarian, was an engraver of some eminence at Berlin about the year 1700.

BEGER, in Geography, a town of Spain, in the country of Seville, 14 leagues from Medina Sidonia.

BEGGA, in Entomology, a species of *Phalena*, (Bombyx) with white wings, having a black rib. This kind inhabits Surinam. The body is white; antennæ and legs yellow, black at the tips. Fabricius, Gmelin, &c.

BEGGAR. Beggars pretending to be blind, lame, &c. found begging in the streets, are to be removed by the constables; and refusing to be removed, shall be whipped, &c. stat. 12 Anne; and our statutes have been formerly so strict for punishing of beggars, that in the reign of king Henry VIII. a law was enacted, that sturdy beggars convicted of a second offence should be executed as felons. But this statute was afterwards repealed. See ROGUE and VAGABOND.

BEGGING ORDER. See MENDICANT.

BEGHARDI, BEGUARDI, or BEGGHARDI, in Ecclesiastical History, called also in Italy *bizochi*, and in France *beguins*, derive their name from the old German word *beggen*, *beggeren*, which signifies "to seek any thing with zeal and importunity." Accordingly persons of this description were called *Beghardi*, whence probably the English word *beggar* is derived; and *Begutte* denoted female beggars. This was a general appellation, and given to no less than thirty sects or orders, that sprung up in the thirteenth century, which differed widely from each other in their opinions, their discipline, and manner of living. It was at first indiscriminately applied to all persons who embraced, with resignation and free choice, the horrors of absolute poverty; begging their daily bread from door to door, and renouncing all their worldly possessions and occupations. It was afterwards restricted to those who distinguished themselves by an extraordinary appearance of devotion, and was used much in the same sense with the term *Methodist* among us. These persons formed a sort of intermediate order between the monks and citizens, resembling the former in their manner of living, without assuming their name, or contracting their obligations. They were divided into two classes, which derived their different denominations of *perfect* and *imperfect* from the different degrees of austerity that they discovered in their manner of living. The *perfect* lived upon alms, abstained from wedlock, and had no fixed habitations. The *imperfect* conformed to the customs of the rest of their fellow-citizens.

in these respects. The name was at first honourable, but by degrees it sunk into reproach, being adopted by many, who, under the mask of religion, concealed the most abominable principles, and committed the most enormous crimes.

The Beghards of Germany, deprived of the protection of the emperor Lewis, suffered extreme misery under Charles IV. who was advanced, by the interest of the pope, to the imperial throne in 1345. Desirous of gratifying the desires of the court of Rome, he supported by his edicts and by his arms the papal inquisitors, and allowed them to apprehend and put to death all those that were deemed enemies; and among others the Beghards were victims to their persecuting power. The emperor himself, who resided at Lucca in Italy, not only approved these violent measures, but issued out in 1369 severe edicts, commanding all the German princes to extirpate out of their dominions the Beghards and Beguines, or, as he himself interpreted the name, "the voluntary beggars," as enemies of the church and of the Roman empire, and to assist the inquisitors in their proceedings against them. By another edict, published not long after, he gave the houses of the Beghards to the tribunal of the inquisition, ordering them to be converted into prisons for heretics; and at the same time ordered all the effects of the Beguines to be publicly sold, and the profits arising from them to be equally divided between the inquisitors, the magistrates, and the poor of those towns and cities where such sale should be made. The Beghards, being reduced to great straits by this and other mandates of the emperor, and by the constitutions of the popes, sought a refuge in those provinces of Switzerland that border upon the Rhine, and also in Holland, Brabant, and Pomerania. But the edicts and mandates of the emperor, together with the papal bulls and inquisitors, followed them wherever they went, and distressed them in their most distant retreats, so that, during the reign of Charles IV., the greatest part of Germany (Switzerland, and those provinces that are contiguous to it, excepted) was thoroughly purged of the Beghards, or rebellious Franciscans, both perfect and imperfect.

The Beghards of Flanders are a denomination by which certain unmarried persons, both bachelors and widowers, are distinguished, who formed themselves into communities of the same kind with those of the female *Beguines*, reserving to themselves the liberty of returning to their former method of life. The first society of those Beghards was established at Antwerp in the year 1228, and continues still; though the brethren of which it is composed have long since departed from their primitive rule of discipline and manners. This first establishment was succeeded by many others in Germany, France, Holland, and Flanders. These fraternities long enjoyed the toleration of the Roman pontiffs; but most of the convents are now either demolished or converted to other uses. See *BRETHREN of the Free Spirit*, *FRATRICELLI*, and *TERTIARIES*. Mosheim's *Eccl. Hist.* vol. iii. p. 86. 8vo. 1758.

BEGIA, in *Geography*. See BAYJAH.

BEGIS, in *Ancient Geography*, a town of Illyria, which belonged to the Trallians. Steph. Byz.

BEGKAWE, in *Geography*, a town of Bohemia, in the circle of Breslaw; 3 miles west of Melnik.

BEGLAISEH, a town of Asiatic Turkey, in the province of Caramania, 8 miles north of Kirshehr.

BEGLERBEG, a Turkish title for the chief governor of a province, who has under him several *bey*s or *sangiacs*, thatis, subgovernors. The word is also written "beylerbey," "beglerbey," "beghelerbeghi," and "beylerbeg." It is compounded of "begler," lords; the plural of "beg," lord, with the word "beg," subjoined; importing as much as *lord of lords*.

The next to the visier *azem*, or the first visier, are the

beglerbeks in Turkey, who, according to Rycaut, may be compared to archdukes in some other countries, being the next ministers below the prime vizier, and having under their jurisdiction many sangiacs, or provinces, and their begs, agas, &c. To every beglerbeg the grand signior gives three ensigus or staves, trimmed with a horse-tail, to distinguish them from the bashaws, who have but two, and from simple begs, or sangiac-begs, who have but one. See BASHAW.

The province or government of a beglerbeg is called "beglerbeglik," or "beglierbeglik." These are of two sorts; the first is called "basile beglerbeglik," which has a certain rent assigned out of the cities, countries, and seignories allotted to the principality; the second called "salianæ beglerbeglik," for maintenance of which is annexed a certain salary or rent, collected by the grand signior's officers with the treasure of the empire. The beglerbeks of the first sort are in number twenty-two, viz. those of Anatolia, Caramania, Diarbekir, Damascus, Aleppo, Tripoli, Trebizond, Buda, Temeswar, &c. The beglerbeks of the second sort are in number six, viz. those of Cairo, Babylon, &c. Five of the beglerbeks have the titles of visiers, viz. those of Anatolia, Babylon, Cairo, Romania, and Buda. The beglerbeks appear with great state, and a large retinue, especially in the camp, being obliged to bring a soldier for every five thousand aspers rent which they enjoy.

The beglerbeks of Romania brought ten thousand effective men into the field.

BEGLERBEG is also a title given to the chief governors of provinces in the Persian empire, having the command over all khans, sultans, &c. in their respective districts.

BEGON, MICHAEL, in *Biography*, was born of a good family at Blois, in 1638. After having occupied some law offices in his native province, he was introduced by his kinsman, the marquis de Seignelai, into the marine department, and became successively intendant of Havre, of the French colonies in America, and of the gallies. In 1688, he removed to Rochefort, and possessed the intendance of that post till his death, which happened in 1710. His leisure hours were assiduously devoted to the cultivation of literature, and he was owner of a valuable library, which was free of public access. In most of his books was written "Michaelis Begon et amicorum," i. e. the property of Begon and his friends; and when he was once cautioned by his librarian against lending his books for fear of losing them, he replied, "I would rather lose them, than seem to distrust any honest man." His cabinet was richly stored with medals, antiques, prints, and various curiosities, collected from all parts of the world. Having procured engravings of several eminent Frenchmen of the seventeenth century, he collected memoirs of their lives, which furnished materials for Perrault's "Hommes Illustres." Of his botanical researches in the American colonies father Plumier availed himself in his publication. *Nouv. Dict. Hist.*

BEGONIA, so named by Plumier after Monf. Begon. in *Botany*. Lin. gen. n. 1156. Schreb. 1442. Dryander in Linn. *Transf.* t. 158. Gartn. *fruct.* t. 31. Juss. gen. 436. Class and order, *monoecia polyandria*. Nat. Ord. *holoracæ*. *Incertæ*, Juss. Gen. Char. * Male flowers. *Cal.* none. *Cor.* petals four (in *B. oïtopetala* six to nine), of which two opposite ones are larger, commonly roundish (in *B. ferruginea* all nearly equal, oblong.) *Stam.* filaments numerous (15 to 100), inserted into the receptacle, very short, sometimes united at the base; anthers oblong, erect. * Female flowers. *Cal.* none. *Cor.* petals in most species five, in some six, in others perhaps four, commonly unequal. *Pist.* germ inferior, three-sided, in very many winged; styles in most three, bifid; stigmas six. *Per.* capsule in most three-cornered, winged, three-celled, opening at the base of the wings; some are two-celled, and others perhaps one-celled. *Essent.*

B E G O N I A.

Difent. Char. Males. Cal. none. Cor. many-petaled. Stam. numerous. Female. Cal. none. Cor. many-petaled, superior. Caps. winged, many-seeded.

Species, 1. *B. nitida*. Dryander. in Lin. Transf. 1. 159. Ait. Hort. Kew. 3. 52. *B. obliqua*. L'Herit. Stirp. Nov. 1. 95. t. 46. *B. minor*, Jacq. Collect. 1. 128. n. 3. *B. purpurea*, Swartz. prodr. 86. "Shrubby, erect; leaves very smooth, unequally cordate, obscurely toothed; largest wing of the capsule roundish." This elegant shrub, which is now a common ornament to our hot-houses, was introduced here in 1777 by William Brown, M. D. A native of Jamaica; flowering here from May to December. 2. *B. isoptera*. Dryand. ubi supra. Smith. ic. ined. 2. t. 43. "Cauliscent; leaves smooth, semicordate, obscurely toothed; wings of the capsule almost equal, parallel." A native of Java, where it was observed by Thouin. 3. *B. reniformis*. Dryand. "Cauliscent; leaves kidney-shaped, angular, toothed; the largest wing of the capsule acute-angled, the others parallel, very small." A native of Brasil, near Rio de Janeiro, in shady clefts of rocks; observed there by Sir Joseph Banks. 4. *B. erminia*. Dryander. L'Herit. Stirp. Nov. 1. 97. t. 47. "Cauliscent; leaves cordate, acuminate, serrate, the largest wing of the capsule sickle-shaped, the rest obliterated." A native of Madagascar, on stones and rocks by brooks, collected there by J. G. Brugniere, M. D. who considers the appendices to the leaves, resembling the galls on lime-tree leaves, or the tails in ermine, as belonging to the leaves themselves, and not occasioned by punctures of insects. 5. *B. crenata*. Dryander. "Cauliscent; leaves unequally cordate, roundish, obtuse, crenate-toothed; capsules two-celled. A native of the East Indies, in the island Salfette, and near fort Victory, on walls and rocks. Found there by Ant. Pantaleon Hove. 6. *B. tenuifolia*. Dryander. "Cauliscent; leaves unequally cordate, ovate, acute-angular, obscurely toothed; capsules two-celled." A native of Pulo Pontangh, or Prince's Island, near Java. Found there by Sir Joseph Banks. 7. *B. ferruginea*. Dryander. Smith. Linn. Supp. 419. Lamarck Encycl. 1. 395. n. 9. Jacq. Coll. 1. 128. n. 1. "Cauliscent; leaves unequally cordate, toothed; petals of the male flower oblong, nearly equal." Distinguished from the other species hitherto known by the long and narrow petals of the male flower, all of the same breadth, and very little differing in length. Gathered in New Canada by Mutis. 8. *B. granata*. Dryander. *B. obliqua*. Thunb. Jap. 231. Kämpf. ic. select. t. 20. Sjukaido. Kämpf. Amœn. 888. "Cauliscent; leaves unequally cordate, angular, serrate; wings of the capsule a little unequal." This and the next species have by far the largest leaves of any in the genus; but in this the flowers are twice as large as in *macrophylla*. A native of Japan. 9. *B. macrophylla*. Dryander. Lamarck Encycl. 1. 394. n. 6. *B. grandifolia*. Jacq. Collect. 1. 128. n. 2. *B. purpurea et nivea maxima, folio auro*. Plum. ic. 34. t. 45. f. 1. "Two feet high, entirely smooth; female flowers five-petaled." A native of the islands in the West Indies. 10. *B. acutifolia*. Dryander. Jacq. Collect. 1. 128. n. 4. Sloan. Jam. t. 127. f. 1, 2. "Cauliscent; leaves semicordate, angular, toothed; the largest wing of the capsule obtuse-angled, the others acute-angled." A native of Jamaica, observed there by Sir H. Sloane, and since by Masson. 11. *B. acuminata*. Dryander. "Cauliscent; leaves hispid, semicordate, acuminate, unequally toothed; the largest wing of the capsule obtuse-angled; the others acute-angled." A native of Jamaica, on the Blue Mountains; introduced into Kew garden in 1790. 12. *B. lumilis*. Dryander. Ait. Hort. Kew. "Cauliscent, upright; leaves hispid, semicordate, doubly serrate; wings of the capsule rounded, a little unequal." A native of the island of

Trinidad in the East Indies; found there by Alex. Anderson. Supposed, on its first introduction to Mr. Lee's garden at Hammer-smith, in 1788, to be annual; it was then very low, and was called *lumilis*; but it has since stood over the winter, and grown much taller. 13. *B. hirsuta*. Dryander. Aubl. Guian. 913. t. 348. Lamarck. Encycl. 1. 393. n. 3. Jacq. Collect. 1. 129. n. 8. "Cauliscent; leaves hispid, semicordate, doubly serrate; the largest wing of the capsule obtuse-angled, the others parallel and very small." Observed by M. F. Aublet, on the rocks of Guiana. 14. *B. urtica*. Dryander. Linn. Supp. 420. Lamarck Encycl. 1. 394. n. 8. Jacq. Collect. 1. 129. n. 7. *B. urticaefolia*. Smith. ic. ined. 2. t. 45. "Cauliscent, radicans; leaves hispid on both sides, unequally ovate, doubly serrate; capsules three-horned at the base." Gathered by Mutis in New Granada. 15. *B. scandens*. Dryander. Swartz. Prodr. 86. *B. glabra*. Aubl. Guian. 916. Lamarck. Encycl. 1. 394. n. 4. Jacq. Collect. 1. 129. n. 5. "Scandent; radicans; leaves ovate-roundish, obscurely toothed; the largest wing of the capsule obtuse-angled, the others parallel and very small." Perennial: a native of Guiana, the isle of France, and Jamaica. 16. *B. tuberosa*. Dryander. Lamarck Encycl. Empetrum acetosum. Rumph. Amb. 5. 457. t. 169. f. 2. "Creeping; leaves unequally cordate, angular, toothed; wings of the capsule parallel." A native of Amboina, the Molucca islands, and Celebes. 17. *B. rotundifolia*. Dryander. Lamarck. *B. obliqua* Linn. Spec. 1498. *B. roseo flore, folio orbiculari*. Tournes. Inst. 660. Plum. Cat. Amer. 20. ic. 33. t. 45. "Creeping; leaves reniform, roundish, crenate." A native of South America, on rocks and trees; found there by Plumier. 18. *B. nana*. Dryander. L'Herit. Stirp. Nov. 1. 99. t. 48. "Stemless; leaves lanceolate; scape with about two flowers." A native of Madagascar, on rocks and trunks of trees; found by Brugniere. 19. *B. tenera*. Dryander. *Falkea tenera*. Koenig. "Stemless; leaves unequally cordate; flowers umbelled." A native of Ceylon, found there by Koenig. 20. *B. diptera*. Dryander. *B. capensis*. Linn. Supp. 420. Jacq. Coll. 1. 130. n. 9. Linn. Mant. 502. "Stemless; leaves unequally cordate; peduncles dichotomous; one wing of the capsule very large, another narrow, and the third obscure." A native of the island of Joanna, in shady places, by the sides of mountains; found there by Koenig. 21. *B. oöpetala*. Dryander. L'Herit. Stirp. Nov. 1. 101. "Stemless; leaves cordate, five-lobed; peduncles dichotomous." Found on the mountains of Lima by Dombey, who sent the seeds to the Paris garden, where it has grown some years, but not flowered. 22. *B. malabarica*. Dryander. Lamarck. Jacq. Collect. Rheed. Malab. 9. 167. t. 86. "Stems herbaceous; peduncles axillary, short, subtriflorous; fruits berried." A native of Malabar. 23. *B. repens*. Dryander. Lamarck. *B. obliqua* 7. Linn. Spec. 1498. Plum. Amer. 20. ic. 34. t. 45. f. 2. "Stems creeping, rooting at the joints; leaves one-cared; peduncles axillary, long, many-flowered." A native of St. Domingo. Mr. Dryander denominates the two last obscure species; and has added also some others.

The whole plant in the Begonias is fleshy; the stem in most of the species is herbaceous, but some are stemless. The leaves are petioled, in the caulescent species alternate. At the base of the petioles is a pair of stipules. The peduncles in the greater part are dichotomous; and in the caulescent species axillary. They are natives of Asia and America within the tropics. Three species have been found on the islands near the coast of Africa, but one on that continent. To Mr. Dryander botanists are principally indebted for their knowledge of this genus. Linn. Transf. vol. i. p. 159.

Propagation and Culture. These plants increase readily by cuttings; and if kept in the bark-love prove highly ornamental,

mental, being much esteemed, both for the beauty of the flowers, and the singularity of the leaves. Where a bark-stove is wanting, they will do very well over the flue of the dry stove. *Martyn's Miller's Dict.*

BEGRAS, in *Geography*, a town of Asiatic Turkey, in Syria, at the foot of the Black Mountain, between Alexandria and Antioch.

BEGUE, **ACHILLES WILLIAM**, in *Biography*, born in the district of Orleans, was admitted doctor in medicine by the university of Paris the 30th of September 1760. He is known principally by his translations into French of Dr. Whytt's Treatise on Nervous Affections; Dr. Monroe's Observations on the Diseases of the Army; Baron Stork's Essays on the virtues of hemlock, the thorn-apple, henbane, and other poisonous vegetables; and Baron Van Swieten's account of the use of the corrosive sublimate in curing the venereal disease. His original compositions are "Le Conservateur de la Santé," et "Etrennes salutaires," both published in 12mo. in 1763; the idea of which seems to have been borrowed from Tissot's "Avis au Peuple sur sa Santé," of which he published an edition at Paris, 1762, in 2 vols. 12mo. *Eloy. Dict. Hist.*

BEGUINS, in *Ecclesiastical History*, were, as well as the Beghards, a kind of half-monks, called Tertiaries, who attached themselves to the genuine followers of St. Francis. In Italy they were denominated "Bizoeli," and "Boeasoti;" in France, "Beguins;" and in Germany, "Beghards," or "Beguards," which last was the denomination by which they were commonly known in almost all places. If we except their fordid habit, and certain observances and maxims which they followed in consequence of the injunctions of the famous saint now mentioned, they lived after the manner of other men, and were therefore considered in no other light than as seculars and laymen. See **BEGHARDS**, and **TERTIARIES**.

We must not confound, says Mosheim, these Beguins and Beguines, who derived their origin from an austere branch of the Franciscan order, with the German and Belgic Beguines, who crept out of their obscurity in the 13th century, and multiplied prodigiously in a very short space of time. Their origin was of an earlier date than this century; but they now acquired a name, and made a noise in the world. It appears from authentic and unexceptionable records, that, so early as the 11th and 12th centuries, there had been several societies of Beguines established in Holland and Flanders. However, the only convent of Beguines that existed before the 13th century, was that of Vilvorden, in Brabant, where they were settled, as appears by public acts, in the years 1065, 1129, and 1151. Their primitive establishment was undoubtedly the result of virtuous dispositions and upright intentions. A certain number of pious women, both virgins and widows, in order to maintain their integrity, and preserve their principles from the contagion of a vicious and corrupt age, formed themselves into societies, each of which had a fixed place of residence, and was under the inspection and government of a female head. Here they divided their time between exercises of devotion, and works of honest industry, reserving to themselves the liberty of entering into the state of matrimony, as also of quitting the convent, whenever they thought proper. And as all those among the female sex, who make extraordinary professions of piety and devotion, were distinguished by the title of Beguines, i. e. persons who were uncommonly "assiduous in prayer," as the name imports (see **BEGHARDS**); that title was given to the women now mentioned. All the Beghards and Beguines that yet remain in Flanders and Holland, where their convents have almost entirely changed their primitive form, affirm unanimously, that both their name and institution derive their origin from St. Beghe, duchess of Brabant,

and daughter of Pepin, mayor of the palace to the king of Austrasia, who lived in the seventh century. This lady, therefore, they consider as their patroness, and honour her as a kind of tutelary divinity with the deepest sentiments of veneration and respect. Those, on the other hand, who are no well wishers to the cause of the Beguines, deduce their origin from Lambert de Begue, a priest and native of Liege, who lived in the twelfth century, and was much esteemed on account of his eminent piety.

The first society of this kind, of which record remains, was formed at Nivelles in Brabant, in the year 1226; or, according to other historians, in 1207; and was followed by so many institutions of a like nature in France, Germany, Holland, and Flanders, that, towards the middle of the thirteenth century, there was scarcely a city of any note that had not its "beguinage," or vineyard, as it was sometimes called in conformity to the style of the "Song of Songs." All these female societies were not governed by the same laws; but in the greatest part of them, the hours that were not devoted to prayer, meditation, or other religious exercises, were employed in weaving, embroidering, and other manual labours of various kinds. The poor, sick, and disabled Beguines were supported by the pious liberality of such opulent persons as were friends to the order. In the 14th century these societies were more numerous in various parts of Germany; but, adopting some of the extravagant opinions of the "Mystic Brethren and Sisters of the Free Spirit," they shared with them in the persecution which they suffered. The "Clementina," or constitution of the council of Vienne, A. D. 1311, against the Beguines, gave rise to a persecution of these persons, which lasted till the reformation by Luther, and ruined the cause of the Beguines and Beghards in many places. From this Clementina, many took occasion to molest the Beguines in their houses, to seize and destroy their goods, to offer them many other insults, and to involve also the Beghards in the like persecution. In the year 1324, however, they obtained some relief by a special constitution of the Roman pontiff, John XXII. in which he explained the Clementina, and ordered that the goods, chattels, habitations, and societies of the innocent Beguines should be preserved from every kind of violence and insult; and this example of clemency and moderation was afterwards followed by other popes. The Beguines, on the other hand, in hopes of disappointing the malice of their enemies, and avoiding their snares, embraced, in many places, the third rule of St. Francis, and of the Augustines. But this measure was unavailing; for from this time they were oppressed in several provinces by the magistrates, the clergy, and the monks, who cast a greedy eye on their treasures, and were extremely eager to divide the spoil. *Mosheim's Eccl. Hist. vol. iii. p. 232, 377, &c.*

Communities of Beguines, or Beguinages, still subsist in Holland, Flanders, and Germany. In Brussels, there is a singular part of it, which is in fact a little town, inclosed by a wall and ditch, and divided into streets. It is called the Beguinage. The number of Beguines is near a thousand, governed by matrons, and under the spiritual direction of the bishop of Antwerp. There are also Beguinages at Amsterdam, Antwerp, and Malines.

BEGZAM, in *Geography*, a town of Africa, in the country of Agadez, south of Agad or Agades, the capital of the country, and at a greater distance south of Afonda, and west of the desert of Iazr. N. lat. 19° 28'. E. long. 12° 50'.

BEHAIRAT-EL-MARDJ, or *Lake of the Meadow*, a morass of Syria, about 3 leagues from Damascus to the south-east, into which flow the rivulets that fertilize the gardens in the neighbourhood of the city. See **DAMASCUS**.

BEHAM, **HANS**, or **JOAN SEBALD**, in *Biography*, an eminent

eminent engraver, flourished about the year 1540. Like Henry Aldegrever and Albert Durer, whose works were the sources from which he derived his greatest improvement, he engraved in wood, and also on copper, and etched some few plates. He was also a painter of reputation, and celebrated by the poets of that age under the name of Bohemus. He was a man of good genius, and distinguished by fertility of invention. But the Gothic taste which prevailed in Germany in his time, is too apparent in all his works. His brother Bartolomeo Beham flourished as an engraver about the same time. He is said to have studied under Marc Antonio Raimondi, whose manner he imitated. His chief residence was at Rome, where he died. Strutt.

BEHAMBERG, in *Geography*, a town of Germany, in the archduchy of Austria, 3 miles east of Steyr.

BEHAMKIRCHER, a town of Germany, in the archduchy of Austria, 6 miles south-east of St. Polten.

BEHAVIOUR, Good, in *Law*. See *Good Alearing*.

BEHBEHAN, a town of Persia, in the province of Fars.

BEHDUROO, a country of Hindoostan, in the northern parts of Lahore, near the Imaus mountains, where one branch of the river Rauvee springs.

BEHEADING, a capital punishment, wherein the head is severed from the body by the stroke of an ax, sword, or other cutting instrument.

Behading was a military punishment among the Romans, known by the name of *decollatio*. Among them the head was laid on a *cipus*, or block, placed in a pit dug for the purpose; in the army, without the *vallum*; in the city, without the walls, at a place near the *porta decumana*. Preparatory to the stroke, the criminal was tied to a stake, and whipped with rods. In the early ages the blow was given with an ax; but in after-times with a sword, which was thought the more reputable manner of dying. The execution was but clumsily performed in the first times; but afterwards they grew more expert, and took the head off clean with one circular stroke.

In England and France, beheading is the punishment of nobles; being reputed not to derogate from nobility, as hanging does.

Beheading is part of the punishment of high-treason, affecting the king's person or government. The king may, and often does, discharge all the punishment, except beheading, especially when any of noble blood are attained. For, beheading being part of the judgment, that may be executed, though all the rest be omitted by the king's command.

In Scotland they do not behead with an ax, as in England; nor with a sword, as in Holland and formerly in France, where they now use the guillotine; but with an edged instrument called the maiden.

BEHEM, BEHEIM, BEHEN, BOHEM, MARTIN, in *Biography*, supposed to be the same with Martin Behemra, to whom Garcilasso de la Vega ascribes the first discovery of America, was a famous geographer and navigator of the 15th century. The christian name, says M. Otto, (*ubi infra*) is the same with that of Garcilasso, and the syllable, "ira" he conceives, were added to his name in consequence of his receiving the honour of knighthood from John II., king of Portugal. Behem was born of a noble family, of which some branches still remain at Nuremberg, an imperial city in the circle of Franconia. Addicted from his infancy to the study of geography, astronomy, and navigation, and having enjoyed the advantage of Regiomontanus's instruction, he entertained the thought, at more mature age, of the possibility of the existence of the antipodes, and of a western continent. Under the influence of this imagination, he paid a visit, in 1459, to Isabella, daughter of John I., king of Portugal, and regent

of the duchy of Burgundy and Flanders; and having informed her of his designs, he procured a vessel, in which he discovered the island of Fayal in 1460. Here he established a colony of Flemings, whose descendants are said still to exist in the Azores, which for some time were called the "Flemish islands." For the proof of this fact M. Otto refers to the records of Nuremberg, and to the testimony of Wagenfeil, one of the most learned men of the last century, in his "Universal History and Geography." Having obtained a grant of Fayal from the regent Isabella, and after having resided there 20 years, Behem applied, in 1484, eight years before the expedition of Columbus, to John II. king of Portugal, for the means of undertaking a great expedition towards the south-west. In the prosecution of this undertaking he discovered that part of America, which is now called Brazil, and sailed to the straits of Magellan, or to the country of some savage tribes, whom he called Patagonians, because the extremities of their bodies were covered with a skin more like a bear's paws than human hands and feet. One of the records, preserved in the archives of Nuremberg, and containing this fact, asserts, that "Martin Behem, traversing the Atlantic ocean for several years, examined the American islands, and discovered the strait, which bears the name of Magellan, before either Christopher Columbus or Magellan sailed those seas; and even mathematically delineated, on a geographical chart, for the king of Lusitania, the situation of the coast, around every part of that famous and renowned strait." This assertion is supported by Behem's own letters, written in German, and preserved in the same archives; which letters are dated in 1486. The discovery of Behem is also noticed by contemporary writers. In the chronicle of Hartman Schedl, or Herman Schedel, entitled "Chronicon Mundi," and of which a German translation was published at Nuremberg in 1493, we have the following passage to this purpose: "In the year 1485, John II., king of Portugal, a man of a magnanimous spirit, furnished some galleys with provisions, and sent them to the southward beyond the straits of Gibraltar. He gave the command of his Squadron to James Canus, a Portuguese, and Martin Behem, a German of Nuremberg in Upper Germany, descended of the family of Bonna, a man very well acquainted with the situation of the globe, blessed with a constitution able to bear the fatigues of the sea, and who, by actual experiments and long sailing, had made himself perfectly master with regard to the longitudes and latitudes of Ptolemy, in the west. These two, by the bounty of Heaven, coasting along the southern ocean, and having crossed the equator, got into the other hemisphere, where, facing to the eastward, their shadows projected to the south and right hand. Thus, by their industry, they may be said to have opened to us another world hitherto unknown, and for many years attempted by none but the Genoese, and by them in vain. Having finished this cruise in the space of 26 months, they returned to Portugal, with the loss of many of their seamen, by the violence of the climate." This passage was cited by the publishers of the works of Æneas Sylvius, afterwards pope Pius II. Two years before the expedition of Columbus, Petrus Matæus, a writer on the canon law, remarks, that "the first Christian voyages to the newly discovered islands became frequent, under the reign of Henry, son of John king of Lusitania. After his death, Alphonsus V. prosecuted the design; and John, who succeeded him, followed the plan of Alphonsus, by the assistance of Martin Behem, a very experienced navigator; so that, in a short time, the name of Lusitania became famous over the whole world." Cellarius also says expressly, "Behem did not think it enough to survey the island of Fayal, which he first discovered, or the other adjacent islands which

which the Lusitanians call Azores, and we, after the example of Behem's companions, call Flemish islands, but advanced still farther and farther south, until he arrived at the remotest strait, beyond which Ferdinand Magellan, following his tract, afterwards sailed, and called it after his own name." Magellan, it is said, saw a chart of the coast of America, drawn by Behem, and preserved in the archives of Nuremberg, and hence conceived the project of following the steps of this great navigator. Riccioli, in his *Geo. Reform.* l. iii. p. 90, says, "Christopher Columbus never thought of an expedition to the West Indies, until some time before, while in the island of Madeira, where, amusing himself in forming and delineating geographical charts, he obtained information from Martin Bœhm, or, as the Spaniards say, from Alphonfus Sanchez de Huelva, a pilot, who, by mere chance, had fallen in with the island afterwards called Dominica." In another place he says, "Let Bœhm and Columbus have each their praise; they were both excellent navigators; but Columbus would never have thought of his expedition to America, had not Bœhm gone there before him. His name is not so much celebrated as that of Columbus, Americus, or Magellan, although he is superior to them all." Martin Behem, in consideration of his great services to the crown of Portugal, was knighted by king John in 1485, in the presence of his whole court. In 1492, the chevalier Behem, crowned with honours and riches, undertook a journey to Nuremberg, to visit his native country and his family; and there he made a terrestrial globe of curious construction, which is still preserved in the library of that city. On this globe is marked the tract of his discoveries, under the appellation of the western lands; and from their situation it cannot be doubted, that they are the present coasts of Brazil, and the environs of the straits of Magellan. This globe was made in the same year when Columbus set out on his expedition; and hence it is inferred, that Behem could not have profited by the observations of this navigator. After having performed several other interesting voyages, the chevalier Behem died at Lisbon in July 1506, universally regretted, and leaving behind him no other work besides the globe already mentioned, which was constructed from the writings of Ptolemy, Pliny, Strabo, and especially from the account of Mark Paul the Venetian, a celebrated traveller of the 13th century, and of John Mandeville, an Englishman, who, about the middle of the 14th century, published an account of a journey of 33 years in Africa and Asia. He has also added the important discoveries made by himself on the coast of Africa and America.

Dr. Robertson treats the history of Behem as a fiction of some German authors, who were inclined to attribute to one of their countrymen a discovery which has produced so great a revolution in the commerce of Europe. Nevertheless, he acknowledges with Herrera, that Behem had settled in the island of Fayal; that he was the intimate friend of Columbus, and that Magellan had a globe made by Behem, by the help of which he undertook his voyage to the south sea. He also relates, that in 1492 this geographer visited his family at Nuremberg, and left there a map drawn by himself, a copy of which was procured for him by Dr. Reinhold Foster, and which, in his opinion, partakes of the imperfection of the cosmographical knowledge of the 15th century; as he found in it, under the name of the island of St. Brandon, land which appears to be the present coast of Guiana, and which lies in the same latitude with the cape Verd isles; and he conceives that this is an imaginary island, which has been admitted into some ancient maps, on no better authority than the legend of the Irish St. Brandon or Brendan, whose story is so childishly fabulous as to be unworthy of any no-

tice. He adds, that hardly any one place is laid down in its true situation. M. Otto thinks that Dr. Robertson furnishes, in his own history, means of refuting his objections against the truth of Behem's history. This learned historian allows, that Behem was very intimate with Columbus, that he was the greatest geographer of his time, and that he had been the disciple of the celebrated John Muller or Regiomontanus; that he had discovered, in 1483, the kingdom of Congo on the coast of Africa; that he constructed a globe, used by Magellan; that he drew a map at Nuremberg, containing the particulars of his discoveries; and that he placed in this chart land, which is found to be in the latitude of Guiana. Whilst Dr. Robertson asserts, without any proof, that this land was but a fabulous island, we may suppose, says M. Otto, upon the same foundation, that the chevalier Behem, engaged in an expedition to the kingdom of Congo, was driven by the winds to Fernambouc, and from thence by the currents, very common in these latitudes, towards the coast of Guiana; and that he took for an island the first land which he discovered. The course which Christopher Columbus afterwards steered, makes this supposition still more probable; for if he knew only of the coast of Brazil, which they believe to have been discovered by Behem, he would have laid his course rather to the south-west. The expedition took place in 1483; it is then possible that, at his returning, Behem proposed a voyage to the coasts of Brazil and Patagonia, and that he requested the assistance of his sovereign, which has been already mentioned. "It is certain," says M. Otto, "that we cannot have too much deference for the opinion of so eminent a writer as Robertson, but this learned man not having it in his power to consult the German pieces in the original, which we have quoted, we may be allowed to form a different opinion, without being too presumptuous." For a farther discussion of this subject, see M. Otto's *Memoir on the discovery of America*, in the *Transactions of the American Society at Philadelphia*, vol. ii. p. 263, &c. Robertson's *Hist. of America*, vol. i. p. 371, &c.

BEHEME, or RAMSEY, SAND, in *Geography*. See RAMSEY.

BEHEMOTH, in *Zoology*, a huge animal mentioned in Scripture, concerning which interpreters are much divided. The strength of this creature, his manner of life, and some other particulars, we find admirably pourtrayed in the forty-first chapter of the book of Job, and from that description some have thought it could apply only to the elephant, but it certainly more fully agrees with the hippopotamus, or river horse; and this is now pretty generally believed to be the animal in question. Bochart, Franzius, and others, who have endeavoured to ascertain all the animals mentioned in the Old Testament, entertain this opinion. See HIPPOPOTAMUS and MAMMOTH.

BEHEN, in *Botany*. See CENTAUREA and CUCUBALUS. BEHERUS, in *Geography*, a town of Asia, in the Arabian Irak, 20 miles N.N.E. of Bagdat.

BEHIRE, in *Geography*, a lake of Lower Egypt, 7 leagues in compass, near Aboukir. This is also the name of a district called Bahira, which see.

BEHIU, a town of Egypt, near the Nile, 17 miles S. of Abu Girgê.

BEHKER, or BHAKOR, a district of India, in the southern part of the country of Moultan, confined chiefly to the east side of the Indus. This is also the name of a town, which is the capital of the country to which it gives name, about 215 geographical miles distant from Moultan to the south, and supposed in the Ayin Acbaree to be the ancient Manfurah. N. lat. 27° 12'. E long. 70° 1'.

BEHLULIA,

BEHLULIA, a town of Syria, 40 miles south-west of Aleppo.

BEHMEN, or BOEHM, JACOB, in *Biography*, commonly called by his admirers, the "German Theosophist," was born of poor parents at a village near Gorkitz, in Upper Lusatia, in 1575. Having been taught to read and write, at the age of 10 years, he was apprenticed to a shoe-maker, or taylor, and in 1594 became a master and was married. Although he never entirely forsook his occupation, his eccentric genius soon carried him "ultra crepidam," beyond his task. Engaging in those theological controversies, which were spreading in his time through Germany, among the lower classes of the people, he was much perplexed concerning many articles of faith, and prayed earnestly for divine illumination. In this state of mind he fell into a trance or extacy in 1600, which lasted for seven days, and afforded him an intuitive vision of God. Soon afterwards he had a second extacy, in which he found himself surrounded on a sudden with celestial irradiations, his spirit being carried to the inmost world of nature, and enabled to penetrate through the external forms, lineaments and colours of bodies, into the recesses of their essences. In a third vision of the same kind, other more sublime mysteries were revealed to him, concerning the origin of nature, and the formation of all things, and even concerning divine principles and intelligent natures. These wonderful communications he committed to writing in 1612; and published a book, entitled "Aurora," the principles and style of which are so mysterious and obscure, that it is not easy to understand or explain them. Indeed the author himself declares that the mysteries of this book are incomprehensible to flesh and blood, and that though the words be read, their meaning will lie concealed, till the reader has by prayer obtained illumination from that heavenly spirit, which is in God, and in all nature, and from which all things proceed. Gregorius Richter, a clergyman of Gorkitz, having seen this work, reproved the author from the pulpit, and procured an order from the senate of the city for suppressing it; and Behmen was required to discontinue his attempts for enlightening the world by his writings. Behmen acquiesced, and refrained from writing for 7 years. A copy of the work, however, found its way to the press at Amsterdam, in 1619; and in the same year he wrote another book on the three principles, to which in the course of a few years he added several others. In 1624 he travelled to Dresden, where he was examined by a body of divines and dismissed without censure. He died in the same year, after having received the sacrament from the hands of Elias Dietrich, and was honourably interred at Gorkitz. His other works are "Of the Three-fold Life of Man;" "Answer to the Forty Questions of the Soul;" "Of the Incarnation of Christ, his Sufferings, Death, and Resurrection;" "A Book on the Six Points;" "On Celestial and Terrestrial Mysteries;" "De Scriptura Rerum;" "On the Four Complexions;" "On True Repentance;" "On True Resignation;" "On the Second Birth;" "Mysterium Magnum;" "On the First Book of Moses;" "On Spiritual Life," &c. These treatises appeared separately, and were afterwards collected and printed together. The best edition is said to be that in 12mo. published in German, at Amsterdam, in 1682. An English edition of his works was given by Mr. William Law, in 2 vols. 4to.

In Jacob Behmen, a warm imagination, united with a gloomy temper, produced that kind of enthusiasm, which in its paroxysms disturbs the natural faculties of perception and understanding, and produces a preternatural agitation of the nervous system, during which the mind is filled with wild and wonderful conceptions, which pass for visions and revelations. Every page of his works, and even the hieroglyphic figures

prefixed to his works, manifest a disordered imagination, and it is in vain to attempt to derive his "Theosophia," from any other source; unless we incline to admit his own account, in which he boasts that he was neither indebted to human learning, nor was to be ranked among ordinary philosophers. He says that he wrote "not from an external view of nature, but from the dictates of the spirit: and that what he delivered concerning the nature of things, and concerning the works and creature of God, had been laid open before his mind by God himself." The conceptions of this enthusiast, sufficiently obscure in themselves, are often rendered more obscure by being clothed under allegorical symbols, derived from the chemical art. As he frequently uses the same terms with Paracelsus, he was probably conversant with his writings. He also appears to have acquired some knowledge of the doctrine of Robert Fludd, a native of England, and the Rosicrucians, which was propagated in Germany with great ostentation during the 17th century. However, he seems, upon the whole, to have followed no other guides than his own inventive genius and enthusiastic imagination; and every attempt which has been made by his followers to explain his system has been only raising a fresh ignis fatuus, to lead the bewildered traveller farther astray. Among other tenets, equally inexplicable, this mystic makes God the essence of essences, and he supposes a long series of spiritual natures, and even matter itself to have flowed from the fountain of the divine nature. Upon these subjects his language resembles that of the Jewish cabbala. The whole Divine Trinity, he says, spreading forth bodily forms, produces an image of itself, "as a God in miniature." If any one name the heavens, the earth, the stars, the elements, and whatever is beneath or above the heavens, he herein names the whole deity, who, by a power proceeding from himself, thus makes his own essence corporeal. There is a great darkness, he says, among the stars, where the devil holds his principality; all arts and sciences flow from the sidereal spirit of this world; the seven liberal arts proceed from seven spirits of nature; and all human things are composed of the four first properties, bitter, sour, heat, and pain. The divine grace, says this chimerical writer, operates by the same rules, and follows the same methods that the divine Providence observes in the natural world; and the minds of men are purged from their vices and corruptions in the same way that metals are purged from their dross; and this maxim was the principle of his fire-theology. But it is needless to give any farther account of a system which exhibits a motley mixture of chemical terms, crude visions, and mystic jargon. The elements of Behmen's theology may be collected from his "Aurora," and his treatise "on three principles."

Some have bestowed high praises on this enthusiast, on account of the wisdom which they pretend is contained in his writings, and also of his piety, integrity, and sincere love of truth and virtue. Others have accused him of the most dangerous errors, and have written volumes in opposition to his doctrines. Amongst the most eminent of his followers and admirers, we may reckon John Lewis, Giftthiel, John Angelus, Werdenhagen, Abraham Franckenberg, who wrote his life, Theodore Tschetch, a Silesian nobleman, Paul Felgenhaver, Quirinus Kuhlman, who was burnt at Moscow in 1684, John Jacob Zimmermann, and our visionary countryman William Law, author of "Christian Perfection." Among Behmen's numerous followers, no one rendered himself more conspicuous than John Pordage, a physician and naturalist, and member of the "Philadelphian Society," who pretended to divine revelation, and declared that he was thus convinced of the truth of Behmen's doctrines. He published a book entitled "Divine and True Metaphysics," with other similar works in favour of Behmen's opinions, which

being soon spread throughout Germany became, together with his other writings, the standard books of all enthusiasts. To the class of his adversaries we may refer Gilbert Ischeffels, who published an admonition against his works in 1643, which was answered by Tschetsch, Gerrard Antagnossius, who refuted Tschetsch, and who endeavoured to shew that Behmen entertained the same opinions as the Manichæans and Gnostics; Tobias Wagner, and Dr. Henry More, who wrote a treatise against Behmenism, entitled "Censura Philosophiæ Teutonicæ," printed in his works, p. 520. Some persons have attempted to prove from Behmen's writings, that he did not acknowledge a deity; and particularly Von Muller, in a work entitled "The Fanatic Atheist." Brucker's Hist. Phil. by Enfield, vol. ii. p. 494, &c. Moheim's Eccl. Hist. vol. v. p. 310, &c.

BEHMENISTS, or BORMENISTS, in *Ecclesiastical History*, the denomination of a class of mystic philosophers, who were the followers of Jacob Behmen, commonly called the Teutonic philosopher. See the preceding article.

BEHN, APHARA, in *Biography*, a writer of novels and plays, was descended of a good family of the name of Johnson in Canterbury, and born in the reign of king Charles I. Her father died at sea in a voyage for Surinam, of which he was appointed lieutenant-governor by the interest of lord Willoughby, to whom he was related; but his daughter, with the rest of the family, arrived thither. Here she became acquainted with the story and person of the American prince Oroonoko, whose adventures she described in a novel under this title. After her return to England she married Mr. Behn, a merchant in London, of Dutch extraction. During the Dutch war in the reign of Charles II. she was employed for gaining intelligence on the continent, and with this view she resided at Antwerp. By her intrigues, it is said, she discovered the design, formed by the Dutch, of sailing up the river Thames, and burning the English ships in their harbours; but her intelligence was slighted by the English court, to which it was imparted. On her return to England she narrowly escaped shipwreck. Her future life was devoted to pleasure and poetry; and by writing she gained a subsistence. With a good person, and distinguished talents for conversation, she formed an intimate acquaintance with several poets and wits of her time, as well as men of pleasure. Her compositions, in verse and prose, were numerous; and she published three volumes of miscellaneous poems, seventeen plays, and a collection of histories and novels, besides some translations and letters. She borrowed much from other writers, and the merit, that was properly her own, consisted in a fluent easy style, occasionally glowing with the ardour of love, when this subject was the topic, and in some sprightly thoughts and facility of invention. Many of her plays succeeded on the stage, at a period when gross indecency of plot and language was no impediment to their reception. Her poetical appellation was *Astrea*; and her dramatic compositions are characterized by Mr. Pope in the following lines:

"The stage how loosely does *Astrea* tread,
Who fairly puts all characters to bed."

None of her dramatic pieces are now acted; her poetry has been long forgotten; but her novels, which were once popular, are now occasionally read. Her death, which was hastened by an injudicious physician, happened in 1689, when she was between the age of 40 and 50; and she was buried in the cloisters of Westminster Abbey. Biog. Brit. Gen. Dict.

BEHNESE, or BAHNASAA, in *Geography*, a town of Egypt, 10 miles north of Abu Girgê.

BEHRENS, CONRAD, BERTHOLD, in *Biography*, was

born at Hilderheim, in Lower Saxony, August 26th 1660. After passing through the usual course of studies in the classics and philosophy, in his own country, and residing for some time at Strasburg and Leyden, he took the degree of Doctor in Medicine at Helmstadt, was made physician to the army of the duke of Brunswick, and in 1712 to the court of Brunswick Lunenburg, and member of the Academy Nature Curioforum, to the Memoirs of which he was a considerable contributor. His principal works are, "De Constitutione Artis Medicæ," Helmst. 1691, 8vo. "Medicus Legalis," 1696, 8vo. published in German. In this he treats of the duties and office of physicians, surgeons, apothecaries, and midwives, of alchemy, of magnetism applied to medicine, and of the causes of sudden death, on which he has some judicious observations. "Selecta Dietetica, five de recta ad sanitatem vivendi ratione tractatus," Francf. 1710, 4to. He died October 4th 1738. His son Rodolph Augustus Behrens, who succeeded to his honours and practice, published "De Felicitate Medicorum Aucta in terris Brunvicenlibus," 1747, 4to. occasioned by some additional privileges accorded to the physicians there. In this work he takes occasion to comment on, and refute the opinion of Middleton, as to the servile condition of physicians among the Romans.

BEHUT, called also BETUH, IHYLUM, or CHELUM, in *Geography*, a river of Hindooistan, is the westernmost of the five rivers that water the Panjab; and its general course is east, and nearly parallel to that of the Attock, but it is of a less bulk. This is the famous Hydaspes of Alexander, on the banks of which he was opposed by Porus, a powerful monarch of the country, at the head of a numerous army. By the Ayin Acbaree, it is said to be anciently called *Beldulta*. The Behut issues from the spring of *Wair*, or *Wair Naig*, in the south-east part of *Cashmere*, and after a north-west course through that valley, enters the mountains at *Barehmoolch*. During this short course it receives abundance of rivulets and streams from some large lakes, and becomes navigable at a few miles below its remotest spring. After entering the mountains it pursues the direction of the Panjab by a very crooked course, being pent up in a deep winding valley, whilst escaping from the wide base of the *Cashmerian* mountains, and rushing with such rapidity and violence that even the stoutest elephant cannot preserve his footing in it. It emerges from the mountains in the district of *Puckhohi*, and is afterwards joined by two small but celebrated rivers named *Kiskengonga* and *Nainfook*. After this it traverses the territory of the *Glickers*, still holding its course through a hilly country, until it crosses the upper or great road leading from *Lahore* to *Attock*, where the hilly tract is confined to the western bank. Here stood, not long since, a city of the name of *Ihylum*, which communicated its name to the river, during the remaining part of its course; and hence it is as commonly named *Ihylum* as *Behut*. From *Ihylum* it pursues its course along the eastern borders of the *Joud* mountains, and unites with the *Chunaub* at about 50 geographical miles above *Moultan*; losing its name in that of the *Chunaub*, as heretofore it lost its name of *Hydaspes* in that of *Acefines*, the ancient name of the *Chunaub*. The interval between the *Behut* and the *Indus*, in the widest part, is about 94 geographical miles. Pliny allows only 120 Roman miles between the *Indus* and the *Hydaspes*. Rennell's Mem. p. 99. Robertson's India, p. 18.

BEIA, PAX JULIA, an ancient city of Portugal, in the province of *Alentejo*, near a lake of the same name. It is mentioned by *Pliny*, *Ptolemy*, and *Antoninus*. Several Roman coins and inscriptions have been found near this place.

Its situation is on a gentle hill in a fertile country rich in corn, and it is surrounded with walls and gates; and it is the
see

for of a boy, a corregidor, and a governor. It is taken from the Moors in 1162. N. lat. 27° 58'. W. long. 100° 30'.

BEJA, a large extent of country in Abyssinia, lying between the northern tropic and the mountains of Abyssinia, reaching from Mahala along the coast of the Red Sea to Saken; then turning westward, and continuing in that direction, with the Nile on the south, the tropic on the north, to the deserts of Selima, and the confines of Libya on the west. See ABYSSINIA.

BEJA of THE. See BAY-JAH.

BÉJAD, a village of Egypt, opposite to Beisouef, partly inhabited by Copts.

BÉJAPOUR, or VISIAPOUR, a considerable city of Hindoostan, and once the capital of a large kingdom of the same name. It is now in the hands of the Poonah Mahrattas; distant 234 miles from Bombay, from Calcutta by the Circars, 1183, and by Aurungabad 1216, from Delhi 916, from Hydrabad 269, from Madras 534, from Poonah 136, from Serangapatam 405, from Betares 876, and from Agra 825 miles. N. lat. 17° 28'. E. long. 75° 27'.

BELAR, a small town of Spain, in the province of Extremadura, situated in the midst of a pleasant valley between high mountains, whose tops are continually covered with snow. It is famous for its baths, and in its vicinity is a lake, which is said to preface bad weather by an unusual agitation. It was raised into a duchy in 1448.

BEJAR de Malina, or Bejer, a town of Spain, in Andalusia, near the Straits of Gibraltar, 8 leagues south of Cadix.

BELARIA, so called by Mutis, in honour of Bejar, a Spanish botanist, in *Botany*. Lin. Gen. Reich. n. 648. Schreb. 811. Juss. 159. Class and order, *doliceandria monogynia*. Nat. Ord. *Bicornes*. *Rhododendra*, Juss. Gen. Char. Cal. perianth one-lobed, gibbous downwards, subventricose, seven-cleft; divisions subequal, ovate, acute, converging, small; the outer ones broader, permanent. Cor. petals seven, oblong, broader above, obtuse, patulous, inserted into the receptacle. Stam. filaments fourteen, subulate, rather shorter than the corolla, alternately less; anther oblong, incumbent. Pyl. germ superior; style columnar, middle-sized, permanent; stigma thickish, seven-lobed. Per. berry juiceless, five-cornered, depressed, umbilicate, seven-celled. Seeds numerous, columnar-oblong, imbricate.

Plant. Char. Cal. seven-cleft. Petals seven. Stam. fourteen. Berry five-celled, many seeded.

Species, 1. *B. glabra*. Mutis Amer. i. t. 7. "Leaves bipinnate, flowers in racemes." A shrub twelve feet high, with round spreading branches. A native of Mexico. Found in New Granada by Mutis. 2. *B. rufinosa*. Mutis Amer. i. t. 8. "Leaves ovate, flowers large." A tree with profuse branches, and an irregular, tender, subpubescent bark; corolla purple, very resinous or viscid. Found in New Granada by Mutis. These have a peculiar bitter flavour, and are allied to the rhododendron. The name was erroneously made "Befaria" by Lamarck.

BEIBENIE *Stella*, in *Astroonomy*, a name given by some astronomers to the principal fixed stars in each constellation.

The appellation is more particularly given to the stars of the first magnitude, otherwise called the heart, *cordis*, of the several constellations; though some would distinguish between *cordis*, and *bebenie stelle*, reserving the former to stars only of the first magnitude, and extending the latter to several of the second, or even third.

Hermes had a treatise express De Stellis Bebenie, published by Junctius, in his *Speculum Astrologicum*, and also in his *Commentaries* upon Jo. de Sacrobosco's book De Sphaera.

BEILHINGEN, in *Geography*, a town of Germany, in the circle of Upper Saxony, and country of Thuringia, 6 miles S. W. of Wuche. N. lat. 51° 23'. E. long. 11° 50'.

BEILA, a town of Italy, in Piedmont. N. lat. 51° 41'. E. long. 7° 35'.

BEILAM, a town of Syria, S. E. of Beasideron in Mesopotamia. N. lat. 36° 26'. E. long. 35° 11'.

BELINGRIEL, a town of Germany, in the circle of Franconia, and bishopric of Bamberg, at the confluence of the Aegard, and the Soule, 10 miles north of Bamberg.

BELSTEIN, a small town and fief of Germany, in the Rhine circle, and capital of a lordship, which it gives name, comprehending about thirty villages, in the principality of Nassau-Dillenburg; 5 miles south of Dillenburg. The lordship belongs to the prince-bishop of Nassau-Orange. D. 17, which enjoys, in consequence of it, a seat and vote at the diets of the electoral Rhine circle. N. lat. 50° 31'. E. long. 8° 11'.—Also, a small town of Germany, in the duchy of Wurtemberg. In 1693, it was burnt by the French. Its district comprehends several villages.

BELLUL, a town of Abyssinia, situate on the Red Sea north of Affab. N. lat. 14°. E. long. 41° 58'.

BEINA, a river of Norway, in the government of Christiania, which runs into the lake of Sperdillon; and serves for exporting timber.

BEINAC, a town of France, in the department of Correze, and chief place of a canton, in the district of Brive, 8 miles south of Tulle.

BEINASCHI, GIOVANNI BATTISTA, in *Biography*, an historical painter, was born in Piedmont in 1634, and studied at Rome under Pietro del Po, and as some say, was afterwards a disciple of Lanfranco. He died in 1688. Beinascchi was an admirable designer, of a lively invention, and not only expeditious, but correct. As an acknowledgment of his merit, he received the honour of knighthood.

BEINASCO, in *Geography*, a town of Piedmont, 4½ miles S. S. W. of Turin.

BEINDGHURA, a town of Hindoostan, in the district of Benapour, part of the territory of the Mahrattas. N. lat. 15° 15'. E. long. 75° 11'.

BEINE, a town of France, in the department of the Marne, and chief place of a canton, in the district of Reims; the place contains 675, and the canton 8474 inhabitants; the territory includes 352½ kilometres and 19 communes.

BEING, in *Metaphysics*, includes not only whatsoever actually is, but whatsoever can be. It is the first and most obvious, the most simple and natural conception that we can frame of any thing which we see, hear, feel, or know. It is in some sense comprehended in all our other conceptions of things, and is therefore the most general or universal of all our ideas. By the affections of being, are meant all powers, properties, accidents, relations, passions, dispositions, internal qualities, external adjuncts, considerations, conditions, or circumstances whatsoever; or, in a word, all those modes which belong to things, either as they are in themselves, or as they stand in relation to other things, or as they are represented or modified by our ideas and conceptions. The various kinds of beings have been referred by writers on this subject into three distinct classes, and they have been considered as either substances or modes, finite or infinite, and natural, artificial, or moral. For the two former classes, see SUBSTANCE, MODE, FINITE, and INFINITE. Natural beings are all those things that have a real and proper existence in the universe, and are considered as formed and ordained by God the creator; such are bodies, spirits, men, beasts, trees, fruit, countenance, sense, reason, fire, air, light, &c. Artificial beings are made by the contrivance or operation of men, whether they are of a more corporeal nature, such as houses, windows, pictures, statues, arms, garments, writing, music, and the various utensils of life; or whether they relate more to intellectual matters, as words, sciences,

rules, arguments, propositions, verse, prose, &c. Moral beings are those which belong to the conduct and government of intelligent creatures, or creatures endowed with understanding and volition, considered as lying under obligations to particular actions or abstinences: but these considered as moral are only modal; such are law, duty, virtue, vice, sin, righteousness, judgment, condemnation, reward, punishment. These distinctions however might, perhaps, be more properly referred to the separate classes of different ideas than different beings. Being is the subject of Ontology. See ONTOLOGY. See also ESSENCE and EXISTENCE.

BEINHEIM, in *Geography*, a town of Germany, in the circle of Swabia, seated on the west side of the Rhine, and belonging to the marquisate of Baden; 6 leagues N.N.E. of Strathburg.

BEINIGKEMEN, a town of Lithuania, 12 miles north of Pilkallen.

BEIRA, a large and fertile province of Portugal, bounded on the north by the province of Entre Duero a Minho, from which it is separated by the river Duero or Douro, and by Tralos Montes; on the west by the ocean and part of Estremadura; on the south by another part of that province and by the Tagus; and on the east by the Spanish Estremadura, and the kingdom of Leon. It is divided into Upper and Lower Beira; the former being the northern part, and lying on the sea-coast; the latter lying towards Spain and Estremadura. Its extent from east to west is generally computed at betwixt 33 and 36 Portuguese miles; and from north to south about as many. It was erected into a principality by John V. in honour of his grandson, the eldest son of the prince of Brasil. It produces wheat, rye, and millet; and, in several parts, excellent wine and oil in such abundance, that considerable quantities of each are exported. Beira comprehends eight jurisdictions, and its principal cities and towns are Coimbra, Lamego, Guarda, Viseu, Miranda do Corvo, Tentugal, Aveiro, Ovar, Pinhel, Alameda, Francofo, Meda, Castello Branco, Penamacor, and Covilha; the four first are episcopal cities. The militia of this province consist of eight regiments, each regiment including about 1000 men.

BEIRAGUR, a town of Hindoostan, on the west of Boad, and near the Mahanuddy river, noted in the Ayin Achbaree, as having a diamond mine in its neighbourhood.

BEIRAM. See BAIRAM.

BEIRUT. See BAIRUT and BERYTUS.

BEISCH, JOACHIM FRANCIS, in *Biography*, a painter of landscapes and battles, was born at Ravensburg, in Swabia, in 1665; and having received the first rudiments of the art of painting from his father, who employed himself in this way for his amusement, he became a good artist by the force of his own genius and by assiduous practice. He was engaged at the court of Munich, and painted the battles fought in Hungary by the elector Maximilian Emanuel. During the absence of the emperor on some of his expeditions, Beisch visited Italy, and there, with a view to his further improvement, studied and copied the famous models to which he had access. Before his journey to Italy, his manner was true, but too dark; his second had more clearness and more truth; and his last was more clear but more weak. The scenes of his landscapes are agreeably picturesque; his touch is light, tender, and full of spirit; and his style of composition frequently resembled that of Gaspar Poussin, or Salvator Rosa. He died in 1748. Pilkington.

BEISHEHIA, or BISHEHRI, in *Geography*, a town of Asiatic Turkey, in Caramania, seated near a lake. N. lat. $37^{\circ} 45'$. E. long. $32^{\circ} 11'$.

BEISSKER, in *Ichthyology*. See BEYSSKER, or BEYZKER, and COBITIS FOSSILIS. Linn.

BEISSONS, in *Geography*, a place of Africa, in the kingdom of Tunis, situate between Taberfoke and Dugga, at which there are found some antique remains and inscriptions.

BEISTEN, a town of Prussia, in the province of Natan-gen, 26 miles south of Konigsberg.

BEIT ABUFARRA, a town of Arabia, 24 miles N.N.E. of Wadeij.

BEIT *el Adham*, a town of Arabia, 24 miles S.W. of Sanaa.

BEIT *Elam*, a town of Syria, south of Antakia. N. lat. $36^{\circ} 5'$. E. long. $36^{\circ} 32'$.

BEIT *el Fakih*, a city of Arabia, in the country of Yemen, situated on a plain, which, though far from being naturally fertile, is industriously cultivated. The houses, many of which are of stone, are separated from one another; and the city has a citadel, which is thought of the utmost importance in a country where armies are destitute of artillery. The town is much molested by a species of ants, called by the Arabs, "Ard." Beit el Fakih is not very ancient: though it has existed for some centuries. It owes its origin to a saint, called "Achmed iba Mufa," from whom it has derived its name; Beit el Fakih denoting the "house or dwelling of the sage." Near the city is shewn the tomb of the saint, upon a sandy hill, where a fine mosque has been erected, and where several devout persons have built cottages round the tomb. When the harbour of Ghalefka was choked up, the inhabitants of that city, for the convenience of trade, removed their effects to the vicinity of this tomb, and settled about it. When it became a considerable city, the lord of the territory erected a citadel for its defence, in the place where water had been found. This city is very favourably situated for trade; being only half a day's journey from the hills in which coffee grows, and but a few days' journey from the harbours of Loheia, Hodeida, and Mocha, from which this commodity is exported. This trade brings hither merchants from Egypt, Syria, Barbary, Persia, Habbesch, India, and often from Europe. Beit el Fakih is the residence of a Dola, whose jurisdiction extends over a large district. Niebuhr mentions a singular instance, which occurred at this place, and which strikingly indicates the coolness of temper and firmness of mind, that distinguish the Arab character. The southern end of a house caught fire; and as the wind blew strong from the south, a great part of the city was soon burnt down. The inhabitants, however, retained their usual tranquillity. No cries nor complaints were heard in the streets; and when the people were addressed with expressions of condolence, upon their misfortune, they calmly replied, "It is the will of God." N. lat. $14^{\circ} 31'$. E. long. $43^{\circ} 12'$. Niebuhr's Trav. vol. i. p. 311.

BEIT *el Kadi*, a town of Arabia, in the country of Yemen, 34 miles north of Chamir.

BEIT *el Naum*, a town of Arabia, in Yemen, 24 miles south-east of Sanaa.

BEIT *Ebn Safan*, a town of Arabia, in Yemen, 28 miles S.S.E. of Saade.

BEIT *Ebn Meri*, a town of Arabia, in Yemen, 38 miles N. of Chamir.

BEIT *Ebn Nafr*, a town of Arabia, in Yemen, 34 miles N. of Chamir.

BEIT *Rodsje*, a town of Arabia, in Yemen, 24 miles S.E. of Sanaa.

BEIT *Il Tola*, a town of Arabia, in Yemen, 28 miles S. of Saade.

BEIT *Ebn Shemshar*, a town of Arabia, in Yemen, 28 miles E. of Abu-Arifch.

BEIT *El Weil*, a town of Arabia, in Yemen, 3 miles N. of Demn.

BEITH, a town of Scotland, in the district of Cunningham,

ham, and county of Ayr. It is seated on a small eminence, and the streets are pretty regularly laid out. A linen manufactory gives employment to many of its inhabitants, and others are occupied in making silk-gauze and cotton. Some considerable manufacturers reside in the town, and though it is said to have consisted of only a few inhabitants at the commencement of the last century, yet the population now amounts to about 1800. The parish, extending about five miles in length, by four in breadth, consists principally of arable land; but some farms, with others at Dunlop, are appropriated to the dairy system, and have long been famous for a particular cheese called the *Dunlop cheese*. Within the boundary of the parish is a small loch, containing abundance of fish, and near it is plenty of peat moss. Coal is found in many places; freestone is abundant, and the limestone quarries are almost inexhaustible. In the latter substance are frequently found various petrifications of shells, and other marine exuvia; also many other silicious petrifications of woods, mosses, &c. The population of the parish and town in 1792, was 2872. Sinclair's Statistical Account of Scotland.

BLITHAR, BES, in *Biography*, a learned Arabian botanist, called *Azhar*, the botanist, from his skill in the science of plants, was born in Spain; and after visiting Africa, travelled into the Levant, Asia, and even as far as the Indies to improve his knowledge. After his return he was patronised by Saladin at Cairo, and died in 1248. He wrote "A General History of Simples, or of Plants, arranged in alphabetical order;" in which he gives the Greek, Arabic, and vernacular names, with the descriptions of each, and particularly in a more detailed manner, those not described by Dioscorides and Pliny. Beithar's work is extant in the Parisian, Escorial, and other libraries. Herbelot. Pulteney's Hist. and Biog. Sketches, &c. vol. i. p. 19.

BEITSTÄDT, in *Geography*, a lake in the northern part of Norway.

BEIUCO, in *Botany*. See HIPPOCRATEA.

BEJWARA, called also *Hofbearpour*, in *Geography*, a town of Hindoostan, in the country of Lahore, about 3 journaes or 36 coffes from Sirhind, 16 coffes N.E. of Jallindhar, and about 25 geographical miles north of Rahoo, and about 30 such miles from Hurepour.

BEIZA, or BEZIATH, a Hebrew word, signifying an egg, in Jewish *Antiquity*, a certain measure in use among the Jews; they say that the beiza contains the sixth part of a log.

The beiza is also a sort of gold coin common among the Persians; it weighs forty drachmas, and from this word, not from the city of Byzantium, the bezant was formed. A bezant is worth two dinars, and every dinar twenty or five and twenty drachmas.

BEK, DAVID, in *Biography*. See BECK.

BEKAA, in *Geography*, a valley of Syria, anciently called Cæle-Syria, or the hollow Syria, separates the chain of mountains denominated by the ancients Anti-Libanus, from the Libanus of the Druzes and Maronites, and by being the depository of the water of the mountains that enclose it, is rendered one of the most fertile districts of all Syria; but the heat of the sun, the rays of which are concentrated by the mountains, is in summer not inferior to that of Egypt. The air, however, which is perpetually refreshed by the north wind and by the agitation of the waters, is not unhealthy. Before the earthquake of 1759, this whole country was covered with villages and plantations of the *Motoualis*; but the destruction occasioned by this terrible calamity, and the subsequent wars with the Turks, have occasioned a general desolation. In this vale is situated the famous BALBEC.

BEKAVA, or BEKAWA, a small town of Poland, in the palatinate of Lublin.

BEKES, a town of Upper Hungary, on the river Koros, which gives name to the *Cepeneshaft*.

BEKI, BEG, or BEYE, a river of Hungary, which runs into the Temes, near Temeswar.

BEKIA, BECOVVA, or BOZVIO, a small British and of the West Indies, about 12 leagues in compass, and containing 3,700 acres, being the least of the Grenadilles, called by the French, "Little Martinico;" 35 miles N.E. of Grenada, and 65 leagues from Barbadoes. It has a safe harbour, called "Admiralty-bay," but no fresh water; and is principally visited by the inhabitants of Grenada and St. Vincent's for the purpose of catching turtle. The soil produces wild cotton, and plenty of water-melons. This island is dependant on the government of St. Vincent.

BEKIER, a name given by mariners to Aboukir, which see.

BEKING, a town of France, in the department of the Moselle, and chief place of a canton, in the district of Sar-Louis, on the Sarre, 5 miles N.N.W. of Sar-Louis.

BEKKER, or BECKER, BALTHASAR, in *Biography*, a famous Dutch divine of the 17th century, was born in 1634, at Warhuifen, a village in the province of Groningen, and pursued his studies first in the university of Groningen, and afterwards at Francker, where he became rector of the Latin school. In 1665, he took his degree of doctor of divinity at Francker, and in the following year he was chosen one of the ministers of that city. In 1670, he published a catechism, intended for persons of mature age, in which he maintained some opinions concerning the right of Christian congregations to chuse their own ministers, and concerning the antiquity and usefulness of bishops, archbishops, &c. and in which he introduced some suggestions that implied his doubt of the eternity of hell torments, as inconsistent with the divine goodness, which gave offence to several divines, and which incurred a prosecution before the ecclesiastical assemblies. This catechism, however, was approved and commended by several learned professors; and it appears that the author had not, at the time of its publication, adopted those sentiments which involved him in future difficulties. In 1679, he was elected minister at Amsterdam; and in 1683, he published his "Inquiry concerning Comets," in which he concurred with Mr. Bayle in maintaining that they are not presages of any evil. By this work, as well as his "Exposition upon Daniel," he gained great reputation; but having attached himself from an early period of his life to the Cartesian philosophy, he adopted Descartes's definition of spirit, and he was hence led to deny all those operations of the devil and other infernal agents upon mankind, which are related in the scriptures. His argument, as it is briefly stated by Dr. Maclaine, the translator of Moshem's history, is as follows: "The essence of mind is thought, and the essence of matter is extension. Now, since there is no sort of conformity or connexion between a thought and extension, mind cannot act upon matter, unless these two substances be united as soul and body are in man; and therefore no separate spirits, either good or evil, can act upon mankind. Such acting is *miraculous*; and miracles can be performed by God alone. It follows of consequence, that the scripture accounts of the actions and operations of good and evil spirits must be understood in an allegorical sense." To this argument it is replied, that by proving too much, it proves nothing at all: for if the want of a connexion or conformity between thought and extension renders mind incapable of acting upon matter, it is hard to see how their union should remove this incapacity, since the want of conformity and connexion remains notwithstanding this union; Besides, according to this reasoning, the Supreme Being can, not act upon material beings; and it is in vain that Bekker maintains the affirmative by having recourse to a miracle for

for this would imply, that the whole course of nature was a series of miracles, or in other words, that there are no miracles at all. The author suggested doubts concerning the agency of the devil in several of his sermons; and he alleged, that several were ascribed to the devil, in which this evil spirit had no concern. He was at length, viz. in 1691, persuaded to publish his system at large, in an elaborate work, entitled, "The World Bewitched." This work is divided into four books. The first contains an account of the opinions of the ancient and modern heathens concerning gods and demons, or spirits. In the second book the author examines all the passages of the Holy Scripture, which mention either angels or the devil, and endeavours to make them agree with his opinion, that the devil has not the least power in this world, and to shew that those passages, which ascribe several actions to good as well as bad spirits, or angels, must be explained in an allegorical manner. Accordingly, he denies that our first parents were tempted by the devil; alleging that this temptation is ascribed to the devil, only because it does not agree with the goodness of God, though Moses does not mention the devil, and that the punishment mentioned by Moses doth not suit the devil, but only the serpent. He also urges several objections against the literal sense of our Saviour's temptation; and he maintains that those possessed with evil spirits, which our Lord cast out, were merely sick or lunatic persons whom he cured, and in whose sickness the devil had no concern. (See *DÆMONIAC.*) Bekker's work, though his system was not new, occasioned great commotion not only in all the United Provinces, but in various parts of Germany. The author, persisting in his opinions, was publicly deposed from his pastoral charge in 1692; but the magistrates of Amsterdam continued his salary till his death, which happened in 1698. Bekker not only retained his opinions after his deposition, but strenuously defended them against a multitude of adversaries as long as he lived. He was a man of a warm imagination, of an active mind, and of a firm resolute temper. His character was irreproachable; and he avowed to the last his full conviction of the truth of the Christian religion. In his defences he exhibited a moderation which he did not experience from his antagonists. A satirical medal was struck at his deposition, which exhibited the devil, in the habit of a minister, riding upon an ass, and holding a banner in his hand, as a token of the victory which he had gained in the synods. His opinions found several advocates; and he became the head of a sect which was called after his name. Gen. Dict. Mosheim's *Ecl. Hist.* vol. v. p. 632.

BEKKERANISM, or BEKKERIANISM, in Ecclesiastical History, the system or sentiments of Balth. Bekker, who denied that spirits can act or operate on bodies. See the preceding article.

BEL, MATTHIAS, in Biography, a learned historian of Hungary, was born at Orfowa, in 1684; and after studying divinity at the university of Halle, he became first, viz. in 1708, rector of the evangelical school at Neufohl, and in 1714, rector of the school at Presburg. In 1719, he was chosen preacher by the German evangelical congregation in that city, and died senior minister in 1749. His two most valuable works are his "Apparatus ad Historiam Hungariæ," and his "Notitia Hungariæ Novæ." The latter work was held in such high estimation, that it procured for him from the emperor Charles VI. the appointment of imperial historiographer, and the honour of being admitted into the royal academy of sciences at Berlin, and also into that of Petersburgh. Pope Clement XII. also testified his approbation of it by conferring on the author his portrait and eight gold medals. The emperor, upon receiving the second volume of the work, raised him to the rank of nobility, but this

circumstance Bel studiously concealed. Among his other works are "Prodromus Hungariæ antiquæ et novæ." Novb. 1723, fol.; "Notitia Hungariæ novæ historio-geographica," Viennæ, 1735-1742, 4 vols. fol.; "Apparatus ad Historiam Hungariæ, sive Collectio Miscellæ Monumentorum, &c. dec. 1 & 2," Pofon. 1735-46, fol. He also translated into the Bohemian language the Bible, and some other books.

BEL, CHARLES ANDREW, son of the former, was born at Presburg in 1717, and studied at Jena and Altdorf. In 1741, he became extraordinary professor of philosophy at Leipzig; and in 1756, he was appointed public professor of poetry, and librarian to the university, with the rank of counsellor of state. He died suddenly in 1782. Among his writings are "De vera origine et epocha Hunarum, Ararum, Hungarorum, in Pannonia," Leipf. 1757, 4to. After the death of Menck, he was employed as editor of the *Acta Eruditorum*, and of the Leipzig literary gazette, which he conducted from the year 1754 to 1781.

BEL, JOHN-JAMES, was born at Bourdeaux, in 1693, and having pursued his studies with great assiduity in the college of the fathers of the oratory, and made distinguished acquisitions in belles lettres, and also in metaphysics and morals, he was admitted counsellor of parliament in 1720. After several visits to Paris, he finally settled at Bourdeaux; and in 1735, he was chosen director of the academy; but the excess of his application to a variety of scientific and literary pursuits hastened his death in 1738. To the academy of Bourdeaux he left the house in which it holds its sittings, and his valuable library. Besides several professional works, M. Bel published "An Apology for Mr. Houdart de la Motte," 1724, 8vo. which is an ironical criticism on the works of that author, and particularly his tragedies; "An Examination of the tragedy of Romulus, by la Motte;" "A Dissertation on the Abbé Dubos's opinion concerning the preference to be given to the perceptions of taste above reasoning, in judging of works of genius;" "Letters containing Observations on Voltaire's tragedy of Marianne;" all which are inserted, together with some other papers of M. Bel, in "Memoirs of Literature and History," collected by father des Moletz of the oratory. He was also the author of the "Neological Dictionary," augmented by the abbé des Fontaines, and intended to expose the new words and affected phraseology of several modern writers. *Nouv. Dict. Hist.*

BEL, in Botany, the name of a plant, and also of its fruit, called by some the cucumis cappariss, or caper-cucumber. Avicenna has given the most copious account of this plant, which is imperfectly described by others; and he says, that the fruit, which resembled a caper, was used in medicine, and resembled ginger in the fiery heat of its taste.

BEL, in Geography, a town of France, in the department of the Rhone and Loire, on the Brevenn; $3\frac{1}{2}$ leagues west of Lyons.

BEL, in Mythology. See *BELUS*.

BEL and the DRAGON, History of, in Biblical History, an apocryphal part of the book of Daniel, which, although it was annexed to this book, and formed the 14th and last chapter of it, was uniformly rejected by the Jews, and made no part of their canon of scripture. It occurs neither in the Hebrew or Chaldee text, nor in the Greek version of the Septuagint, but was taken out of the Greek version of Theodotion. Africanus, Eusebius, and Apollinarius, have rejected the narration, not only as uncanonical, but also as fabulous; and Jerom also concurs in their opinion. Origen maintains the truth of the history contained in the 13th (see *SUSANNA*,) and 14th chapters, against Africanus, but does not assert it to be canonical. This history is also cited, as part

of the prophecy of Daniel, by Isidore, Clemens Alex. Tertullian, Origen, Cyprian, Diodorus, Hilary, Basil, Gregory Nazianzen, Ambrose, and Augustin. Salustius Severus, and the author of the Synopsis of St. Athanasius, also mention these histories as part of the sacred text; and Rufinus upbraids Jerom for having cut off from Daniel the fong of the three children, the history of Saffana, and that of Bel and the Dragon. Against the truth of this latter history, allowing it to be apocryphal, it has been alleged, that the ancient title of the LXX. attributed it to Habakkuk, and that Daniel mentioned in this history was a priest; and that therefore he must have been another Daniel to whom this history belongs. To this argument it has been replied, that the character of priest is not given to Daniel in the version of Theodotion, and that the version attributed falsely to the LXX. is of no date. Against the history of the Dragon it has been urged that Habakkuk, who lived in the time of Manasses, was dead when it is supposed that he wrote these things, and was caught up by the spirit to carry provision to the prophet Daniel. To this objection it is answered, that there were two Habakkuks; one, who was the prophet in the time of Manasses, and of the tribe of Simeon; and another, mentioned in this passage of Daniel, of the tribe of Levi. Against this history it has also been objected, that it relates the confinement of Daniel in the lion's den to have lasted six days; whereas in chap. vi. 5. 22, it is said, that he had been confined only one night. The advocates of the history reply, that he was twice cast into the lion's den; under Darius, because he prayed to God against the king's commandment; and under Cyrus, on account of the dragon. Dupin's Canon. b. i. c. 3. § 21. See APOCRYPHA, and DANIEL.

BELA, in *Geography*, a pretty large town of Upper Hungary, seated in a delightful plain, not far from the river Pannone, but much rendered by frequent fires.

BELA, or **BEYLA**, a town of Africa, in the kingdom of Senegal, near the river Belad, or Rahad, between Dender and Teava, in the route from Senegal to Gonder.

BELA-BISSA, i. e. 'the white man,' *D'la*, formerly *Bel-Bissa*, a mean town of Lower Hungary, in the Schemnitz district, and geparshicht of Hont, whose mines being exhausted, the inhabitants applied themselves to tillage.

BELABRE, a town of France, in the department of the Indre, and chief place of a canton, in the district of Le Blanc en Berry, 2 leagues south-east of Le Blanc, and 8½ south-west of Chateauroux. N. lat. 46° 33'. E. long. 1° 3'.

BELALCASAN, a town of Spain, in the province of Andalus, on the frontiers of Badrenadura, 9 leagues from Cordova.

BELAN. See BELTON.

BELANCE ISLAND in *Geography*, one of the small islets or rocks which lie between the island of Ulbair and St. Matthew's point, at the entrance into the Breil harbour.

BELASAMA, formed from *belisama*, the mouth of a river, in *Ancient Geography*, the name given by Ptolemy to the bay near Liverpool, at the mouth of the river Merley.

BELASL, in *Geography*, a town of Germany, in the Tyrol, 8 miles west of Bellano.

BELATUCADRUS, or **BELATUCADROS**, the name of a deity of the Britons, mentioned in several old inscriptions, and supposed by Belin de Belloy, and V. Tu. (de Orig. & Prog. Idol. l. 2. c. 17.) to be the same with Belisagus, which see. Bishop Yttelton and professor Ward supposed him to have been a local deity (see *Archaeologia*, vol. 1. p. 38.) with a festival referred to Apollo, who was worshipped, as they observe, by the Druids. Mr. Pegge, (Id. vol. iii. art. 14.) contends, that it is highly absurd to look out for any other deity in Belatucadros, but the god Mars.

This ingenious antiquary acknowledges, that he was a local deity, peculiar in this island to the Brigantes, but at the same time asserts, that he was equivalent to Mars, and that he was invested with the same powers as that god, and that he had not the least concern with Apollo, or any relation to him. The opinion of Mr. Pegge is approved and confirmed by Mr. Gough. (Id. vol. x.) We may add, that it is rendered unquestionable by the inscription recorded by Muratori (*Inscrip. Theat. 43. 1.*) which is as follows: "DIO MARTI, BELATUCADRO."

BELAY, on board of *Ship*, signifies the same as fatten. Thus they say, belay the sheet or tack, that is, fatten it to the kevel, by winding it several times round a luff, &c.

BELAYE, in *Geography*, a town of France, in the department of the Lot, and chief place of a canton, in the district of Lauzerte, one league south-east of Puy l'Evêque.

BELAYING-CLEARS, in *Naval Language*, are pieces of wood, which have two arms, or horns, and are nailed through the middle to the masts, or elsewhere, for the purpose of belaying ropes to them.

BELAYING-PINS, are turned wooden pins, with a shoulder near the middle: the small end is driven through the rough tree rails, or racks of thin plank made on purpose. Their use is for belaying ropes to them. Iron belaying pins are round, taper from the middle to each end, and are driven in the rails, or racks, to belay the ropes to, by taking several cross-turas about them.

BELBA, in *Geography*, a town of Egypt, on the coast of the Mediterranean, 19 miles east of Tineh.

BELBEIS, a town of Egypt, about 35 miles north-east of Cairo, and 45 north-west of Suez. N. lat. 30° 22'. E. long. 31° 55'.

BELBEK, a river of the Crimea, which falls into the Euxine.

BELBINA, in *Ancient Geography*, an island of Greece, in the Saronic gulf, near the promontory of Saniun, and opposite to the Seyllaan promontory: mentioned by Pliny, Strabo, &c.—Also, a town of the Peloponnesus, in Laconia, near which was a temple of Minerva.

BELBO, in *Geography*, a river of Italy, which rises about 2 miles east of Ceva, and runs into the Tanaro, six miles S.W. of Alexandria.

BELBUCH, a town of Germany, in the circle of Upper Saxony, in Pomerania, one mile N.E. of New Treptow.

BELUCH, and **Zomaluch**, in *Mythology, were regarded among the Vedals as the good and evil genii. The former signified the white god, and the latter the black god. They were objects of divine honours.*

BELCA, in *Ancient Geography*, a place of ancient Gaul, between Briodbrum and Genabum, where was an amphitheatre.

BELCAIRE, in *Geography*, a town of France, in the department of the Aude, and chief place of a canton, in the district of Limoux, 3½ leagues S.W. of Quillan. The place contains 915, and the canton 6757 inhabitants; the territory includes 227½ kilometre and 17 communes.

BELCANIA, a town of Asia, placed by Ptolemy in the greater Armenia.

BELCASTRO, a small episcopal city of Naples, in the province of Calabria Ultra; 10 miles N. E. of St. Severina.

BELCHER, a township of America, in the county of Hampshire, and state of Massachusetts, containing 1485 inhabitants, who subsist chiefly by farming.

BELCHERS, a cluster of islands in Hudson's bay. N. lat. 56° 10'. W. long. 80° 33'.

BELCHIER, JOHN, in *Biography*, a surgeon of eminence in London, was born at Kingston-on-the-Thames in

1706. After receiving a classical education at Eton, he became pupil to Mr. Chefeldon, by whom he was much esteemed. In 1736, he was elected surgeon to Guy's hospital, and soon after fellow of the Royal Society. The following year, he sent to the society the case of a woman who died of a dropfy of the ovarium, attended with some remarkable circumstances, and soon after, an account of the case of a man whose arm had been torn off at the shoulder, by one of the ropes of a mill. The circumstance most deserving attention in this case was, that only a small quantity of blood was lost by the accident, which Belchier very properly attributed to the great distension the arteries had sustained before the limb was separated from the body. The man recovered. His next, and last communication to the society, was the result of a series of experiments and observations on the effect produced on animals, by mixing madder with their food. After continuing this diet for a few days, on killing the animals, the bones were found to be tinged with the madder, but on suffering some of them, that had been so fed, to live a few days longer, the colour induced by the madder became dilute and pale, and at length totally disappeared; a proof, it was observed, that the bones are well supplied with absorbents, as well as with blood vessels. See Philosophical Transactions. Nos. 423, 442, and 449. Belchier died in 1785, in the 80th year of his age, having for several years previously retired from business, and was buried in the chapel of Guy's hospital, to which he had been a zealous friend and patron. Gen. Biog. Dict.

BELCHING. See RUCTATION.

BELCHITE, in *Geography*, a small town of Spain, in the country of Arragon, seated in a fruitful soil, on the river Almonazir; 8 leagues south from Saragossa. N. lat. $41^{\circ} 19'$. W. long. $0^{\circ} 30'$.

BELCIANA, in *Ancient Geography*, a town of Asia, in Assyria. Ptolemy.

BELDEK, in *Geography*, a town of Hungary, 15 miles south of Zatzmor.

BELDIRAN, a town of Asiatic Turkey, in the province of Caramania, 28 miles south of Cogni.

BELEBEV, or **BELEBEIEF**, a town of Russia, in the government of Ufa, on the rivulet falling into the Diema, 60 miles south-west of Ufa. N. lat. 54° . E. long. $54^{\circ} 14'$. This is also the name of one of the nine districts, comprehended by the province of Ufa.

BELÉKIS, a town of Slavonia, 10 miles north-west of Belgrade.

BELEM, a town of Portugal, in the province of Estremadura, or in the vicinity of Lisbon, on the north side of the Tagus, in which are a considerable monastery and a royal palace. In its magnificent church, which suddenly sunk in 1756, many kings and princes of the blood have been interred. Below Belem is a square tower called "Torre de Belem," fortified with cannon, which no vessel must pass till it has been visited. Near this tower, which is near a league west from the city of Lisbon, in N. lat. $38^{\circ} 40'$. W. long. $9^{\circ} 40'$, are several batteries, and a small irregular fort, commonly called San Gíao, built on a rocky point, and covering the entrance of the harbour, and opposite to it is another tower called "Torre velha," or old tower, strengthened by a few cannon and soldiers.

BELEM, a town of North America, in the country of New Navarre, 180 miles north-west of Cinaloa.

BELEM, **BELLEM**, or **BELM**, a town and district of Germany, in the circle of Westphalia, bishopric of Osnabruck, and prefecturate of Iburg; 3 miles east of Osnabruck.

BELEM, or **PARA**, a sea-port town of South America, in the country of Brazil, seated at the north head of the river

Guama, which falls into the river of the Amazons. See **PARA**.

BELEM Cape, a high steep point, on the coast of Galicia, in Spain, about N.N.E. from cape Finisterre, between which is the projecting point of cape de Toriane, bearing south-west four leagues from Belem. The principal rock of this rugged point, appearing like a black tower, is called the Monk, or Munich.

BELEMNITA, in *Natural History*, a species of **NAUTILUS**, in the *testacea* order of *vermes*, with an uniform, smooth, conic, and acute shell, frequent among the fossils of Europe. See the next article.

BELEMNITE, or **THUNDERSTONE**, *Pfeilstein*, *Donnerstein*, Germ. *Belemnite*, *pierre de foudre*, *Daÿyle*, Fr. *Belemnita*, *Lapis Lynceus*, *Ideus Daÿtylus*, *Lapis Ceraunius*, **LAT.**

The belemnite is a fossil, which has obtained its name from the Greek *βελος*, an arrow, on account of its resemblance to an arrow-head. Its lengthened conical or spindle-shaped figure suggested a likeness to the finger, hence the name *daÿtylus*. The ignorant superstition of some of the ancients attributed the origin of this substance to the congealed urine of the *Lynx*, on account of its strong smell when pounded or scraped; by others it was supposed to be one of the materials of the thunderbolt, and it has derived names from both these circumstances.

The form of the belemnite is generally intermediate between a long cylinder and a very acute-angled cone; the apex is a plain rounded point; the base is somewhat concave: at a distance between the base and apex, varying in length from one-third to one-sixth of the whole, the diameter of this fossil begins to increase towards the base in a considerably greater ratio than it did from the apex; the most correct idea, therefore, of its figure, will be formed by imagining a truncated cone terminated by another much longer and more acute-angled, rounded off at the extremity instead of coming to a sharp point. It is by no means common, however, to find belemnites thus perfect, being for the most part broken off at one extremity, and not unfrequently at both. Considerable variations are observed in the form of this fossil: it is sometimes expanded and somewhat flattened at the extremity, or is nearly cylindrical, or enlarged and rounded off at the apex, so as to resemble a club. In the flattened varieties a longitudinal furrow on each side is occasionally observed. The colour of the belemnite is generally brownish yellow, with a transparency resembling alabaster. It usually consists of calcareous spar, mingled however with animal matter; for when exposed to a red heat it gives out an odour like burnt horn: sometimes it occurs converted into flint, at other times is found filled with pyrites, or even according to Volkmann, (*Silesia Subterranean*. § 155.) with galena.

If a longitudinal section is made of a perfect belemnite, it will appear to be composed, like a cow's horn, of a number of elongated conical lamellæ inserted one into the other, covering a core or alveolus, also of a conical shape, but extending never more than a third of the length from the base towards the apex. A cross fracture of this fossil beyond the alveolus exhibits a number of rays converging from the circumference towards the centre, and as many concentric circles as there are conical lamellæ.

The alveolus of the belemnite is a conical body, divided transversely into cells by bony parietes resembling watch glasses; the centre of each of which, according to Platt, Rosinus, Sage, &c. is perforated to receive a tube or siphunculus, which passes from the apex to the base of the alveolus, and thus communicates with all the cells, in the same manner as is observable in the nautilus, the ammonite, and orthocera-
tite:

time: it is remarkable, however, that Deluc (*Journal de Physiq.* vol. 19. p. 360.) altogether denies the existence of this perforation. Every paries in the alveolus serves as the base of a coroidal lamina; the number of these last, therefore, is equal to that of the cells of the alveolus.

It often happens that the alveolus of the belemnite is found detached from the other part of the fossil, and in this state it has been considered as a peculiar species of orthoceratite; while the coroidal case, deprived of this characteristic part, has been supposed to be a mere stalaçtite, or a petrified tooth of the grampus, or a spine of a species of echinus, or even of vegetable origin.

M. Deluc, denying the perforation of the alveolus, considers the belemnite as a bone belonging to an unknown animal analogous to the sepia, or cuttle-fish, apparently, however, without much reason.

The belemnite has never been met with but in a fossil slate; it occurs not unfrequently in marble, limestone, and chalk strata, together with other marine remains; and detached fragments are often found in the gravel beds that cover or adjoin these strata.

The finest English specimens have been procured from the chalk pits of Oxfordshire: the quarries of Meudon near Paris contain many perfect and beautiful varieties; but the largest species come from the Margraviate of Anspach in Prussia. *Philos. Trans.* for 1764. *Journ. de Physique*, vols. li. lii. liii. Schröter's *Lithologisches real und Verballexikon*, &c. vol. i.

BELENUS, or BELINUS, in *Mythology*, a name which the Gauls gave to the sun, which they also called *Mithra*; and as some suppose the same with the *Baal* of Scripture, and the *Belus* of the Assyrians.

Belenus, latinized by the Roman authors, according to Toland, ubi infra from 'Beal' or 'Bealan,' was understood by the Gauls and their colonies to denote the sun; and according to J. Capitolinus (Maximin. c. 22.) and Herodian (l. 8. c. 3.) he was the same deity with the Apollo of the Greeks and Romans. He was actually denominated Apollo in the inscriptions found at Aquleia, where he was honoured with a peculiar worship, under the figure of a young man without beard, with rays about his head, and an open wide mouth for uttering oracles. Tertullian (*Apolog.* c. 23.), informs us, that Belenus was the idol-deity of the Norici, and among the Illyrians, Vopiscus says (Aurelian apud init.) his forms and ornaments were the same with those of the Mithra of the Orientals. The sun, indeed, seems to have been the most ancient and universal object of idolatrous worship; inasmuch that perhaps there never was any nation of idolaters which did not pay some kind of homage to this glorious luminary. Accordingly, he was worshipped by the Gauls and ancient Britons with great devotion under the various appellations of Bel, Belinus, Apollo, Graunius, &c. names which in their language were expressive of the nature and properties of that visible fountain of light and heat. To this illustrious worship, those famous circles of stones, called cairns, or carns, of which there are not a few still remaining, seem to have been chiefly dedicated; where the Druids kept the sacred fire, the symbol of this divinity, and from whence, as they were seated on eminences, they had a full view of the heavenly bodies. The first day of May was, in the Druidical rites of worship, a great annual festival in honour of Belenus, or the sun. On this day prodigious fires were kindled in all their sacred places, and on the tops of all their cairns, and many sacrifices were offered to that glorious luminary, which now began to shine upon them with great warmth and lustre. Of this festival there are still some vestiges remaining, both in Ireland and in the highlands of Scotland, where the first of May, is called "Beltein," i. e. the fire of Bel or Belinus.

Two such fires, says Toland, were kindled near one another on May-eve in every village of the nation, as well throughout Gaul, as in Britain, Ireland, and the adjoining lesser islands, between which fires the men and beasts to be sacrificed were to pass; from whence came the proverb "between Bel's two fires," meaning a person in a great strait, not knowing how to extricate himself. One of the fires was on the cairn; the other on the ground. On the eve of the first day of November there were also such fires kindled, accompanied with sacrifices and feasting. All the people of the country on this eve extinguished their own fires entirely; and every master of a family was religiously obliged to take a portion of the consecrated fire home, and to kindle the fire anew in his house, which for the ensuing year was to be prosperous. The Celtic nations also kindled other fires on Midsummer eve, which are still continued, says Toland, by the Roman catholics of Ireland, making them in all their grounds, and carrying flaming brands about their corn-fields. This is done likewise in France, and in some of the Scottish isles. These Midsummer fires and sacrifices were intended for obtaining a blessing on the fruits of the earth, now ready for gathering; as those of the first of May, that they might prosperously grow; and those of the last of October were a thanksgiving for finishing their harvest. But in all of them regard was had to the several degrees of increase and decrease in the heat of the sun. Toland's *Hist. Druids* in his *Works*, vol. i. p. 69, &c. Henry's *Hist.* vol. i. p. 156, &c.

BELERIUM, (D. od. Sic. l. v. c. 22.) or BOLERIUM, (Ptolem. l. ii. c. 3.) called also by Ptolemy "Antivestæum" in *Ancient Geography*, is the promontory formed by the most western point of Britain, now known by the name of "Land's End."

BELLESME, in *Geography*, a town of France in the department of the Orne, and chief place of a canton in the district of Mortagne, 3 leagues S. from it. The place contains 2708 and the canton 13,022 inhabitants; the territory includes 170 kilometres and 15 communes.

BELESTA, or BELESTAT, a town of France, in the department of the Aude, and chief place of a canton, in the district of Quillan, 10 miles west of Quillan.

BELETTE, in *Zoology*, a name under which Buffon describes the common weevil, *mustella affinis* of Gmelin.

BELEZ, in *Geography*, a town of South America, in Terra Firma, and province of New Grenada.—Also, a river of Spain, which runs into the Mediterranean, between Barcelona and Taragona.

BELFAST, a considerable town of Ireland, in the county of Antrim, and province of Ulster, situate at the mouth of the river Lagan, which separates it from the county of Down. The town, except a small portion of it, is not elevated more than six feet above high water mark at spring tides. Belfast lough, or the bay of Carrickfergus, into which the Lagan flows, is a spacious æstuary, a great part of which is left dry every tide, which is the case likewise with Strangford lough, another great æstuary, the nearest extremity of which is distant about 8 miles S.E. Between Belfast and Lough Neagh, which is about 12 miles west of it, there is a chain of mountains, the highest of which, called Devis, is about 1580 feet high. The roots of these mountains extend to the neighbourhood of the town. Mr. Arthur Young found them to consist of very good loam to their summits, and complains of their being neglected. As tillage, however, is improving in that neighbourhood, it may be supposed that there is no longer cause for such complaint. There was formerly a castle at Belfast, which seems to have been a post of importance, as it was twice taken and destroyed by the earl of Kildare,

lord deputy, in 1503 and 1512. After the complete reduction of Ireland at the beginning of the 17th century, Belfast became the property of Sir Arthur Chichester, afterwards lord deputy, and baron of Belfast, who exerted himself in the settlement of Ulster. Through his influence it was made a borough, and sent two members to the Irish parliament; and an English gentleman, who travelled through part of Ireland in 1635, and whose manuscript journal is in the possession of general Vallancey, mentions that lord Chichester had a stately palace at Belfast, which was the glory and beauty of the town, and which was his chief residence. Through the influence of this nobleman, the custom-house was removed from Carrickfergus to Belfast by the earl of Strafford in 1638, for which a compensation of 2000*l.* was paid to the corporation of Carrickfergus. In 1648, Belfast was taken possession of by colonel (afterwards the celebrated general) Monk, for the parliament of England. So late as 1726, when Boate's Natural History of Ireland was re-published by Dr. Molyneux, it was a small place of little consequence. But situated in the centre of a populous and industrious country, it has since become one of the most interesting objects in Ireland to the political economist. The town is well-built, mostly of brick, and the streets are broad and straight. The bridge over the Lagan is 2560 feet long with 21 arches; it was built about the time of the revolution, at the joint expence of the counties of Antrim and Down, and cost 12,000*l.* Eighteen of the arches are in the former, and three in the latter county. With regard to size it is the fifth, and with respect to commerce, is generally reckoned the third town in Ireland, being next to Dublin and Cork. Vessels of 200 tons halt loaded used to come to the quay, there being about ten feet water at spring tides, but now the water at the quays is from nine to thirteen feet deep according to the time of the moon, having been deepened by the exertions of the ballast corporation. Vessels which cannot come to the quays lie two miles and a half below the town, where there is very good anchorage. The West India trade was considerable before the late war, and has revived since the restoration of peace. The trade in pork and butter has increased very much of late years; and also the American trade. The export of linen both to England and America is very considerable. In 1775, the gross custom, according to Mr. Young, amounted only to 64,800*l.* including the excise upon tobacco and foreign spirits. In 1797, it amounted to 87,016*l.* 6*s.* 2*d.* In the following year it decreased on account of the disturbed state of the country, but it has since gradually risen; and in the year ending 5th April 1802, amounted to 246,890*l.* 9*s.* 4½*d.* The excise of Belfast in 1796 was only 9097*l.* 13*s.* 2*d.* but previous to the stoppage of the distilleries it had risen to 22,165*l.* 3*s.* 6*d.* exclusive of Carrickfergus and Templepatrick, which wards are included in the same district. The duty on licences in 1801, amounted to 4309*l.* Though the increase, as in other places, must be partly attributed to the increase of duties, yet the extension of trade must also have been considerable. The population of Belfast was taken at different periods by a gentleman who filled the office of high constable: but not officially. In 1782, the number of inhabitants appeared to be 13,105, and in 1791, 18,320, exclusive of 1,208 in Ballymacarret, the suburbs on the Down side of the river Lagan. There were in 1791, 695 looms, of which 522 were employed in the cotton manufacture, 129 in that of cambric and linen, 28 of sailcloth, and 16 of flockings. There are also manufactories of glass, sugar, and earthen-ware. The public buildings are not many; the linen hall is large and commodious, and there is a good assembly-room over the Exchange. There is a barrack which contains about 300 men. The church is a

handsome structure, but is too small for the parish. Other places of worship are, four presbyterian meeting-houses, one seceding, and one Methodist meeting house, and one Roman Catholic chapel. The charitable institutions are, a poor-house and infirmary, which maintains and clothes 300 of various ages, and is conducted on the same plan as the Dublin house of industry; a fever-hospital, a dispensary, a lying-in hospital, a charity-school for boarding girls, a day-school for boys and girls, a Sunday-School, and a School of industry for the blind, none of them very extensive, but sufficiently so for such an industrious country. It is probable that the Hamburg plan, described by Mr. Voght, from which such unspeakable benefit has been derived, would succeed better in Belfast than in any other town of Ireland, and from the public spirit and active disposition of the inhabitants, it would, without doubt, be well attended to. In such a town as Belfast, many commercial institutions might be expected; and we accordingly find a chamber of commerce, a ballast office corporation, two insurance offices, &c. There are also a library society, under the title of the *Belfast Society for Promoting Knowledge*: and a literary society, lately established on a plan similar to that of other societies for philosophical and literary purposes. An academy for the education of the higher class in this town, was founded by the inhabitants in 1786, and has been hitherto under the care of a presbyterian minister, but the advantages of it are not confined to any sect. Belfast is situated 80 miles north of Dublin, and sends one member to the imperial legislature. W. long. 5° 49'. N. lat. 54° 43'. Variation W. August 8th, 1789, 11° 15' P. M. 26° 20'. Arthur Young's Tour. Dr. Beaufort's Memoir, &c. &c.

BELFAST, a township and bay of America, in Hancock county and district of Maine, both situate in the Waldo Patent, at the mouth of Penobscot river, and on its western side, 38 miles N. E. by E. from Hallowell, and 246 N. E. from Boston. The town contains 245 inhabitants. The bay, on the north-western part of which the town stands, runs up into the land by three short arms. In the middle of it lies Isleborough island, which forms two channels leading to the mouth of Penobscot river.

BELFORD, a market town of Northumberland, England, is seated on the great post road from London to Edinburgh, at the distance of 322 miles from the former. This town, though small, is particularly neat, and its houses are ranged on the ridge of a hill, which commands a view of the North sea. The church was built in 1700; near it are the ruins of an old chapel, and at a short distance are the foss and vallum of an ancient encampment. Here are a weekly market on Tuesdays, and two annual fairs. The number of houses in the township is 161, and of inhabitants 902.

About four miles east from Belford, is Bamborough castle, the origin of which is attributed to king Ida, who began his reign about the year 559. The present remains are considerable, and appear to be wholly the relics of Norman architecture, though our historians are decidedly of opinion that they occupy the site of a Saxon fortress or palace. This was besieged in the year 642, by Penda, the Pagan king of the Mercians, but without success. In the year 710, king Osred, on the death of Alfred his father, sought refuge here, with Brithric, his tutor or guardian, and after a gallant defence, repulsed Edulph and his partizans. In the reign of Egbert, this castle was made the prison of Kenulph, bishop of Lindisfarne, who was confined here from 750 to 780. In many subsequent periods, it was the scene of repeated sieges, and suffered successively by the Danes, by the Normans, and by the Yorkists.

BELFORTE, a town of Italy, in the duchy of Parma, 19 miles S.S.W. of Parma.

BELFRY, **BELFREDUS**, is used by military writers of the middle age for a fort or tower, erected by besiegers to overlook and command the place besieged.

They were all called *berfridi*, *berfredi*, *verfredi*, and *belfragia*. Their structure and use are described in verse by a poet of those days.

Belfry originally denoted a high tower, whereon sentinels were placed to watch the avenues of a place, and prevent surprize from parties of the enemies, or to give notice of fires by ringing a bell. Du-Cange.

In the cities of Flanders, where there is no belfry on purpose, the tower of the chief church serves the same end. The word belfry is compounded of the Teutonic "bell" and "fried," *peace*, because the bells were hung for preserving the peace.

BELFRY, is also used for that part of a steeple wherein the bells were hung. This is sometimes called by middle-aged writers *campanile*, *clocharia*, and *triflegum*. Du-Cange. This is sometimes used in *Heraldry* as a crest.

BELFRY, is more particularly used for the timber-work, which sustains the bells in a steeple; or that wooden structure, to which the bells in church-steeples are fastened.

BELFRY, *Great*, in *Ornithology*, the alarm thrush of Latham, and turdus tinens of Gmelin, le grand belfroi of Buffon, is so called by this latter naturalist, from the singular sound which it makes in the evenings and mornings, and which resembles the din of an alarm bell. The succession of sounds is as rapid as the quick strokes of a bell, and continues about an hour. See **TURDUS TINNENS**. The "small belfry," is the speckled thrush of Latham, and **TURDUS LINEATUS** of Gmelin, which see.

BELGÆ, in *Ancient Geography*, were Scythians or Goths, who, advancing from Asia, drove the Cimbrî or northern Celts before them; and at a long period preceding the Christian era seized on the north-west part of Gaul, where they acquired the provincial denomination of Belgæ; and from them the country which they inhabited obtained the name of Belgic Gaul. Writers are not agreed as to the etymology of this appellation. As they were a fierce, contentious, and warlike people, and disposed to domineer over all their neighbours, according to the character which Cæsar (Comment. l. ii. c. 4.) has given of them, some have supposed that they were called "Belgæ" on that account; the word "Belgæ" is the old Teutonic signifying "fierce" and "quarrelsome." Others have supposed, that the term "Belgæ" is synonymous with the Celtic "Belighis," and that it signifies, persons who inhabited the *low northern part*. Others again have derived Belgæ from "Belgen" or "Vulgen" signifying stranger. Some time after their settlement in Gaul, but at an unknown period, they penetrated into Britain; and accordingly when Cæsar first explored this island, he informs us (l. v. c. 10.) that the primitive inhabitants were driven into the interior part, while the regions on the south-east were peopled by Belgic colonies. The Belgæ may, therefore, be justly regarded as the chief ancestors of the English nation. On the continent, the Belgæ having taken possession of part of Gaul, and being naturally a ferocious people, waged frequent wars with the Germans; so that these two nations continued in a state of hostility and friendship, sometimes invading each other's territories, and at other times assisting each other against the Romans. In the time of Cæsar, the Belgæ, alarmed at the success of the Romans in their expeditions against the Germans, formed a grand alliance with the Celts, Germans, and Gauls, in order to drive them farther from their neighbourhood. Cæsar, according to his usual manner, found means to sow such dissensions among them, that many of these allies submitted to him; however, the Nervii, Attre-

bates, and Veromandi, stood firm, and though at length defeated, it was one of the dearest victories which Cæsar had ever obtained; and, in consequence of this defeat, the whole Belgic nation was compelled to submit to the Roman yoke. The Belgæ of Britain were seated to the east of the Durotriges, on the same coast, and inhabited the counties now called Hampshire, Wiltshire, and Somersetshire. When Cæsar invaded Britain, some part of this country was possessed by the Segontiaci, whose chief town was Winchester, called by the Britons "Caer-seguent," from the name of these, its ancient inhabitants. But these people seem to have been soon after subdued by and incorporated with the Belgæ, as they are never afterwards mentioned. As to the first introduction of the Belgæ into Britain, history is silent; but with respect to some few of the latest colonies who settled here not very long before the Roman invasion, and who inhabited the south parts of Britain, Cæsar informs us, (l. v. c. 10.) "that the sea-coast of Britain is peopled with Belgians, drawn thither by the love of war and plunder." "These last (he says) passing over from different parts, and settling in the country, still retain the names of the several states from whence they were descended." The latest of these Belgic colonies came into Britain only a few years before Cæsar's invasion. This colony was conducted by Divitiacus, king of the Suetonides, one of the most powerful of the Belgic nations in Gaul; and having obtained a footing on the British coast, he continued to reign over the Belgæ in this island, as well as over his ancient subjects on the continent. In his continental territories, he was succeeded by Galba, and in his British dominions by another of his sons, perhaps Segouax, who attempted to destroy Cæsar's fleet. Although the Segontiaci submitted to Cæsar, we have no account of the submission of the Belgæ to that conqueror. The honour of subduing that British nation was reserved to Vespasian, who, landing an army in these parts, A. D. 49, fought 32 battles, took more than 20 towns, subdued two very powerful nations, one of which was the Belgæ, and the Isle of Wight. After this time, the country of the Belgæ was much frequented by the Romans, who made in it many excellent military ways, and built several beautiful towns, which are mentioned by both Ptolemy and Antoninus. The most remarkable of these towns were Venta Belgarum, Winchester, famous for the imperial weavery which was there established, and Aquæ Solis, Bath, even then renowned for its warm and salutary springs. The country of the Belgæ was included in the Roman province, called Flavia Caesariensis, and governed by the president of that province, and his inferior officers. Henry's Hist. vol. i. p. 246, &c.

BELGARD, or **BELGARUM**, in *Geography*, a town of Germany, in the circle of Upper Saxony, and chief place of a circle to which it gives name, in the duchy of Pomerania, seated on the Perfante, and noted for its market for horses. It was a place of some distinction as early as the 11th century, for its strength and for the number and valour of its inhabitants; but it has suffered much by fire and by war; particularly by the 30 years' war. By the treaty of Westphalia, it devolved to the house of Brandenburg. It has a castle and a provostship, and is the seat of a royal balliage. N. lat. 54° 10'. E. long. 16° 51'.

BELGERN, a town of Germany, in the circle of Upper Saxony, and margraviate of Meissen, seated on the river Elbe, 36 miles N. W. of Dresden, and 24 N. W. of Meissen.

BELGERS, a town of Asiatic Turkey, in the province of Caranania, 78 miles west of Cogia.

BELGEVAN, a town of Asia, in Tartary, in the kingdom of Bucharia, and province of Catland.

BELGICA, in *Conchology*, a species of **SABELLA**, very

briefly described by Gmelin, as having a conic shell "testa conica;" and is said to be found on the shores of Holland.—Obs. This is supposed by some to be the *fabella granulata* of Linnaeus, and *tubiformis* of Pennant; but it is by no means certain that even the two last are of the same species: we think they are not; and it may admit of equal doubt whether either of them be the species Gmelin describes as *belgica*. The last mentioned author seems to be under no small difficulty in this respect himself, for he entirely omits taking the slightest notice of either as species, or even amongst his synonyms. *Sabella tubiformis* of Pennant is undoubtedly different from *fabella belgica* of Gmelin, according to Klein and Martini, to which he refers. Vide *Donov. Brit. Shells*, pl. 133.

BELGICA, in *Ornithology*, a species of *SCOLOPAX*, with a very straight bill, black at the tip: head, neck, and breast ferruginous: abdomen white; back, wings, tail, and legs black. *Nozem. nederl Vogel. t. 27.* A native of Holland, and feeds on worms, &c.

BELGICA GALLIA, in *Ancient Geography*, one of Cæsar's three divisions of Gaul, or Gallia, the other two being Aquitania, and Celtica, or Gallia propria. Gallia Belgica was bounded by the ocean to the north, by the Sequani (Seine) and Matrona (Marne) to the west, by the Rhine to the east, and to the south by various limits, at different times. Cæsar appropriated the Sequani and Helvetii to that part of Gallia Celtica which was afterwards called "Lugdunensis." But Augustus, when he made a new partition of the provinces, transferred the Sequani and Helvetii to Gallia Belgica. According to the distribution of Ptolemy, Gallia comprehended four parts, viz. Aquitania, Lugdunensis, Belgica, and Narbonensis. See *GALLIA*. Mentelle, in the *Encyclopedie Methodique*, divides Gallia Belgica into *Belgica prima*, comprehending the Treveri, Mediomatrici, Verdunenses, and Leuci; and *Belgica secunda*, including the Nervii, Morini, Ambiani, Bellovaci, Silvanectes, Vadicasses, Suesfiones, Veromandui, Atrebatas, Remi, and Catalauni. The capital of the Treveri, viz. Augusta or Treveri, was the metropolis of *Belgica prima*. *Belgica secunda* contained a great number of cities, and comprehended Lorraine and Champagne; whilst *Belgica Prima* contained a portion of the isle of France, Picardy, and Artois. *Belgic Gaul* comprehended those provinces of the Netherlands now called the *Belgic provinces*, which were formerly subject to the house of Austria, but which have been recently annexed to the French dominions. See *NETHERLANDS*.

BELGICA, Balchuyfen, a village of Gallia Belgica, in the country of the Ubii, between the rivers Rhone and Roer, 8 miles from Marcomagum, according to the itinerary of Antonin, in *Germania secunda*, or *Inferior*, south-west of *Colonia Agrippina*.

BELGINUM, BINGEN, or BALDENAU, a place of *Germania prima*, or *Superior*, a province of Gaul, at some distance to the east of *Augusta Trevirorum*.

BELGIUM, a canton of Gallia Belgica, from which it is distinguished by Cæsar (l. v. c. 24.) as a part from the whole; to this canton he assigns the Bellovaci, to whom Hirtius (l. viii. c. 46 and 47.) adds the Atrebatas. And as the Ambiani were feated between the Bellovaci and Atrebatas, these also must be included in Belgium, which must have extended to the sea. These three people, says Cellarius, were the proper and genuine Belgæ, all the rest being adventitious, or foreigners. See *AMBIANI, ATREBATII, and BELLOVACI*.

BELGIUS, a river of Africa in Libya. Hesychius.

BELGNEA, a town of Arabia Deserta. Ptolemy.

BELGOROD, in *Geography*. See *BIELGOROD, and AKERMAN*.

BELGRADE, ALBA GRÆCORUM, a town of European Turkey, the capital of Servia, seated on the side of a hill, at the conflux of the Save and the Danube. It was formerly a very strong place, but is now destitute of fortifications, and it was accounted the barrier and key of Hungary, to which it was first annexed by the emperor Sigismund.

The number of inhabitants is now supposed to amount to about 25,000. The suburbs are extensive, and it has a great resort of Turkish, Jewish, Greek, Hungarian, Armenian, Austrian, and Slavonian merchants. The streets, in which the chief trade is carried on, are covered with wood, as a shelter from the sun and rain; the shops are small, and the commodities that are sold are conveyed out of a window, as the buyers never enter them; the richest merchandize is exposed to sale in two bazars that cross each other; and there are two exchanges constructed with stone, and supported by pillars. There are likewise at Belgrade a caravanserai, or public inn, and a college for young students. Its situation near the rivers renders it convenient for commerce; and as the Danube falls into the Black sea, and affords a passage to Vienna, trade is easily extended to distant countries, so that Belgrade is a staple town in these parts. The Armenians and Jews are employed as factors; the former have a church, and the latter a synagogue in this place. In the environs of Belgrade are several small villages near one another, and almost all of them inhabited by Greeks. The fields present some degree of culture; and the whole adjacent country affords fine clusters or stalk-fruited oaks (*quercus racemosa*, Lamarck) whose wood is very hard and very fit for ship-building. Some few vineyards and gardens are to be seen in the vicinity of Belgrade. The aqueducts, constructed by the emperors of the east for conveying water to Constantinople, attract admiration. See *AQUÆDUCT*. N. lat. 45° 10'. E. long. 21° 12'.

The possession of Belgrade has been repeatedly disputed between the Austrians and Turks. In 1521, it was taken by the Turks, after having been attacked in vain by Amurath II. in the preceding century, but recovered by the Imperial army in 1688. In 1690, it fell again under the Turkish yoke, from which the Austrians unsuccessfully attempted to regain it in 1693. By the treaty of Carlowitz in 1699, the Turks remained in possession of it; but in 1716, it was besieged by prince Eugene, and after a severe contest it was compelled to surrender to the Imperial arms.

Belgrade is chiefly famous in the history of military operations on account of the battle fought in its vicinity in the year 1717, the result of which was the last great victory obtained under the auspices of the celebrated prince Eugene, and which decided the event of the war then depending between the German and Ottoman empires.

The Turks, notwithstanding the losses they had sustained during the campaign of 1716, determined to make the most vigorous efforts for the preservation of their Hungarian acquisitions. The imperialists were equally desirous of terminating the war by some important action. Prince Eugene, having concentrated the Austrian forces in the bannat, on the 15th of June effected the passage of the Danube in boats with 30,000 of his troops without the loss of a man, in presence of some Turkish corps stationed on the southern bank, who, without attempting an opposition, threw themselves into Belgrade. A bridge of boats was immediately constructed for the passage of the rest of the army, the horse, and artillery, and by the 19th of the same month, Belgrade was completely invested.

The first care of prince Eugene, who foresaw that the Turks would venture a battle to relieve the place, was to fortify his camp in such a manner as might enable him to

BELGRADE.

cope with an army much superior in number to his own. He accordingly began to call up lines of circumvallation and contravallation, strengthening them with entrenchments, redoubts, and other field works of the necessary description. Within these lines the army encamped to the south of Belgrade; its front towards the open country, its left resting upon the Danube; its right extending towards the Save. A bridge of boats was thrown across the latter river, and, as well as that already constructed on the Danube, secured by strong *tetes de pont*. The line of contravallation, looking towards Semedria, consisted of a ditch, sixteen feet wide, of proportionable depth, and defended by a strong parapet. The proper openings were left for the troops to issue and form in order of battle without confusion, covered in front by ravelins and redans; and upon the right, a large *fleche*, or redoubt, was erected for the purpose of commanding a hollow ground, which the Turks might otherwise have found serviceable in their approaches. The field pieces of all the different battalions, planted at regular distances along the front of the contravallation, secured it from any sudden insult. As, however, the army was not sufficiently numerous to occupy the whole extent of ground between the two rivers, cross entrenchments were formed, connecting the principal lines on the right and left, and still preserving a communication with the different bridges.

As the Turkish garrison consisted of between twenty and thirty thousand regular troops, and had also a strong flotilla on the Danube, prince Eugene found it absolutely necessary to maintain two flying camps: one of several thousand men at Semlin, to keep up a communication with Peterwaradin, from whence the Imperialists derived their supplies of provisions, under Count de Hauben; and another of five battalions and some cavalry to cover the head of the bridge over the Danube. Four ships of war protected the navigation of that river, and watched the motions of the Turkish flotilla. But a violent storm which happened on the 13th of July, had nearly rendered abortive the projects of the besiegers. The bridges of the Danube and Save were broken by the force of the tempest. Several vessels, detached from the rest, were carried floating at random down the stream, and the Turks took advantage of this accident to make a sally across the Save, and attack the redoubt which covered the head of the bridge. The gallant defence of a captain and 64 men, who alone garrisoned the post, preserved it, together with that part of the bridge which remained on the north side of the river, from falling into the hands of the enemy. To prevent such forties in future, the camp of Semlin was strongly reinforced, and the command entrusted to count Marigny. More serious operations commenced; and during the night of the 18th, trenches were opened against Belgrade to the north of the Save by 1,200 pioneers, covered by a large detachment under general Marsigli. The Turks, however, the following morning, opened a dreadful fire upon them from all the batteries of the place, the flotilla on the Danube, and the islands in that river, and making a sortie with 4000 men in boats, assaulted so furiously the guard of the trenches, that if prince Eugene had not animated the troops by his personal presence and bravery, in repulsing the attack, a total defeat must have ensued. As it was, general Marsigli, with twenty other officers of note, and 400 soldiers, perished in this affair. It became necessary to augment the guard of the trenches to nine battalions, and construct new lines. In six days a complete chain of works was established from the bridge along the Save to its influx with the Danube, and from thence ascending the course of the latter river to the camp of Semlin, defended with redoubts, and well provided with artillery: inasmuch,

that from the moment of their completion, the garrison attempted no farther sallies.

On the 23d of July, the cannonade and bombardment commenced from all the Austrian batteries, with dreadful effect, and by the 30th, Belgrade resembled, towards the water, a heap of ruins. But the excellent state of their fortifications on the side of the besieging camp, and expectations of approaching succours, animated the garrison to maintain a most vigorous resistance. Their expectations were not delusive. The grand vizier, having drained the Turkish provinces of soldiers to complete his army, had already begun his march, and on the 28th his advanced parties appeared in fight, and began to skirmish with the Austrian out-posts. The number of these marauders daily increased, and on the last of July, the vizir with his whole army arrived in presence of the Imperialists. But instead of attacking prince Eugene as the latter expected, he encamped upon the heights above the Austrian camp with all his forces, supporting his right flank by the Danube and stretching his left towards the Save. The following days were spent in preparing batteries, throwing up entrenchments, and making approaches against the works of the Imperialists, as if they had literally been a town besieged. Eugene found himself compelled, by this mode of attack, to adopt new dispositions. He instituted additional artillery on his own lines, defended all the avenues with chevaux de frize, mined the ground before the *fleche* already mentioned, and called in part of his troops from the opposite bank of the Save. Nevertheless, the Turks, pursuing their projected plan of operations, pushed their approaches in spite of the dreadful havoc which the Austrian bombs and grenades incessantly made among them to within musket shot of the contravallation. Their army amounted to upwards of 200,000 men. Their works were mounted with 140 pieces of cannon and mortars. The garrison, who now sustained some respite from the fire of the Austrian batteries, directed their own upon the tents of the besiegers, and thus situated, between two hostile armies, who from their situation commanded more or less every part of his position, Eugene found himself enfiladed by the fire of upwards of 250 pieces of artillery. His situation became every day more precarious. The dysentery, which for the last month had done great mischief in his camp, now raged to such a degree that hundreds were buried in a day. A mortality prevailed among the horses, in consequence of which half of the cavalry were dismounted; and an army which, at the opening of the campaign, amounted to above 80,000 men, could not now muster 60,000 effective. Though no immediate scarcity of provisions or ammunition was experienced, yet the disappointment of the expectations prince Eugene had conceived, that the Turks would be obliged to retire for want of provisions, obliged him to determine without delay on some decisive measure; especially as the vizier had occupied an eminence adjoining the Save, with a considerable body of troops, and might, by sending 20 or 30,000 men across the river, have rendered a retreat, in case of defeat, impracticable to the Austrians. Under these circumstances, it was resolved, in a general council of war held on the 15th of August, to be beforehand with the enemy, by making a decisive attack on their camp. The detachments beyond the Save were immediately called in, except about 1,400 foot, and 300 horse. Seven regiments of cavalry and ten battalions with all the dismounted horse and dragoons, were left in the lines to observe the garrison. Eleven regiments of cavalry, commanded by field marshal count Palfi, and general count Merzi, composed two lines on the right, and marched out before midnight. The left wing, consisting of 12 regi-

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ments, marched out at the same time, commanded by general Montecuculi and Martigny. The infantry, under prince Alexander of Wirtemberg, in chief, was drawn up in the centre; the first line of 22 battalions, conducted by count Maximilian of Staremberg, and count Harrach; the second, of 18 battalions, by the prince of Bevern. The corps de reserve, with which marshal Seckendorf remained in the lines, ready to act as occasion should require, was composed of nine battalions. The effective force of the two lines, on whom the success of the day in a great measure depended, did not amount to more than 40,000 men; yet, notwithstanding this immense inferiority, the confidence of the soldiers in their commander was such, that they received the orders to prepare for action with the greatest cheerfulness, and marched out, as if inspired with a certainty of victory.

At one in the morning the Imperialists, favoured by a thick fog, quitted their trenches: The right advancing towards the *fleche*, which was assigned as its point of formation, and the left over the open ground adjoining the Danube. Two hours were spent in making the necessary preparatory movements; but the fog, which had hitherto favoured the Imperialists, increased to such a degree as to become productive of serious inconvenience. The right wing, missing its way, tumbled, instead of the *fleche*, upon one of the Turkish advanced works. The surprise was equal on both sides; but a discharge which immediately opened upon the Austrian cavalry from the guard of the trenches, spread the alarm throughout the whole of the grand vizier's army. His troops hastily rushed from every part of the camp towards the scene of action, and in a few minutes count Palfi became hotly engaged. The Austrians, formed in a hurry, and their battalions, through fear of losing the support of the cavalry, inclining successively to the right flank, a wide vacancy was left in the centre, and afforded the Turks an advantage of which they did not fail to profit. Meantime, the combat, once engaged on the right, quickly commenced on the opposite flank. Prince Eugene had intended to begin the attack with both wings at the same time; but convinced by the heavy firing he heard towards the Save, that Palfi had already begun the battle, he was himself obliged to come to blows, before the battalions of his left wing were completely formed. It was now between four and five o'clock in the morning. The fog continued so thick as to prevent the combatants from discerning each other, till they arrived almost close to the muzzles of their adversaries' pieces; and owing to this obscurity several small detachments of Austrians, whom a desire to signalize themselves carried unawares into the thickest of the enemy, were entirely cut off. The assailants nevertheless gained ground. As the darkness obliged them to march with their firelocks always presented, the fire they poured in, the moment they perceived their enemies, was so close, well directed, and did such prodigious execution, that the Turkish battalions, as they advanced in succession, were broken, dismayed, and precipitated headlong into their trenches, where the bayonet and sabre made dreadful havoc among them. The cavalry were not equally successful; the broken nature of the ground obliged them to perform frequent evolutions in order to find some passages of easier access, and the Turks, who lined the trenches, galled them with severe and incessant firings. The centre of the enemy's army too finding nothing to oppose them, threw several battalions into the void space between the flanks of the Imperialists, and completely intercepting all communication, opened a heavy fire to right and left upon the divided forces. The battle, under the present circumstances, seemed irrecoverably lost, but the fog, at this critical mo-

ment clearing up, discovered to prince Eugene the disposition of both armies, and his own perilous situation. The advance of the second line prevented his total defeat. The prince of Bevern, who commanded it, marched up to the Turks, whose success had thrown them into disorder, and charged with such fury, that the infidels, unable to sustain the shock, fled in disorder, and were pursued up to their very trenches, leaving the space where they had been defeated covered with their dead. This success gave a new turn to affairs. No time was lost in filling up the interval that had been so unwarily left, and in forming the two wings of the imperialists for a new effort. The impatience of the soldiers to engage prognosticated success. The right began the attack; carried with irresistible impetuosity the batteries whose fire they had hitherto sustained, and turned the cannon against the entrenchments which protected the Turkish camp. The left experienced more opposition. The enemy had their principal forces on that side, and these, reinforced by several corps whom the success of count Palfi had driven from the right, constituted an immense superiority. The janizaries defended themselves with great bravery, and repulsed the Austrians in their first attack; but these rallying, returned to the charge, beat the Turks from their outermost entrenchment, and pushing their advantage, advanced regularly up to the second, without firing a musket till they came within ten paces of the enemy. This work was carried in less time than the first: the Turkish entrenchments were forced one after another, as well as several *coupures* with which their camp was defended; and notwithstanding resistance was attempted at each of them, and the Austrians experienced every where a terrible fire, yet the courage and conduct of prince Eugene surmounted every obstacle, and obliged victory, after a struggle of six hours, to declare in his favour. The last serious stand made by the infidels, was at a grand battery mounted with 18 pieces of cannon, and defended by 20,000 janizaries, sustained by 10,000 spahis, the bravest troops in the Turkish army. It was necessary to halt and form the troops anew for this perilous attempt; but when the word to charge was given, they rushed forward with an impetus nothing was capable of resisting. The Imperial grenadiers, in defiance of the fire from the battery, bore down all opposition, mounted through the embrasures, and drove the Turks from their guns; while the rest of the army made such slaughter, that the bodies of the slain rose in heaps round the redoubt. The routed forces, driven on all sides from their entrenchments, retired into the plain, as if to form once more for the defence of their camp; but observing the Imperialists, after having gained the heights, advancing towards them in good order, they betook themselves to flight in every direction, leaving their camp, baggage, and ammunition, at the mercy of the conquerors. The victory was complete by 9 o'clock in the morning. The plunder of the infidels' camp, which resembled a large city, was given to the soldiers.

This battle, fought on the 16th of August 1717, cost the Turks 10,000 of their best troops killed in the action, and 3,000 in the pursuit. About 5,000 were wounded, and nearly the same number made prisoners. In the Turkish camp and lines were found 131 pieces of brass cannon, 30 mortars, and an immense quantity of powder, bullets, bombs, and grenades. There were also taken 52 colours, 9 horse-tails, and other military trophies. The loss on the German side, by reason of the fog, was not in proportion to the length of the fight. Their killed amounted to nearly 3,000 men, among whom were the generals count Hauben and Dalberg; and about 4,500 were wounded. Of the latter, however, only about 2,000 recovered. In consequence of this great victory,

viſion. Belgrade ſurrendered on the 19th; the gariſon ſtill conſiſting of more than 25,000 men, being allowed to march out with all their effects. Its fortifications towards the land were in a moſt excellent ſtate, and more than 400 pieces of cannon and mortars found on the works in the arsenals, and on board the ſtella on the Danube.

Belgrade, which the prince of Paſarowitz left in poſſeſſion of the Auſtrians, was ſucceſsfully attacked by the Turks in 1739; but by the treaty concluded that year under the mediation of France, was reſtored to the Porte. Its fortifications were, however, previously demolished. In 1789, it was beſieged (Sept. 12.) by an Auſtrian army under marſhal Laudon, who in his approaches made uſe of the old lines of circumvallation conſtructed by prince Eugene, and which the Turks, from an unaccountable negligence, had neglected to fill up. The marſhal, aſſiſted by a numerous and well-ſerved train of artillery, proceeded with ſuch rapidity in his attacks, that after all the ſuburbs and outworks had been carried ſword in hand, the gariſon, apprehenſive of a ſtorm, ſurrendered (Oct. 8.) upon honourable terms. Immeaſurable ſtores, with about 300 pieces of artillery, were found in the place. Belgrade was, however, anew given up to the Turk in 1791, at the peace of Siſtova, ſince which time it has continued quietly in their poſſeſſion.

BELGRADE, a townſhip of America, in the county of Lincoln and diſtrict of Maine, incorporated in 1796; formerly called Walington-plantation. It lies weſt of Sidney, and between Androſcoggin and Kennebeck rivers.

BELGRADO, a town of the Venetian ſtates of Italy, in Friuli, ſituate near the river Tagliamento. N. lat. 46°. E. long. 13° 51'.

BELHAVEN, the former name of Alexandria, in Fairfax county, Virginia. See ALEXANDRIA.

BELIA, in *Entomology*, a ſpecies of PAPILIO, with entire white wings; the lower ones yellow, and ſlightly ſcaſated with grey beneath. A native of Barbary. Fabricius.

BELIA, in *Ancient Geography*, a town of Hiſpania Terraſotenſis, in the country of the Hedetani (Ptol.), eaſt of Bilbilis, and nearly ſouth-eaſt of Cæſar-Auguſta (D'Anville); now *Bellevic*, which ſee.

BELIAL, formed of בל *non*, nothing, and יל, denoting in Hebrew, to profit, q. d. unprofitable; in *Scripture Hiſtory*, ſignifieth a wicked, worthless perſon, who is ſubjected to eternal ſubjection. Thus the inhabitants of Gibeon, who abuſed the Levite's wiſe, are ſigmatiſed by the name of Belial. (Judges, xix. 22.) Hophni and Phineas Eli's ſons, are called ſons of Belial in Sam. ii. 12, on account of the ſeveral crimes they had committed, and their indecorous behaviour in the temple of the Lord. Sometimes, ſays Calaneo, the name Belial is uſed to denote the devil. To this purpoſe, he cites 2 Cor. vi. 15, where the apoſtle Paul ſays, "What concord hath Chriſt with Belial?" whence it appears, as he ſuppoſes, that in the apoſtle's time, the Jews, under the name of Belial, commonly underſtood the devil in the places where this term occurs in the Old Teſtament. Others are of opinion, that the heathen demon might be called "Belial," either becauſe they were of no uſe, or becauſe ſo much wickedneſs entered into the idea which the Pagans entertained of them. However, it has been ſuggeſted, that there may be no reference to the heathen gods at all, whether they were deified ghoſts or not; the word Belial being often applied to living men; and it being the general deſign of the apoſtle in this place to diſſuade Chriſtians from ſuffering themſelves to be drawn into any thing criminal by the heathens. Grot. in loc. Farmer's *Demonſtrac.*, p. 201.

The learned Bryant (*Analysis Anc. Mythol.* vol. ii.

p. 163.) conſiders Belial as the title of the chief Syrian god, called Bel and Baal, and rendered by the Greeks Βελία, Beliar. Hence, Clemens Alex. (l. v. p. 680.) inſtead of ſaying, what agreement can there be between Chriſt and Belial, ſays, Τις ἐς οὐρανὸν ἀναβήσας πρὸς Βελία. This Belial, or Beliar, was the ſame as Belorus and Oôris, who were worſhipped under the ſymbol of a ſerpent. Hence Hieronymus explains the term Beliar by a ſerpent.

BELIUS, in *Ancient Geography*, a river of Aſia, which ſprung in Davana, and diſcharged itſelf into the Euphrates. Ammian. Marcell.

BELICA, an epiſcopal town of the Gauls, in the diſtrict Lugdunenſis.

BELICENA, a town of Spain, in Grenada, 11 leagues from Grenada.

BELICL, a river of Suſſy, which empties itſelf into the ſea near Bigai, in the Val de Mazara. It reſembles (ſays Swiſburne, vol. iii. p. 374.) the Mole in Surry in ſize and colour; and winds very agreeably between high banks overgrown with elms, willows and tamarisks. The vale on both ſides is wide and well laid out in corn-fields, and paſtures crowded with horſes and horned cattle.

BELIDA. See BLEIDA.

BELIDES, in *Antiquity*. See DANAIDES.

BELIDOR, BERNARD FOREST DE, in *Biography*, a French mathematician and engineer, was born in Catalonia, about the year 1698, and became profeſſor-royal at the artillery ſchool of la Fere, and provincial commiſſary of artillery. By various exploits, he firſt diſcovered that the proportion of gun-powder in the loading of cannon might be reduced to two-thirds of the quantity, without leſſening its effect: but as he communicated this economical idea to cardinal Fleury, without previously conſulting the grand-maſter of artillery, he loſt both his places. Upon this the prince of Conti took him to Italy, and by his patronage, Belidor was again brought into notice at court. Marſhal Belleiſle, the war-miniſter, appointed him inſpector of artillery, and allotted to him apartments at the arſenal of Paris, in which he died, Sept. 8, 1761. Belidor was choſen an aſſociate of the academy of ſciences in 1751; and was the author of ſeveral uſeful works on civil and military architecture, hydraulics, fortification, and engineering: viz. "Sommaire d'un cours d'Architecture Militaire, civile et hydraulique," 1720, 12mo.; "Nouveau cours de Mathematiques, &c." 1725, 4to.; "La Science des Ingenieurs," 1729, 4to.; "Le Bombardier François," 1734, 4to.; "Architecture Hydraulique," 1737—1761, 4 vols. 4to.; "Dictionnaire portatif de l'Ingenieur," 8vo.; and "Traite des Fortifications," 4 vols. 4to. Several of his pieces are alſo inſerted in the memoirs of the academy of ſciences for the years 1737, 1750, 1753, and 1756. Nouv. Diet. Hiſtor. Huttois's Math. Diet.

BELIEF, in its general and natural ſenſe, denotes a perſuaſion, or a ſtrong aſſent of the mind to the truth of any propoſition. In which ſenſe, belief has no relation to any particular kind of means or arguments, but may be produced by any means whatever.—Thus we are ſaid to believe our ſenſes, to believe our reaſon, to believe a witneſs, &c. And hence, in rhetoric, all ſorts of proofs, from whatever topics deduced, are called *arses*, becauſe apt to produce belief, or perſuaſion touching the matter in hand.

BELIEF, in its more reſtrained and technical ſenſe, invented by the ſchoolmen, denotes that kind of aſſent which is grounded only on the authority or teſtimony of ſome perſon or perſons, aſſerting or attelling the truth of any matter propoſed. In this ſenſe belief ſtands oppoſed to knowledge and ſcience. We do not ſay we believe that ſnow is white, or that

that the whole is equal to its parts; but we see and know them to be so: that the three angles of a triangle are equal to two right angles, or that all motion is naturally rectilinear, are not said to be things credible, but scientific; and the comprehension of such truths is not belief, but science. But when a thing propounded to us is neither apparent to our sense, nor evident to our understanding; neither certainly to be collected from any clear and necessary connection with the cause from whence it proceeds, nor with the effects which it naturally produces; nor is taken up upon any real arguments, or relation thereof to other acknowledged truths; and yet, notwithstanding, appears as true, not by a manifestation, but by an attestation of the truth, and moves us to assent, not of itself, but in virtue of a testimony given to it—this is said to be properly credible: and an assent to this is the proper notion of belief or faith.

A judicious writer (Price's Review of the principal questions in Morals, p. 158.) is of opinion, that all the general grounds of belief or assent, may be comprehended under the three following heads: viz. 1st. Immediate consciousness (which see), or feeling; whence we acquire the knowledge of our own existence, and of the several operations, passions, and sensations of our own minds; and to this head may be referred the information we derive from our powers of recollection and memory; 2dly, Intuition (which see); and to this we owe our belief of all self-evident truths, our ideas of the general, abstract affections and relations of things, our moral ideas, and whatsoever else we discover, without making use of any process of reasoning; and 3dly, Argumentation or Induction. See these articles. See also ASSENT and FAITH.

BELIENE, in *Geography*, a village of Egypt, depending on the grand seikeh, and agreeably situated between two canals; 12 miles south of Girgê.

BELIEVERS, in *Ecclesiastical History*, an appellation given towards the close of the first century to those Christians who had been admitted into the church by baptism, and instructed in all the mysteries of religion: they had also access to all the parts of divine worship, and were authorized to vote in the ecclesiastical assemblies. They were thus called in contradistinction to the *catechumens*, who had not been baptized, and were debarred from these privileges.

BELILLA, in *Botany*. See MUSSËNDA.

BELIM, in *Geography*. See BELEM and PARA.

BELIN, a town of France, in the department of Girônde, and chief place of a canton in the district of Bourdeaux. The place contains 1212, and the cantons 7008 inhabitants: the territory includes 585 kilometres and 6 communes.

BELINA, a town of European Turkey, in Bosnia, about midway between Banjaluka and Belgrade.

BELION, a name given to a river of Lusitania, called also Limias, Limæus, Lethe, and the river Oblivion, in *Ancient Geography*, was the boundary of the expedition of Decimus Brutus. His soldiers, when they arrived at this river, refused, from motives of superstition, to cross it; upon which he snatched an ensign out of the hand of the bearer, and passed over, by which his army was encouraged to follow (Livy). He was the first Roman who ever proceeded so far, and ventured to cross. The appellation, according to Strabo, took its rise from a sedition that occurred in a military expedition between the Celtici and Turduli after crossing this river, in which the general was slain, so that they remained dispersed there; and from this circumstance it was called the river of Lethe, or Oblivion. (Cellarius.) It is now called "El Lima," and runs westward into the Atlantic, to the south of the Minho.

BELISAMA, or BELIZANA, in *Mythology*, a name

given by the Gauls to their Minerva, or to the goddesses who was the inventress of the arts. She was represented with a helmet adorned with a plume, clothed in a tunic, without sleeves, and covered with a mantle called "peplum." Her attitude, with her head leaning on her right hand, was that of a person in a profound reverie. Human victims were sacrificed on her altars.

BELISAME. See BELASAMA.

BELISARIUS, in *Biography*, the *Africanus* of New Rome, was born, and probably educated, among the Thracian peasants; and advanced from the humble station of one of the private guards of Justinian, then general of the Roman forces, and afterwards emperor, in which he had served with valour and reputation, to distinguished military command. Under the new title of General of the East, he encountered the Persian army near the fortresses of Dara, on the confines of Persia, with a much inferior force, both as to the number and quality of his troops, and obtained a decisive victory. In the next campaign, A.D. 530, he hastened from Dara to the relief of Syria, which was invaded by the Persians; and though he was defeated in an engagement which the impatience of his troops had precipitated, he saved his army from the consequences of their own rashness, and the victory of the Persian commander was so dearly purchased, that it was soon followed by peace. Belisarius, on his return to Constantinople, rendered essential service to the emperor Justinian, by quelling a dangerous sedition. In 533, the supreme command of the fleet and army, destined for the African war, was delegated to Belisarius, with an unlimited power of acting according to his own discretion, as if the emperor himself were present. After a voyage of three months, in which he had repeated opportunities of exercising his talents as a commander, he disembarked his troops on the African coast. Immediately upon their landing an instance of pillage occurred, which gave him occasion for inculcating the maxims of justice, moderation, and genuine policy. "When I first accepted the commission of subduing Africa, I depended much less," said the general, "on the numbers, or even the bravery of my troops, than upon the friendly disposition of the natives, and their immortal hatred to the Vandals. You alone can deprive me of this hope; if you continue to extort by rapine, what might be purchased for a little money, such acts of violence will reconcile these implacable enemies, and unite them in a just and holy league against the invaders of their country." His exhortations, accompanied by rigid discipline, produced the most salutary effect. The inhabitants, instead of deserting their houses, or hiding their corn, supplied the Romans with a fair and liberal market; the civil officers of the province continued to exercise their functions in the name of Justinian; and the clergy, from motives of conscience and interest, assiduously laboured to promote the cause of a catholic emperor. In his progress towards Carthage, he defeated, with great slaughter, the formidable army collected by Gelimer, and entrusted to the conduct of his brother and nephew, and reduced the king himself to the necessity of seeking his safety by a precipitate flight.

Belisarius, having taken possession of the city, restored, with incredible dispatch, its walls and ditches, which the heedlessness and indolence of the Vandals had suffered to decay. The defeat of Zano, the brother of Gelimer, and the pusillanimous flight of the king himself, terminated the conquest of Africa in the manner already related under the article Africa, which see. Belisarius, on his return to Constantinople in 534, obtained a splendid triumph, and was created sole consul for the ensuing year. The day of his inauguration resembled the pomp of a second triumph; his curule

BELISARIUS.

carle chair was borne aloft on the shoulders of captive Vandal; and the spoils of war, gold cups, and precious jewels, were profusely scattered among the populace. His most distinguished recompence, however, consisted in the faithful execution of a treaty, for which he had pledged his honour to the king of the Vandal, who received from the emperor an ample estate in the province of Calabria, whither he retired with his family and friends to a life of peace, of affluence, and perhaps of content.

The next object to which the attention of Belisarius was directed was that of terminating the dominion of the Ostrogoths in Italy. With this view he invaded Sicily A. D. 535, and having laid siege to Palermo, which was soon reduced, and which was the only place where he met with any resistance, he soon after entered Syracuse in triumph. In the spring of the following year he was diverted from the prosecution of his designs by a dangerous revolt of the African forces, which demanded his presence at Carthage. By an easy victory he would have restored the peace of Africa; if he had not been hastily recalled to Sicily, for the purpose of appeasing a sedition which had broken out in his own camp. Having effected this object, and sufficiently garrisoned Palermo and Syracuse, he embarked his troops at Messina, A. D. 537, and landed them, without resistance, on the opposite shores of Rhegium. From Rhegium to Naples, his fleet and army, almost always in view of each other, advanced nearly 300 miles along the sea-coast; and he received the submission of the inhabitants of the several countries of Bruttium, Lucania, and Campania, through which he passed. The capture of Naples, to which he laid siege both by sea and land, was for some time delayed; and he had reconciled himself to the disgrace of abandoning it, that he might march, before the winter season, against Rome and the Gothic king. But in the moment of anxious suspense a stratagem occurred of introducing, by means of the dry channel of an aqueduct, a file of soldiers into the heart of the city, who gained admittance to their companions, by whom the walls were scaled on all sides and the gates burst open. Belisarius, having succeeded in this enterprise, restrained the cruelty and ferocity of the Huns; and, for this purpose, he appeared alone in the streets and churches of Naples, and exerted himself in moderating the calamities of the inhabitants. "The gold and silver," he repeatedly exclaimed, "are the just rewards of your valour. Spare the inhabitants; they are Christians; they are supplicants, they are now your fellow-subjects. Restore the children to their parents, the wives to their husbands; and show them, by your generosity, of what minds they have obstinately deprived themselves." The city was thus saved by the virtue and authority of the conqueror. From Naples, Belisarius proceeded to Rome; which, on his approach, was evacuated by the Gothic garrison, and which, after sixty years' servitude, was delivered from the yoke of the Barbarians, and surrendered, without opposition, Dec. 10, A. D. 536. The Gothic chief, who bore himself a trophy of the victory, was sent with the keys of Rome to the throne of the emperor Justinian. In the following spring Vitiges, who had been elected by the Goths at the funeral of the feeble and deposed Theodatus, collected an army of 150,000 men, and attempted to recover the capital. On the approach of the Barbarians, Belisarius called forth to survey their camp; but being surrounded by the enemy, he extricated himself by singular exertions of strength and valor. When the whole army of the Goths, having passed the Tiber, formed the siege of the city, which was continued above a year, before their final departure. Belisarius, aided by his wife Antonia, his constant companion in every expedition, made many efforts for the re-

lieve of its distressed inhabitants, and for repelling the barbarians, which at length, in concurrence with a force sent by the emperor, were crowned with success; so that Rome was released from the hostile attacks of the Gothic army, which raised the siege, and, after attempting the recovery of Rimini, took shelter within the walls of Ravenna. Upon the arrival of an army from Constantinople, under the command of Narfes, a dissention arose between the two generals, whose respective authority was not accurately defined; but Belisarius was appointed, by the emperor's special commission, to the supreme command. He incurred, however, considerable odium by the hasty execution of Constantine, governor of Spoleto, who had committed an act of robbery, and in consequence of this measure the two armies separated, and Narfes was exalted by the leader of the discontented faction to assume an independent and supreme command. Belisarius, by his prudence and perseverance, regained his reputation and influence, and procured the recall of Narfes, and the establishment of military subordination. In the interval of discord, the Goths, aided by the Franks, captured Milan, with circumstances of aggravated cruelty. In 539, the destruction of Milan was succeeded by the invasion of Theodobert of Austrasia, the most powerful and warlike of the Merovingian kings, who, behind the favour which he afforded to the Goths, invaded the plains of Italy with an army of 100,000 barbarians, and marked his way by ruin and slaughter. The clamours of his conquering army, diminished by famine and disease, at length induced Theodobert to listen with respect to the mild exhortations of Belisarius; who, as soon as he was delivered from his foreign and domestic enemies, seriously employed his forces in the final reduction of Italy. Having redeemed Ostia and Esula, he proceeded to invest Ravenna; and whilst he was engaged in the blockade of this city, he received from Justinian a treaty of peace, which he had actually signed without deigning to ask his counsel and concurrence. By this disgraceful and precarious treaty, Italy and the Gothic territories were divided, and the provinces beyond the Po were left with the legal title to Vitiges. Belisarius rejected the treaty of partition, and declared his firm resolution of leading Vitiges in chains to the feet of Justinian. Upon this the Goths retired with doubt and dismay, and perceiving their own distressed and perilous estate, offered their arms, their treasure, and the fortifications of Ravenna to Belisarius, if he would disclaim the authority of a master, accept their choice, and assume, as he had deserved, the kingdom of Italy. The Roman general, seeming to acquiesce in their proposal, stipulated the surrender of Ravenna at an appointed day; and in December 539, he entered the city without opposition, secured the royal treasures, and placed Vitiges under a guard in the royal palace. The submission of the capital was followed by that of the towns and villages in Italy; and the independent Goths, who still remained in arms at Pavia and Verona, were ambitious only to become the subjects of Belisarius. But his inflexible loyalty rejected, except as the substitute of Justinian, their oaths of allegiance: nor was he offended by the reproach of their deputies, that he rather chose to be a slave than a king. Justinian, listening to the suggestions of envy and jealousy, recalled Belisarius; who obeyed the summons, and departed for Constantinople, carrying with him the treasures of Ravenna, and the persons of Vitiges, his wife, and chief robbers. The emperor received him with seeming cordiality, but without granting him the well-earned honours of a second triumph. Belisarius, however, was the object of universal admiration and applause among the people; and by the number of soldiers in his private pay, and the attachment of the army, whose affection he secured by his justice and liberality, he

might well be reckoned the second person in the empire. To the husbandmen he was endeared by the peace and plenty which they enjoyed under the shadow of his standard. Such had been the rigid discipline of his camp, that the country, instead of being injured by the march of the Roman armies, had been enriched by them; and not so much as an apple was gathered from a tree, nor could a path be traced in the corn fields. As to his personal conduct, he was sober and chaste to so great a degree, that, in the licence of a military life, none could boast that they had seen him intoxicated with wine, and that he was never suspected of violating the laws of conjugal fidelity. "The spectator and historian of his exploits," says Gibbon, "has observed, that amidst the perils of war, he was daring without rashness, prudent without fear, slow or rapid according to the exigencies of the moment; that in the deepest distress he was animated by real or apparent hope; but that he was modest and humble in the most prosperous fortune. By these virtues he equalled or excelled the ancient masters of the military art. Victory, by sea and land, attended his arms. He subdued Africa, Italy, and the adjacent islands; led away captives the successors of Genferic and Theodoric; filled Constantinople with the spoils of their palaces; and in the space of six years recovered half the provinces of the western empire. In his fame and merit, in wealth and power, he remained, without a rival, the first of the Roman subjects; the voice of envy could only magnify his dangerous importance; and the emperor might applaud his own discerning spirit, which had discovered and raised the genius of Belisarius." Nevertheless, the fame, and even the virtue of Belisarius, were polluted by the lust and cruelty of his wife Antonina. This profligate woman was the daughter of a theatrical prostitute; and in the various situations of the fortune of her parents, she became the companion, the enemy, the servant, and the favourite of the empress Theodora. Before her marriage with Belisarius, she had one husband and many lovers; and after their connubial union, she contrived to gratify her licentious passions, and to impose on the credulity of her husband, whom she dishonoured, and whom by her influence she illigat- ed to transactions that fix an indehble stain on his memory.

When Syria was invaded by Chosroes king of Persia, in the year 540, and Antioch, its rich capital, destroyed, Belisarius, the conqueror of Italy, was appointed to the defence of the east. Accordingly, in the year 541, he encamped beyond the Euphrates, within six miles of Nisibis, in order to restrain the progress of the Persian monarch on the coast of the Euxine. Having succeeded, without the support which he had reason to expect, in forcing Chosroes to return with loss and precipitation, he was recalled, at the close of the campaign, to Constantinople, by an ungrateful court; but the dangers of the ensuing spring restored his confidence and command; and the hero, almost alone, was dispatched with the speed of post-horses, to repel by his name and presence the invasion of Syria. On the banks of the Euphrates his firm attitude restrained Chosroes from advancing towards Palestine, and compelled him to repair to the river: thus accomplishing his purpose by a safe and bloodless victory, more glorious than his African and Gothic triumphs, in which neither fortune, nor the valour of his soldiers, can subtract any part of the general's renown. But the danger threatened to Italy by the rapid conquests of Totila, who had been advanced to the Gothic throne, required the presence of Belisarius; and accordingly he was again recalled from the east, and in 544, he arrived at the port of Ravenna with an inconsiderable number of ill-provided recruits. Thus supported, he was unable to impede the progress of Totila, and to prevent his laying siege even to Rome. When the city was reduced to extreme distress by the want of provisions,

the supply of which had been long obstructed by the besieging army, Belisarius made a bold attempt for its relief. But his enterprise for this purpose having failed, Rome was obliged to submit to the Gothic yoke; and Belisarius could only prevail by his interposition to prevent its threatened destruction. Totila, having demolished its walls, and removed most of its inhabitants, marched into the south of Italy; upon which Belisarius took possession of it, and hastily fortified himself within its circuit; so that he was able thrice to repulse the Gothic army which Totila brought against it. But whilst he was engaged in its defence, he was commanded by the emperor to leave a sufficient garrison at Rome, and to transport himself into Lucania, in order to suppress a revolt which had taken place in that province. In this warfare he was basely vanquished by the delay, disobedience, and cowardice of his officers; and having reposed in his winter-quarters at Crotona, he was obliged by the rapid march of the Goths to make his escape to the coast of Sicily. At length Antonina, who had been sent to Constantinople to solicit succours, obtained, after the death of the empress, permission for Belisarius to return. Accordingly, after failing to deliver Italy from the Goths, and wandering like a fugitive along the coast, without daring to march into the country, or to accept the bold and repeated challenge of Totila, he was recalled in September 548. The subsequent success of Narses in recovering Italy, threw a shade over the military reputation of Belisarius; though about 10 years afterwards he distinguished himself by saving the capital from an incursion of the Bulgarians, who had advanced to its long walls, about 40 miles from the city, and occasioned an universal alarm. The enemy were put to flight by the military veteran at the head of a tumultuary band; though it was necessary to purchase their return into their own country by a heavy ransom. This was the last exploit of Belisarius; and his remaining days were doomed to misfortune and disgrace. The jealousy of the emperor, increasing with his years, led him to suspect Belisarius of being concerned in a conspiracy against his crown and his life; and the veteran general, after forty years' service, and on incompetent testimony, was judged guilty, Dec. 5, A. D. 563. His life, indeed, was spared, but his fortunes were sequestered, and he was guarded for several months, as a prisoner, in his own house. At length, July 19, A. D. 564, his innocence was acknowledged; his freedom and honour were restored; and death, which might be hastened by resentment and grief, removed him from the world about eight months after his deliverance, March 13, A. D. 565. "The name of Belisarius," says Gibbon, "can never die; but instead of the funeral, the monuments, the statues, so justly due to his memory, I only read, that his treasures, the spoils of the Goths and Vandals, were immediately confiscated by the emperor. Some decent portion, however, was reserved for the use of his widow; and as Antonina had much to repent, she devoted the last remains of her life and fortune to the foundation of a convent. Such is the simple and genuine narrative of the fall of Belisarius and the ingratitude of Justinian. That he was deprived of his eyes, and reduced by envy to beg his bread, *Give a penny to Belisarius the general*, is a fiction of later times, which has obtained credit, or rather favour, as a strange example of the vicissitudes of fortune."

The source of this idle fable may be derived from a miscellaneous work of the twelfth century, the *Chiliads* of John Tzetzes, a monk, who relates the blindness and beggary of Belisarius in ten vulgar or political verses. (Vid. Corp. Poet. Grec. tom. ii. p. 311.)

“Εκπωμα ζυλινον κρηνον εβρα τω μελω
Βελισαριω εβρολεν δεξ τω στρατηλατη
Ον τυχη μεν εδοξασαι, απιστηφλοι δ' ο φθονος.”

This metal or romantic tale was imported into Italy with the language and manuscripts of Greece; repeated before the end of the fifteenth century by Crinitus, Pontanus, and Volaterranus; attacked by Aheat for the honour of the law, and defended by Baronius for the honour of the church. Yet Tzetzes himself had read in other chronicles, that Bellarius did not lose his sight, and that he recovered his fame and fortune. Gibbon's Hist. Decl. and Fall of the Rom. Emp. vol. vii.

The statue in the villa Borghese at Rome, in a sitting posture, with an open hand for the right arm, is now only attributed to Bellarius; but it may be supposed with great propriety to Augustus, represented under the character of a man of war, propitiating the anger of Nemesis. See Olaus Roem. Hist. lib. vi. c. 10. that on a certain day every year, he humbled himself to the condition of a beggar, extended his open hand, and soliciting alms from the people. Val. schlegel, tom. iii. p. 265.

BELLUSO, in *Antient Geography*, a town of Spain, near Alcala de la Rin. *Ant. Itin.*

BELLIFANI, a people of Spain, according to Pliny.

BELLITZ, in *Geography*, a town of Germany, in a prefecture of the same name, in the circle of Saxe, and a country of the Elector of Brandenburg, seated on the river Nieperitz, or Belitz, which has repeatedly suffered from fire. It is defended by old ramparts and ditches, and has a manufacture of cloth; 28 miles south-west of Berlin, and 12 south-west of Pitzdam.

BELITZY, a town and district of the Russian empire, in the government of Mohilef, seated on a rivulet falling into the S. fl.

BELKANI, a town of Asiatic Turkey, in the province of Natolia, 14 miles north of Satalia.

BELKIN, a town of Egypt, 45 miles south-west of Damietta, and 54 south-west of Cairo.

BELKOVA, a river of Russia, in the government of Archangel, which runs into the Frozen sea. N. lat. 68° 30'. E. long. 58° 34'.

BELL, a popular machine, ranked by musicians among the number of musical instruments of percussion. The music of bells is altogether melody; but the pleasure arising from it consists in the variety of interchanges, and the various successions and general predominance of the consonances in the sounds produced.

The parts of a bell are the body or *barrel*, the *clapper* which strikes, and the ear or *campan*, whereby it is hung to a large bar of wood.—Its usual matter is a kind of compound metal, called *bell-metal*. The thickness of its edges is usually $\frac{1}{4}$ of the diameter, and its height twelve times its thickness. The bell-founders have a diapason, or bell-scale, with which they measure the size, thickness, weight, and tone of their bells. For the method of casting bells, see *FOUNDRY*.

The sound of a bell arises from a vibratory motion of the parts thereof, much like that of a musical chord. The stroke of the clapper, it is supposed, must change the figure of the bell, and of round make it oval; but the metal having a great degree of elasticity, that part which the stroke drove farthest from the centre, will fly back again, and thus even somewhat return to the circle than before; for at the two points, which before were the extremities of the longer diameter, now become those of the shorter. Thus, the circumference of the bell undergoes alternate changes of figure, and by reason thereof gives that tremulous motion to the air, in which a sound is formed.

M. Perrault maintains, that the sound of the same bell or chord is a compound of the sound of the several parts thereof; so that when the parts are homogeneous, and the

dimensions of the figure uniform, there is such a perfect mixture of all these sounds, as constitutes one uniform, smooth, even sound; and the contrary circumstances produce harshness. This he proves from the bell's differing in tune according to the part you strike, and yet strike it at any where, there is a motion of all the parts. He therefore considers bells as composed of an infinite number of rings; which, according to their different dimensions, have different tones, as chords of different lengths have; and when struck, the vibrations of the parts immediately struck determine the tone; being supported by a sufficient number of consonant tones in the other parts. Mr. Hawksbee, and others, have found by experiment, that the sound of a bell struck under water, is a fourth deeper than in the air; though Merfennus says, it is of the same pitch in both elements. This writer has treated largely of the different metals of which bells are formed, of their figure, castitude, and degrees of ponderosity, as they respect each other in a given series.

Bells are observed to be heard farther, placed on plains, than on hills; and still farther, in valleys, than on plains: the reason of which it will not be difficult to assign, if we consider, that the higher the sonorous body is, the rarer is its medium; consequently the less impulse it receives, and the less proper vehicle it has to convey it to a distance. There is a curious observation in a paper of M. Reaumur's in the Memoirs of the Paris Academy, relating to the shape most proper for bells, to give them the loudest and clearest sound. He observes, that as pots, and other vessels more immediately necessary for the service of life, were doubtless made before bells, it probably happened, that the observing these vessels to have a sound when struck, gave occasion to making bells, intended only for sound, in that form: but that it does not appear that this is the most eligible figure; for lead, a metal which is, in its common state, not at all sonorous, yet becomes greatly so on being cast into a particular form, and that very different from the common shape of bells. In melting lead for the common occasions of casting in small quantities, it is usually done in an iron ladle; and as the whole is seldom poured out, the remainder, which falls to the bottom of the ladle, runs into a mass of the shape of that bottom. This is consequently a segment of a sphere, thickened in the middle, and thinner towards the edges: nor is the ladle any necessary part of the operation, since, if a mass of lead be cast in that form in a mould of earth or sand, in any of these cases it is found to be very sonorous. Now, if this shape alone can give sound to a metal, which in other forms is perfectly mute, how much more must it necessarily give it to other metals naturally sonorous in whatever form. It should seem that bells would much better perform their office in this than any other form, and that it must particularly be a thing of great advantage to the small bell of common house-clocks, which are required to have a shrill note, and yet are not allowed any great size. M. Reaumur very judiciously observes, that if our fore-fathers had opportunities of being acquainted with the sound of metal in this shape, we should probably have had all our bells of present of this form. Mem. Acad. Par. 1726.

With regard to the origin of bells, those of a small size are very ancient; but those of a large bulk, hung in towers and hung by ropes, were introduced at a much later period. Among the Jews, it was decreed by Moses, that the silver part of the blue robe, which was worn by the high priest in religious ceremonies, should be adorned with four granaries and gold bells intermixed at equal distances. (see Ex. lxxv. 33, 34.) The king of Persia is said to have had the hem of his robe adorned, like that of the Jewish high-priests, with pearls, rubies and gold bells. The Arabian princes wear on their legs large hollow gold rings, which

with small flints, which sound like bells, when they walk ; and these, with several appurtenances, give notice that the mistress of the house is passing, so that the servants of the family may behave with respect, and strangers may retire to avoid seeing the person who advances. Cabinet supposes, that it was with some such design of giving notice that the high priest was passing, that he wore little bells at the hem of his robe ; and it was also a kind of public notice that he was about to enter into the sanctuary. In the court of the king of Persia, no one entered the apartments without some warning ; and thus the high priest, when he entered the sanctuary, desired permission to enter by the sound of his bells, and in so doing he escaped the punishment of death annexed to an indecent intrusion. The prophet Zachary (ch. xiv. 20.) speaks of the bells of the horses, which were probably hung to the bridles or foreheads of war-horses, that they might thus be accustomed to noise. Calmet.

Among the Greeks, those who went the nightly watch rounds in camps or garrisons, carried with them a little bell, which they rang at each centry-box to keep the soldiers appointed to watch awake. A bell-man also walked in funeral processions, at a distance before the corpse, not only to keep off the crowd, but to advertise the flamen dialis to keep out of the way, lest he should be polluted by the sight, or by the funeral music. The priest of Proserpine at Athens, called "hierophantus," rung a bell to call the people to sacrifice. The hour of bathing, at Rome, was announced by the sound of a bell, and hence it has been supposed they were used to mark the hours of devotion, and summon people to church. Servants in the houses of great men were called up in a morning by the sound of bells. Zonaras informs us, that bells were hung with whips on the triumphal chariots of their victorious generals, in order to remind them that they were still amenable to public justice. Bells were affixed to the necks of criminals going to execution, to warn persons to avoid so ill an omen as the sight of the executioner or condemned criminal, who was devoted and about to be sacrificed to the "dii manes." To this superstition some persons have attributed the custom in England of ringing parish bells, while a malefactor is on his way to the gallows ; though others have generally supposed it was intended as a signal to all who heard it, admonishing them to pray for the passing soul. Phædrus mentions bells annexed to the necks of brutes : "Celsa cervicæ eminent, clarumque, collo jactans tintinnabulum." Taking these bells away was construed by the civil law to be theft ; and if the beast was thus lost, the person who took away the bells was to make satisfaction. Sheep had them tied about their necks, to frighten away wolves, or rather by way of amulet, or to direct shepherds where to find their flocks ; and since the practice of blessing them has been introduced, they have been thought to preserve animals from epidemical disorders.

The uses of bells are summed up in the Latin distich :

"Laudo Deum verum, plebem voco, congrego clerum,
Defunctos ploro, pestem fugo, festa decoro."

To the same purpose is the following inscription on bells, mentioned by Weever, in his "Funeral Monuments," p. 122.

"Funera plango, fulgura frango, sabbata pango,
Excito lentos, dissipos ventos, paco cruentos."

The first bells are said to have been made about the year 400, at Nola, in Campania, whereof St. Paulinus was made bishop in 409 ; at least it is asserted, he was the first who brought them into use in the church. Before his time Christians made use of rattles, "sacra ligna," to call the congregation together ; no bells being allowed by government to a proscribed sect. Hence, it is added, they had their Latin names, *Nolæ*, first used by Quintilian, and

Campanæ, a term which was adopted in the time of St. Jerom. But others say, they take these names, not from their being invented in Campania, but because it was here the manner of hanging and balancing them in steeples, now in use, was first practised ; at least, that they were hung on the model of a sort of balance invented or used in Campania. For in Latin writers we find *Campana slatera*, for a steel-yard ; and in the Greek *κρητάνηζον*, for ponderare, to weigh. At first they were called *saints* ; and hence are derived a *toefaint*, or *toefin*.

Polydore Virgil ascribes the invention of church bells to pope Sabinian, St. Gregory's successor ; but this is a mistake ; for St. Jerom, contemporary with Paulinus, makes mention of one. Pope Sabinian did not invent bells ; but he was the first who appointed the canonical hours to be distinguished by them.

We even find mention made of bells in Ovid, Tibullus, Martial, Statius, Manilius, and the Greek authors, under the appellations of *tintinnabula*, and *sounding brass*. Suetonius, Dion, Strabo, Polybius, Josephus, and others, mention them under the names of *petasus*, *tintinnabulum*, *aramentum*, *croतालum*, *signum*, &c. But these appear to have been no more than baubles, and not like the huge bells in use among us.

Hieronymus Magius, who has a treatise on bells (written when in chains in Turkey, and which is accounted very remarkable, purely from his memory, without the assistance of any book), makes large bells a modern invention. Indeed, we do not hear of any before the sixth century, when they were applied to ecclesiastical purposes in some of the monastic societies of Caledonia, as they were in those of Northumbria before the conclusion of the 7th century ; and they seem to have been used from the first erection of parish churches in this kingdom. In 610, we are told, Lupus, bishop of Orleans, being at Sens, then besieged by the army of Clotharius, frightened away the besiegers by ringing the bells of St. Stephen's. The first large bells in England are mentioned by Bede, towards the latter end of that century, or about the year 670. They seem to have been pretty common in the year 816. Ingulphus mentions that Turketulus, abbot of Croyland, who died about the year 870, gave a great bell to the church of that abbey, which he named Guthlac, and afterwards six others, all which rang together ; and not long after this time, Kinfeus, archbishop of York, built a tower of stone to the church of St. John at Beverly, and placed in it two great bells, and at the same time provided that other churches in his diocese should be furnished with bells. J. Stubbz. Act. Pont. Ebor. fol. 1700. Mention is also made by St. Aldhelm, and William of Malmesbury, of bells given by St. Dunstan to the churches in the west. See Spelm. Gloss. voc. *Campana* ; and Bingham's Ant. Christ. Church, book viii. ch. vii. § 15.

The Greeks are usually said to have been unacquainted with bells till the ninth century, or about the year 865, when their construction was first taught them by a Venetian.

Indeed it is not true, that the use of bells was entirely unknown in the ancient eastern churches, and that they called the people to church, as at present, with wooden mallets. Leo Allatius, in his Dissertation on the Greek temples, proves the contrary from several ancient writers. It is his opinion, that bells first began to be disused among them, after the taking of Constantinople by the Turks ; who, it seems, prohibited them, lest their sound should disturb the repose of souls, which, according to them, wandered in the air. He adds, that they still retain the use of bells in places remote from the intercourse of the Turks ; particularly, very ancient ones in mount Athos. F. Simon thinks the Turks rather prohibited the Christians the use of bells out

of political than religious reasons; inasmuch as the ringing of bells might serve as a signal for the execution of revolts, &c. The city of Bourdeaux was deprived of its bells for rebellion; and when it was offered to have them restored, the people refused it, after having tasted the ease and convenience of being freed "from the constant din and jangling of bells."

Matthew Paris observes, that anciently the use of bells was prohibited in the time of mourning; though, at present, they make one of the principal ceremonies of mourning. Mabillon adds, that it was an ancient custom to ring the bells for persons about to expire, to advertise the people to pray for them; whence our passing-bells. The passing-bell anciently served two purposes: one of which was engaging the prayers of all good people for departing souls; and the other was, driving away the evil spirits which haunted the bed and house, and which were ready to seize their prey, or to terrify and molest the soul in its passage; but by the ringing of this bell, it is said they were kept at a distance. To this circumstance we may probably ascribe the high price demanded for tolling the largest bell of the church; which being louder, and heard at a greater distance, might keep these evil spirits more remote, and also procure for the dying man a greater number of prayers.

Lobineau observes, that the custom of ringing bells at the approach of thunder is of some antiquity; but that the design was not so much to shake the air, and so dissipate the thunder, as to call the people to church, to pray that the parish might be preserved from mischief by it.

Whatever occasion some catholics may have given for the reproach, that they attribute to bells the power of driving away demons, and dispelling storms; it is certain the ancient canons of the church only ascribe this power very remotely to bells. Their meaning seems to be this: Satan fears and flies from the bells, because he knows that bells summoned good people to church to pray, and he dreads their prayers. It was therefore to prayer, occasioned by the ringing of bells, and not to the bells, that such good effects were ascribed.

The custom of christening or blessing bells is very ancient. The charge of baptizing bells, alleged by protestants against the Roman catholics, has been denied by the latter; but they allow that they bless bells with certain ceremonies, as they do all other church utensils; and that one of the ceremonies is the giving of a name to the bell, in order to distinguish it from others, or in honour of some saint. It seems reasonable, therefore, to acquit them of the blame of prostituting baptism in this case, and to charge them merely with consecration and benediction. Before bells were hung, they were washed, crossed, blessed, and named by the bishop. This is what some protestants have called baptizing of them; but others say, it might be denominated the illustration of them, resembling the illustration of trumpets among the Romans. Cardinal Bona observes (Rer. Liturg. l. ii. c. 22.), that the name of some saint is given to a bell at the time of its consecration, that the people may think themselves summoned to divine service by the voice of the saint whose name the bell bears. Some say that this custom was introduced by pope John XIII. who occupied the pontifical chair from 965 to 972, and who first consecrated a bell in the Lateran church, and gave it the name of John the Baptist. But it is evidently of an older standing; there being an express prohibition of the practice in a capitular of Charlemagne in 789: "ut cloce non baptizetur." See *Hospinian de Origine Templorum*, p. 113. where there is a particular account of all the ridiculous ceremonies practised about bells. See Dr. Franklin's *Observations on consecrated Bells*, and the Form in consecrating them, *Experiments, Observations, &c.* p. 487, ed. 1769.

Nankin, a city of China, was anciently famous for the largeness of its bells; but their enormous weight having brought down the tower in which they were hung, the whole building fell to ruin, and the bells have ever since been disregarded. One of these bells is nearly twelve English feet high, the diameter seven and a half, and its circumference twenty-three; its figure almost cylindrical, except for a swelling in the middle, and the thickness of the metal about the edges, seven inches. From the dimensions of this bell, its weight is computed at 50,000 pounds, which is more than double the weight of that at Erfurt, said by father Kueher to be the greatest bell in the world. These bells were cast by the first emperor of the preceding dynasty, above three hundred years ago. They have each their name, the hanger *tehoui*, the eater *ch.*, the sleeper *choui*, the will *fi*. Father le Compte adds, that there are seven other bells in Peking, cast in the reign of Youlo, each of which weighs 120,000 pounds. But the founds even of their biggest bells are very poor; being struck with a wooden instead of an iron clapper.

The Egyptians have none but wooden bells, except one brought by the Franks into the monastery of St. Anthony.

In the churches of Russia their bells are numerous, and distinguished by their enormous size. They are hung, particularly at Moscow, in belfreys or steeples detached from the churches, with gilt or silver cupolas or crosses; and they do not swing like our bells, but are fixed immovably to the beams, and rung by a rope tied to the clapper, and pulled sideways. One of these bells in the belfrey of St. Ivan's church at Moscow, weighs 127,836 English pounds. It has always been esteemed a meritorious act of religion to present a church with bells, and the piety of the donor has been estimated by their magnitude. According to this mode of estimation, Boris Godunof, who gave a bell of 288,000 pounds to the cathedral of Moscow, was the most pious sovereign of Russia, until he was surpassed by the empress Anne, at whose expence a bell was cast, weighing 432,000 pounds, which exceeds in size every bell in the known world. Its dimensions, as ascertained by Mr. Cox (*Travels in Russia*, vol. i. p. 322.), are as follow: the height is 19 feet, the circumference at the bottom 63 feet 11 inches, and its greatest thickness 23 inches. The beam to which this vast machine was fastened, being accidentally burnt by a fire in 1737, the bell fell down, and a fragment was broken off towards the bottom, which left an aperture large enough to admit two persons abreast without stooping.

The ringing or striking of the bells, though it forms no part of divine worship, as some writers have asserted, serves, however, by the number of strokes, to inform any person without the church, what part of the religious service is beginning within it. Thus, several strokes are struck just before the mass; and this is called "blagovell," i. e. the agreeable sound, as a summons to the praises of God. Before the commencement of the liturgy, it sounds three; and in the middle of it, a few strokes are given to the bell, to let the people without know that the hymn to the holy virgin is now beginning to be sung. All persons, on hearing this throw aside their work, bow, and cross themselves, repeating silently the verse then singing in the church. In the same manner is regulated the fixed number of strokes at the several periods of the vespers and the matins. On some holidays they are sounded through the whole day. *Tooke's Hist. of Russia*, vol. i. p. 128.

The same writer also informs us, that ringing the bells on church and court holidays, is a species of exercise of which the Russians are very fond: but they produce nothing like harmony from them. The sole excellency consists in striking the clapper the oftenest.

For further particulars relating to bells, see *CHANGES in a given*

a given number of bells, TINTINNALOGIA, CARILLONS, and RING.

BELL Bay, in *Geography*, a harbour on the south-west coast of East Greenland, to the north of Horn Sound.

BELL Sound, is situated on the west coast of Spitzbergen, in the icy sea. N. lat. 77° 12'. E. long. 12° 40'.

BELL, *hearing the*. See RACING.

BELL, *foundry of*. See FOUNDRY.

BELL, *diving*. See DIVING.

BELLS, *electrical*, are used in a variety of entertaining experiments by electricians. The apparatus, which is originally of German invention, consists of three small bells suspended from a narrow plate of metal (*Plate, Electricity*;) the two outermost by chains, and that in the middle, from which a chain passes to the floor, by a silken string. Two small knobs of brass are also hung by silken strings, one on each side of the bell in the middle, which serve for clappers. When this apparatus is connected with an electrified conductor, the outermost bells suspended by the chains will be charged, attract the clappers, and be struck by them. The clappers becoming electrified likewise, will be repelled by these bells, and attracted by the middle bell; and discharge themselves upon it by means of the chain extending to the floor. After this, they will be again attracted by the outermost bells, and thus, by striking the bells alternately, occasion a ringing, which may be continued at pleasure. Flashes of light will be seen in the dark between the bells and the clappers; and if the electrification be strong, the discharge will be made without actual contact, and the ringing will cease. An apparatus of this kind, connected with one of the conductors that are erected for securing buildings from lightning, will serve to give notice of the approach and passage of an electrical cloud.

BELL-glass, in *Chemistry*, a convenient vessel for many chemical operations, particularly upon gaseous bodies. It has the advantage of not being easily overturned, and is readily manageable by the knob of glass at the top. When used, it is always inverted or standing with the open end downwards. See *Plates in Chemistry*.

Chemical bells are a sort of receptacles chiefly used in preparing the oil or spirit of sulphur, for gathering and condensing fumes into a liquor.

BELL, in *Building*, is used to denote the body of the Corinthian and Composite capital, by reason of its resemblance to the figure of a bell inverted. In this sense, bell is the same with what we otherwise call *vase* and *tambour*, sometimes also *corbel*. The neck of the bell is always to be even and perpendicular with the bottom of the flutings of the column.

BELL flower, in *Botany*. See CAMPANULA.

BELLS, *hair*. See HYACINTH.

BELL-metal, an important alloy, composed principally of copper and zinc. See COPPER.

BELL-animal, in *Zoology*, a name given by some of the early writers on microscopical discoveries, to creatures of the Hydra genus. The bodies of these animals are shaped like bells, and they have very long and slender tails, by which they fasten themselves to the roots of little plants. They are usually found in great numbers together, in a sort of clusters or bunches; and all of the same bunch have always the same motion, very frequently contracting themselves, and afterwards expanding all together to the full length of their tails. They usually contract instantaneously; but are more slow in the expanding themselves again. Baker's *Microsc.* p. 98. See HYDRA.

BELL-muskus, in *Botany*, a name given by some authors to the plant called *hamia moschata*, and mosch-seed.

BELL-pepper. See CAPSICUM.

BELL-polype, in *Zoology*, is the name applied to one par-

ticular species, the extremities of whose branches resemble bells, and which is now called *Vorticella Umbellaria*.

BELL-weed, an English name used by some authors for the *Jacea-nigra*, or common knap-weed, called also by many English writers *Maiselon*.

BELLA, STEFANO DE LA, in *Biography*, an eminent engraver, was born at Florence in 1610, and after having been for some time employed in the business of his father, who was a goldsmith, applied to the study of engraving, and became the disciple of Costa Galvani. At first he imitated the manner of Callot, who had been a disciple of the same master; but acquiring a facility in handling the point, he adopted a manner of his own, which is said to have surpassed, in freedom and spirit, that of Callot. At Paris, whither he removed in 1642, he formed an acquaintance with Israel Silvestre, and was much employed by Henriette, the uncle of Silvestre. Upon his return to Florence, he obtained a pension from the grand duke, and was appointed to instruct the prince Cosimo, his son, in the art of design. But being habitually subject to violent pains in the head, they at length terminated his life in 1664. The free and masterly etchings of this excellent artist are well known; and his distinguishing excellence consists in the freedom of his point, and the lightness and elegance of his figures. He drew correctly, and with great taste; and his works display much genius and great fertility of invention. Their slightness is compensated by their fire and animation. He is said to have engraved 1400 plates; among which are, "Six Views of Livourne;" several sets of "Shipping;" "A Holy Family;" several "Madonas;" a "View of Pont-neuf, at Paris;" "St. Prosper;" a scarce print; five small ovals, in which is represented "Death carrying away persons of various ages;" "Death mounted on the skeleton of a horse;" "Panassus;" and the "Rock," both scarce; "Animals;" "Beggars;" and various sets of "Hunting;" "Shipping;" "Landscapes;" "Ornaments;" &c. Strutt.

BELLA POLLÀ, or TERRA POLLÀ, in *Geography*, a small high island, resembling two islands with lofty round hills, 10 leagues N. E. by N. from cape Angelo, and 4 leagues N. N. W. from Grava island; situate on the coast of the Morea in the Archipelago.

BELLA, in *Entomology*, a species of PHALÆNA (*bombyx*;) found in North America. The wings are yellow, with six rows of black dots; posterior wings red, with black tips. *Linn. Mus. Lud. Ulr.*

BELLABRÉ, in *Geography*, a town of France, in the department of the Indre, and chief place of a canton, in the district of Le Blanc. The place contains 895, and the canton 6672 inhabitants: the territory includes 300 kilometres and 11 communes.

BELLAC, a town of France, and principal place of a district, in the department of the Upper Vienne, seated on the Vincon. It derives its name from an old fortified castle, erected in the 10th century, and contains about 2500 inhabitants. The place contains 3901, and the canton 10,854 inhabitants: the territory includes 255 kilometres and 9 communes. N. lat. 46. 7'. E. long. 0° 57'.

BELLADAC, a town of Asia, in the province of Diarbekir, 45 miles west of Rabba.

BELLADONNA lily, in *Botany*. See AMARYLLIS.

BELLADONNA, a name given by the Italians to the *deadly nightshade*, because the ladies make a cosmetic of the juice, or distilled water, which they use to make their complexion fair and white. Ray.

Others derive the name from the intoxicating quality of this plant: "Quod insomnis pulchras offendat virgines feminasque." *Bod. Comment. in Theophrast.* 10, 8. See ΑΤΡΟΦΑ.

BELLADONNA, in *Entomology*: *Papilio Cardui*, is described under the name in the *Fauna Suecica*. Lin. i. n. 778.

BELLAIRF, in *Geography*, a post town of America, near the centre of Harford county in Maryland, and the chief town of the country. It contains a court-house and jail, and has but few inhabitants. Distance from Harford 6 miles, N. W. 22. N. E. from Baltimore, and 86 W. S. W. from Philadelphia.

BELLANO, a town of Italy, in the Milanese, 17 miles north of Como. It is situated at the foot of a lofty precipice; rent from top to bottom by a chasm, through which a furious torrent forces its way. A bridge is thrown across the chasm, from which the spectator looks down into a deep gulf, and an aqueduct is conducted along the steep sides of the rock.

BELLARGUS, in *Entomology*, a species of **PAPILIO** (P.L.B. rur.) described by Eiper; and is *Papilio Adonis*, Guel. &c.

BELLARMIN, **ROBERT**, in *Biography*, a cardinal of Rome, and one of the most famous controversial writers of his time, was born at Monte Pulciano, a town of Tuscany, in 1542, and entered into the society of the Jesuits in 1560. He was ordained priest by Julius in 1569, and in the following year advanced to the theological chair in the university of Louvain. Having remained seven years in the Low Countries, he returned to Italy, and in 1576, began to read lectures at Rome on controversial subjects; and having been honoured by three successive popes with important commissions, he was, in 1578, nominated to the cardinalate by Clement VIII. with this striking eulogium: "We choose him because the church of God does not possess his equal in learning." In 1602, he was created archbishop of Capua; and it is supposed he would have been raised to the papal chair, if he had not been a Jesuit. In about four years he resigned his archbishopric, upon being recalled to Rome by pope Paul III. and here he continued his services to the church, till the year 1621, when he retired from the Vatican to a house of his order, in which he died the same year, at the age of 79. When he was visited in his last illness by pope Gregory XV. he expressed his profound veneration for the apostle, and Christ's wear on earth, by saying him on his entrance with the words of the ecsternion to Christ: "Lord, I am not worthy that thou shouldst come under my roof." On the day of his funeral it was necessary to keep off the populace by a military guard, as they pressed on, either to touch his body or to procure some relic of his garments, as if he had been a saint.

Bellarmin was a very strenuous defender of the catholic religion against the reformers; and his numerous arguments were collected by protestant divines as specified objects of satirical attacks. He has written a "A Path of Controversy," which, in Italy, was requested by pope Paul V. to be the chief edition of that of Bellarmine in 1621, &c. &c. The chief of his works, which are printed in several volumes, is his *De controversiis*, printed in four volumes in 1619. He has also written several treatises; and a treatise of the immortality of the soul, in which he has distinguished himself by his own pen, and which has been translated by several learned hands into all the principal languages of Europe, has been translated into English, and is published in several editions, and is one of the most famous and useful books in the world. He has also written several other treatises, and a great number of sermons, and a great number of letters, and a great number of other works, which are all of great value and use to the church and world.

chief work, he wrote "A Commentary on the Psalms," "Sermons;" "A Treatise on Ecclesiastical Histories;" "A Treatise on the Temporal Authority of the Pope," against Barclay; "The Groans of the Dove;" "On the Obligations of Bishops;" and "A Hebrew Grammar." Some of his works, and particularly his book on the temporal authority of the pope, raised adversaries against him in his own communion, whilst his declaration of the right of the pontiffs to depose princes, caused it to be condemned by the parliament of Paris; his assertion of the indirect power of the popes in temporal matters, so offended the court of Rome, that Sixtus V. caused it to be inscribed in the Index of the Inquisition. Some protestants, by excess of zeal, injured their own cause, by circulating unfounded and malignant calumnies against his morals, &c. Joseph Scaliger has even asserted, that he did not believe a word of the doctrines he defended, whereas it is most probable that he inclined to superstition in fact, and to scrupulosity in practice. At his death he bequeathed one half of his soul to the Virgin Mary, and the other half to Jesus Christ; and it is said, that he would not allow the vermin that infested his body to be mollied; under the plea, that these animals had no other paradise than their present existence, of which it was cruel to deprive them. His right to canonization was strongly urged; and the popes were prevented from allowing his claim merely by the fear of giving offence to those foreigners whose temporal rights he had opposed. Gen. Dict. Nouv. D. G. Hill. Mosheim. Eccl. Hist. vol. iv. p. 221, &c.

BELLAS, in *Geography*, a small town of Portugal, in Estremadura, containing about 1240 inhabitants.

BELLATOR, in *Entomology*, a species of **CIMEX** (spinolas). It is brown above, beneath yellowish; antennae black annulated with white. Gmelin. A native of Cayenne. This is *Corix B. lator* of Fabricius.

BELLATRIX, in *Astronomy*, a ruddy, glittering star of the second magnitude, in the left shoulder of ORION.

It takes its name from *bellum*, a-belligerently supposed to have great influence in kindling wars, and forming warriors.

BELLAY, **WILLIAM DU**, in *Biography*, a French general, signalized himself in the service of Francis I. by his valour as an officer, and by his talents as a negociator. He was a diligent and successful in his efforts for inducing some of the universities of France to pronounce judgment in favour of the divorce of king Henry VIII. from his queen Catharine; and he was employed in several embassies to Germany for the purpose of conciliating the princes of the protestant league, and dividing their objections against the king's master's severity in punishing heretics. Bellay was eminently distinguished for his skill in penetrating, by his spies and intrigues, into the designs of the enemy; he succeeded in the point, with the worst in quality of victory, and to have well known from the Emperor's. In the division of command, after some important battles, he came to the king, and by his skill, he obtained a pardon for his conversion; but he was confined the moderation of Charan, between France and the Emperor, under a necessity of stopping at St. Zeno, where he died January 1607, 1613. He was buried in the church of Marly; and a noble monument was erected to his memory. He wrote several other works; of which the principal are "The History of the seven Years," "The Grand Treaty," which he is said to be led to, or directed part, each consisting of eight books. Of this work the first four are now extant, and were by the late Mr. D. Bellay, in his "Memoirs" from 1513 to 1513." They are written in a simple and lively manner, but are somewhat partial in favour of Francis I.

Bellay was one of the first French writers who expressed a doubt of the miraculous facts recorded of Joan of Arc. Gen. Dict.

BELLAY, *John du*, a cardinal, younger brother of the preceding, was born in 1492; and having made considerable proficiency in literature, was highly esteemed by Francis I. By him he was employed in several embassies, particularly in negotiating a reconciliation between Henry VIII. of England and the see of Rome; and he was advanced by him to several considerable preferments. Bellay, in the business of king Henry, visited the pope at Rome, where he continued, and in 1535, he was made cardinal by Paul III. As soon as he received intelligence of the hostile designs of Charles V. he returned to France, and resisted that prince's invasion of Provence in 1536, as the lieutenant-general of Francis, with as much military vigour as prudence, and he exerted himself in putting the metropolis, and other places in Picardy and Champagne in a formidable state of defence. After the death of Francis I. his credit declined by the intrigues of the cardinal of Lorraine, and retiring to Rome, he resigned his preferments to France, and was made bishop of Ostia. He was so much respected by his brother cardinals, that they had thoughts of raising him to the pontificate, when he died in 1560 at Rome, aged 68 years. Bellay was distinguished as a patron of literature; and by his advice, in concurrence with that of Budæus, Francis I. founded the royal college in 1529. He was an elegant writer, both in Latin and in French. In the Latin language he wrote some harangues, and an apology for Francis I. and in the latter three books of poems, consisting of elegies, odes, and epigrams, published by R. Stephens, in 1546. Gen. Dict.

BELLAY, *Joachim du*, a French poet, was born at Lire in Anjou, about the year 1524; and amidst various domestic misfortunes, which marked his earlier years, he directed his attention to the study of the ancient and modern poets. At length his own performances in verse made him known at court, and he became the delight of Francis I. Henry II. and Margaret queen of Navarre. He was characterized by the appellation of the "French Ovid," which seemed to have not improperly been bestowed upon him, on account, partly, of the sweetness and facility of his muse, and partly of the licentiousness of some of his pieces. In the sonnet he particularly excelled, and a rank has been assigned to him as a poet next to that of Ronsard. He followed his relation the cardinal to Rome; and on returning with him to France as his agent, he lost his favour in consequence of charges of irreligion and immorality that were alleged against him. But another relation, who was bishop of Paris, gave him a canonry in his church in 1555, and he had the prospect of further preferment; but was carried off by an apoplexy, January 1, 1561. His French poems were published in 1561, and his Latin ones in 1561. Nouv. Dict. Hist.

BELLE DE NUIT, in *Botany*, a name which the French give to the flower of the Jalap.

BELLE bay, in *Geography*, a harbour on the N. E. part of the great bay, called Fortune bay, on the south coast of the island of Newfoundland, in the Atlantic ocean.—Also, another bay on the N. W. side of the same island, 6 or 8 leagues N. W. from the bay of Isles, and about as much S. W. from the small bay of Higournachet.

BELLE Dune, *La*, or *Handsome Town*, a long projecting barren point, on the south side of Chaleur bay in North America, about 8 leagues N. N. W. of Nipisiguit, where temporary cod and herring fisheries are carried on by different people; no trade being established at the place.

BELLE isle, *Belleisle-en-Mer*, or *Belliste*, an island in the bay of Biscay, near the W. coast of France; about 9 miles long,

and from 2 to 4 broad, surrounded by steep rocks, which together with the fortifications, render the conquest of it difficult. It was taken by the English in 1761, but restored at the peace in 1763. The soil is various, rocky, with salt marshes, and some fertile grounds. Besides Palais, the capital, it contains three other small towns, and about twenty villages. N. lat. 47° 17' 30". W. long. 3° 6' 30".

BELLE-isle-*sur-Mer*, in the department of Morbihan, and chief place of a canton, in the district of L'Orient, by the late French arrangement, contains 2496, and the canton 5569 inhabitants: the territory includes 105 kilometres and 5 communes.—Also, a small island of France, in the river Loire, in the department of the Mayenne, half a league west of St. Mathurin.—Also, an island on the east side of the northern part of Newfoundland, east of Canada-head between 50° 4' and 50° 50'. N. lat. and between 55° 39' and 55° 46'. W. long.—Also, an island of North America, at the mouth of the straits of this name, between the country of the Esquimaux, or New Britain, and the north end of Newfoundland. The island is about 7 leagues in circuit, and lies 16 miles from the nearest land on the coast of Labrador, or New Britain. On the north-west side it has a harbour for fishing vessels, or small craft, called "Lark harbour;" and, on the E. point, it has another small harbour or cove, which will admit shallows. The narrow channel betwixt Newfoundland and the coast of Labrador, called the "Straits of Belle Isle," receive several rivers from the coast of Labrador. These straits lead into the gulf of St. Lawrence from the N. E. and are distant 5 leagues N. from Newfoundland. The north point of the island is in N. lat. 51° 57' and the south point in N. lat. 51° 48' and W. long. 55° 40'.—Also, an island of Ireland in lough Erice, in the county of Fermanagh, 6 miles S. E. of Enniskillen.

BELLE-isle-*en-Terre*, a town of France, in the department of the Northern coast, and chief place of a canton, in the district of Guingamp. Seated on an island in the river Guer; 3 leagues west of Guingamp. The place contains 812, and the canton 9118 inhabitants: the territory includes 152½ kilometres and 6 communes.

BELLE plaine, a valley of Piedmont, in the Alps, situate partly in the county of Nice, partly in the county of Tenda, a few miles N. W. of Saorgio.

BELLEFENSE, a town of France, in the department of Côte-d'or, and chief place of a canton, in the district of Beaune. The place contains 1717, and the canton 10,324 inhabitants: the territory includes 215 kilometres and 17 communes.

BELLEFOREST, *Francis du*, in *Biography*, was born at a village called Sarzan, in the province of Guienne in 1530, and after an early education in the court of Navarre, was sent to study the law at Toulouse. But employing himself in writing panegyrics in bad verses, on all the noblesse in and about Toulouse, by whom he was rewarded with praise and entertainment, he removed to the capital: and by attention and industry attained to some reputation in the reigns of Charles IX. and Henry III. so that he gained the post of historiographer-royal, which he afterwards lost for want of paying due regard to fact in his productions. He is said to have composed more than 50 works on different subjects, during a life of 53 years, as he died at Paris in 1583. It is related of him, that there was neither tongue nor science which he did not profane. His most fertile topic was history; and he published compilations of "Tragical Histories;" and "Wonderful Histories." The only two works worth recording are, "The History of the nine Kings of France, of the Name of Charies," folio; and "The Annals of general History of France,"

France," Par. 162, 2 vols. folio, in which last work are 4 veracious facts, intermixed with fables, and therefore having no authority. *Gen. Dict. Nouv. Dict. Hist.*

BELLEGRARDE, *Jouis-Baptiste Merleand*, usually called the "Abbe," was born of a family of rank in the diocese of Nantes in 1638, and entered into the society of the Jesuits. His talents and labours were formed by Father Le Cour, under whom he ranked as a disciple. Attached to the principles of Descartes, which were opposed by the Jesuits, he abandoned the society of Jesuits, after continuing in it 16 or 17 years, and taking priest's orders; and entered into the world, preaching occasionally with applause, but devoting himself chiefly to the profession of an author. Under this character he wrote many books, and supported himself chiefly by the profits accruing from them, distributing to the poor every thing that exceeded a bare maintenance. Some time before his death he distilled from his library 1500 vols., sold his books, and retired to the community of St. Francis de Sales at Paris, established for the support of poor priests, and here he died in 1724. His voluminous publications consist chiefly of translations from the works of St. John Chrysostom, St. Paul, St. Gregory Nazianzen, St. Ambrose, Thomas a Kempis, &c. and also from Ovid, Virgil, and other profane writers. His style is pure and elegant; but he often mistakes the sense of his authors, especially of the Greek fathers. The subjects of his original works are, in general, morals, and matters of taste. Those that have been most favourably received are, "Reflections on Rhetoric;" "Reflections on what may please and displease in the Commerce of the World;" and "Reflections on Eloquence and Poeticks of Style." These, and some other pieces, form a collection of 14 final volumes. *Nouv. Dict. Hist.*

BELLEGRARDE, in *Geography*, a fortified town of France, in the department of the Aveyron; it was taken by the Spaniards in 1744, and retaken the following year by marshal Schomberg. After the peace of Nimwegen, Louis XIV. built a regular fortress with five bastions, to defend the Pyrenees; 5 leagues S. of Perpignan.—Also, a town of France, in the department of the Loiret, and chief place of a canton, in the district of Montargis. The place contains 754, and the canton 5991 inhabitants: the territory includes 172½ kilometres, and 12 communes.—Also, a town of France, in the department of the Creuse, and chief place of a canton, in the district of Aubusson; 2 leagues east of Aubusson. The place contains 1027, and the canton 7638 inhabitants: the territory includes 165½ kilometres, and 9 communes.

BELLEGRAY, a village or village of Germany, in the county of Upper Rhine, and the principality of Bala, with a rich soil of Barrenness. It is distant about 20 miles from Paris, and is a very agreeable situation, surrounded by mountains and sheltered by forests. In this place is instituted a military academy for young nobility and gentry.

BELLEM. See **BELM.**

BELLEN, a town of Scotland, in the canton of Schottland, or the N. E. of Zetland.

BELLENAVE, a town of France, in the department of the Aisne, and chief place of a canton, in the district of Guise, 3 leagues N. W. of Guise.

BELLENOUMBE, a town of France, in the department of the Loiret, and chief place of a canton, in the district of Dreux, 3 leagues west of Neufchâtel, and 5 S. S. E. of Dreux. The place contains 212, and the canton 5144 inhabitants: the territory includes 162½ kilometres, and 127 communes.

BELLI-NDIEN, *William*, (*Bellinensis*, Lat.) in *Biography*, a son of one of the most eminent scholars, was born in Scotland, and spent the greater part of the 17th century. He was professor of the Belles Lettres in the uni-

versity of Paris in 1662, and continued for a considerable time in that office, even after he was made master of the university, and taking James I. of England. At Paris he published, in 1658, his "Cicero Principis," containing a body of extracts from Cicero's writings, relative to the maxims of a monarch's government, and the duties of a prince. This work was dedicated to Henry, prince of Wales, and he prefixed to it a treatise "De Processu et Semperitua Reipublice," in which there is a rich vein of maturing sense and fervent piety. The origin of our errors in religion, and of our defects in policy and morals, is traced out with considerable accuracy and learning. But while the author condemns the monstrous tenets of ancient idolatry, and the gross corruption of philosophy, he bestows many just encomiums on the wisdom and the patriotism of some ancient legislators. In 1662, the author published a work similar to the former, under the title of "Cicero Consul, Senator Senatuturpe Romanus;" on the nature of the consular office, and the constitution of the Roman senate. Encouraged by the reception given by the public to these works, he conceived the plan of a third work, "De Statu imperii Orbis," which was to contain a history of the projects of government and philosophy from the antediluvian times to their various degrees of improvement under the Hebrews, Greeks, and Romans. This work was dedicated to Charles, prince of Scotland and Wales; but when he had proceeded so far as to print a few copies of this work, in the year 1665, it was suggested to him, that his three treatises, "De Statu Principis;" "De Statu Reipublice;" and "De Statu Orbis;" being on similar and connected subjects, might be united in one work; accordingly they were republished in this form under the title of "Bellendenus de Statu," in 1666. Bellenden afterward projected a more extensive work, "De Tribus Lumibus Romanorum," in which Seneca and Pliny were to be joined to Cicero; but death prevented the execution of his whole plan. He was an elegant writer, and a man of extensive knowledge and sound judgment. His Latin style is formed upon that of Cicero; and he embraces every opportunity of interweaving the most choice and proper phraseology from the Roman orator, even whilst he is expressing his own sentiments, so that it is not always easy to distinguish sentences cited from Cicero, from his own language. The book "De Statu," was reprinted in London in 1787, 8vo. by an anonymous editor, (supposed to be the learned Dr. Parr,) with a Latin preface by the editor, relating to the politics and public characters of that period, and beautiful engravings of Mr. Burke, lord North, and Mr. Fox, to whom the three treatises are respectively dedicated. To preserve the memory of every composition which flowed from the pen of Bellendenus, the editor has inserted an epithalamium on the marriage of Charles I. and a "panegyricum carmen" on the embassy to Spain. These verses were found in the British Museum.

The editor owns his firm conviction that Dr. Middleton, in his celebrated history of Cicero, was much indebted to the writings of Bellendenus, although he has never mentioned his name. Pref. to Bellendenus de Statu. Monthly Review, vol. lxxvi. p. 491, &c. vol. lxxvii. p. 54, &c.

BELLEREAU, in *Geography*, a town of France, in the department of the Meurthe, and chief place of a canton, in the district of Nancy, 2 leagues S. E. of Port-a-Mousson.

BELLEROPHON, in *Fables* or *History*, the son of Glaucus, king of Ephyrus or Corinth, was contemporary with Jason. Under a charge of homicide, at some say, on his own brother, he was forced to retire to the court of Prætus, king of Argos, where he was accused by Sthenobara, or a Homer says, Antia, the wife of Prætus, of an attempt upon her chastity. For this insult Prætus sent him to Jobates, his

father-in-law, king of Lycia, with private instructions to put him to death. Jobates demurring against the execution of these orders, employed him in several dangerous expeditions against the Solymi, and against the Amazons, from which he returned victorious. Having thus ingratiated himself with Jobates, he obtained his daughter in marriage, and a settlement in a fertile part of Lycia, where he reigned and brought up his family. From Homer's account, which represents him as "hated by the gods, and wandering in the Aleian plain, a prey to melancholy, and avoiding all commerce with men," he seems to have become insane, and to have died in that state. To his various exploits Homer and other writers have annexed the story of his killing the triform monster called the Chimæra, by the assistance of the flying horse Pegasus, granted him by Minerva and trained for his use. Of the numerous conjectures that have been offered for the explication of this fable, we shall only mention that of Bochart, (Phaleg. l. i. c. 6.) who suggests, that in his expedition against the Solymi, he overcame them, and also their three gods, which they painted on their ensigns, in the several forms of a lion, a goat, and a dragon; and which he probably joined together on his own, in memory of his conquest; and this gave birth to the fable of his killing the monster Chimæra. Homer. Iliad. vi. Anc. Univ. Hist. vol. v. p. 97, &c.

BELLES LETTRES, considered as synonymous with *polite literature*, however vaguely and indefinitely these terms have been often used, properly comprehend those subjects that relate to man as a being endowed with senses of taste and imagination, which were intended to embellish his mind, and to supply him with rational and useful entertainment. In this restricted sense they include the origin, structure, and various kinds of language, or grammar, universal and particular, criticism, rhetoric in its whole extent of composition, style, and elocution; history, in its several departments, ancient and modern, general and special, and all the different kinds of poetry. In the distribution of the Lyceum of Arts, established at Paris in 1792, the belles lettres comprehend general grammar, languages, rhetoric, geography, history, antiquities, and numismatography; whereas, those parts of learning that are of a more grave, sublime, or abstruse kind, and that are more immediately the objects of the understanding, such as logic, metaphysics, ethics, and the various branches of the mathematics and natural philosophy, are usually referred, by way of distinction, to the class of sciences. This distinction, however, is not rigidly observed, even by Rollin and others, who professedly treat of the belles lettres. In their confined and appropriate meaning, they open a field of investigation peculiar to themselves. Their province comprehends every thing that relates to beauty, harmony, grandeur, and elegance; every thing that can soothe the mind, gratify the fancy, or move the affections. They present human nature under a different aspect from that which it assumes, when viewed by other sciences. They bring to light various springs of action, which, without their aid, might have passed unobserved; and which, though of a delicate nature, frequently exert a powerful influence on several departments of human life. Such studies have also this peculiar advantage, that they exercise our reason without fatiguing it. They lead to enquiries acute, but not painful; profound, but not dry or abstruse. They strew flowers in the path of science; and while they keep the mind bent, in some degree, and active, they relieve it at the same time from that more toilsome labour to which it must submit in the acquisition of necessary erudition, or the investigation of abstract truth. Besides, the study of polite literature furnishes an agreeable amusement for those intervals of leisure which occur in every man's life; and thus pre-

vents his being a burden to himself, or recurring to the indulgence of pernicious passions, and the pursuit of licentious pleasures. The satisfactions which this study imparts, occupy a kind of middle station between those of mere sense and those of pure intellect: they refresh the mind after the toils of intellect, and the labours of abstract study; and they gradually raise it above the attachments of sense, and prepare it for the enjoyments of virtue. Of those, whose minds in early life incline to polite literature, good hopes may be entertained, as this liberal and elegant turn is favourable to many virtues; whereas, to be entirely void of relish for eloquence, poetry, or any of the fine arts, is an unpromising symptom of youth, and furnishes suspicions of their being prone to low gratifications, or destined to drudge in the more vulgar and illiberal pursuits of life. A cultivated taste increases sensibility to all the tender and humane passions, by giving them frequent exercise, while it tends to weaken the more violent and fierce emotions:

"— Ingennas didicisse fideliter artes,
Emollit mores, nec sinit esse feros."

"These polish'd arts have humaniz'd mankind,

Soften'd the rude, and calm'd the boist'rous mind."

The elevated sentiments and high examples which poetry, eloquence, and history, are often bringing under our view, naturally tend to nourish in our minds public spirit, the love of glory, contempt of external fortune, and the admiration of what is truly illustrious and great. Although it should not be said that the improvement of taste and virtue are the same, or that they may be always expected to co-exist in an equal degree; yet it must be allowed, that the exercise of taste is, in its native tendency, moral and purifying. From reading the most admired productions of genius, in poetry or in prose, almost every one rises with some good impression left on his mind; and though these may not always be durable, they are at least to be ranked among the means of disposing the heart to virtue. Indeed, without possessing the virtuous affections in a strong degree, no man can attain eminence in the sublime parts of eloquence. He must feel what a good man feels, if he expects greatly to move, or to interest mankind. They are the ardent sentiments of honour, virtue, magnanimity, and public spirit, that only can kindle that fire of genius, and call up into the mind those high ideas, which attract the admiration of ages; and if this spirit be necessary to produce the most distinguished efforts of eloquence, it must be necessary also to relish them with proper taste and feeling. Blair's Lectures on Rhetoric, and Belles Lettres, vol. i. lect. 1. Rollin's Method of treating and studying the Belles Lettres, vol. i. p. 3, &c. M. de Rosenstein's Oration, delivered before the Swedish Academy, translated by N. G. Agander.

BELLESME, in *Geography*. See BELESME.

BELLEVILLE, a town of France, in the department of Paris, and chief place of a canton, in the district of St. Denis, half a league east of Paris.—Also, a town of France, in the department of the Rhone, and chief place of a canton, in the district of Villefranche, 2½ leagues north of Villefranche.—The place contains 2039, and the canton 11,528 inhabitants: the territory includes 145 kilometres and 12 communes.—Also, a town of France, in the department of Vendée, and the district of Montaigne, one league north of La Roche-sur-Yon.

BELLEVOIS, in *Biography*, a painter of sea pieces, known through all parts of Europe as a good painter, died in 1684. His subjects are views of havens, sea-ports, shores, calms, and storms at sea; but in his calms he shows his peculiar excellence. Histouch is light, and his colouring clear; the perspective of his sea-ports and buildings is true, and has an agreeable effect; his skies are generally bright, and judiciously

judiciously managed; and his colouring is transparent. His figures are indifferent, and without much expression. His pictures occur in public sales, and some of his best style fetch a tolerable price. Pilkington.

BELLEVEUE, or *St. Belin*, in *Geography*, a town of France, in the department of the Saone and Loire, and chief place of a canton, in the district of Charolles. The place contains 2800 and the canton 9406 inhabitants: the territory includes 322½ kilometres and 13 communes.

BELLEVEY. Lat. BELICA, a town of France, and principal place of a district in the department of the Ain, before the revolution the capital of Le Buguey, and the seat of a bishop, seated among hills and small eminences, about 2 miles from the Rhone, and twelve miles east of Lyons. The place contains 3727 and the canton 12,118 inhabitants: the territory comprehends 195 kilometres and 22 communes. N. lat. 45° 45'. E. long. 5° 35'.

BELLEGROVE, a town of America, in Bergen county, New Jersey, on the road to Albany, within half a mile of the line that separates New York from New Jersey, which extends from Delaware river to that of Hudson; distant 24 miles N. by W. from the city of New York.

BELLI, in *Modern History*, the name of a society or sect among the Negroes of Africa, in the interior kingdoms of Sierra Leona, which is properly a school or seminary for the education of children, renewable every 25th year by order of the king, who is visitor or superior of the college. Here the young men learn to dance, fight, fish, hunt, and above all, to chant a certain hymn, which, in the language of the college, they call "bellidog," or the praises of belli: these songs consist only of a repetition of the same lowly expressions, enforced by the most indecent and lascivious postures. When a young negro is become an adept in this practice, he is admitted a fellow of the college, deemed to be qualified for all employments, temporal and spiritual, and entitled to a number of important privileges.

BELLICA *columna*, in *Antiquity*, a column near the temple of Bellona, from which the consuls or sceiales cast javelins towards the enemy's country, by way of declaration of war.

BELLICOSUS, in *Etymology*, a species of CAMEL, (*oblongus*), that inhabits Africa. It is of a brown colour; posterior thighs arched, and dentated; and four spires on the abdomen. Fabricius. Gmelin.

BELLICULI, or BELLIFORM *Murini*, among *Naturalists*, denote a species of sea-shells of an umbilical figure, sometimes of a white colour, spotted with yellow; and sometimes of a yellow, streaked with black lines, after the snail fashion.

BELLIDIASTRUM, in *Botany*. See DORONICUM.

BELLIDIODES. See CHRYSANTHEMUM.

BELLEVEUE, POMPONE DA, in *Biography*, chancellor of France, was born at Lyons in 1529, studied at Toulouse and Padua, and in 1575 became superintendent of the finances, and in 1579 president of the parliament of Paris. Having been employed in several important embassies by Charles IX. and Henry III. and IV. he was created chancellor by the latter in 1599, as a recompence for his services at the peace of Vervin. In the execution of his office he was enlightened, inflexible, inclined to austerly, and, by the warmth of his temper, to occasional precipitance. He was distinguished by his learning and eloquence, as well as by his talents for business. In 1604, he lost the seals, but continued in the posts of chancellor and president of the council; however, he used to say, regretting his loss, "that a chancellor without the seals was a body without soul." He died in 1607; and several eulogies were bestowed on his memory, in honour of the regard which he always testified to learning and its professors. The grandson of the former was distinguished, in the reigns of Louis XIV. and XV. by

his legal and diplomatic talents; and was founder of the general hospital at Paris. Nouv. Dict. Hist.

BELLIMO, in *Modern History*, a mode of trial, or a kind of purgation, practised by the Negroes in the interior countries of Africa, when persons are accused of murder or theft, and consisting of a composition of certain herbs or barks of trees, which they oblige the accused to hold in his hand, under a full persuasion, that, if he be guilty, blisters will immediately rise upon the skin. Sometimes the bellimo consists in obliging the accused to swallow a large glass of a liquor compsed from the bark of the neno and quoni trees, which the negroes believe to be virulently poisonous. The innocent immediately reject it by vomit; but the guilty siew a froth about the mouth, and are accordingly judged worthy of death.

BELLING *of Hops*, denotes their opening and expanding to their customary shape, supposed to bear some relation to that of a bell. Hops blow towards the end of July, and bell the latter end of August or the beginning of September.

BELLINGHAM, in *Geography*, a small town of Northumberland, England. It has a market on Tuesday, one fair annually, and is 300 miles north of London. In 1780, this town was nearly consumed by fire, and its houses now only amount to 70, and inhabitants to 337. About four miles to the south is the village of Wark, where are the keep and some ruins of an ancient castle.

BELLINGHAM, a small farming township of America, in Norfolk county, Massachusetts, containing 735 inhabitants, 20 miles N. from Providence, and 34 S. from Boston.

BELLINI, LAURENCE, in *Biography*, a learned and ingenious physician, was born at Florence in 1647. He had the advantage of being educated under Manchetti, Redi, and Borelli, and profited so well by their instructions, that he was made professor in mathematics and philosophy at Pisa, when he was only twenty years of age. He was also no mean proficient in oratory, poetry, and music, but proposing to practise medicine, he was soon advanced to the chair of professor in anatomy, a post he continued to fill with reputation for near thirty years. He was one of the principal supporters of the medico-mathematic school, who attempted to explain the functions of the body, the causes of diseases, and the operations of medicines on mechanical principles. In this he was followed by Archibald Pitcairne, who read his works at the schools in Edinburgh during the life-time of Bellini, and dedicated one of his own works to him. When he was fifty years of age, he was called to Florence, by Cosmo III. who appointed him his physician, and about the same time, on the recommendation of Lancisi, he was made honorary, or consulting physician to pope Clement XI. but having more imagination than judgment, and endeavouring to square his practice to his theory, he was generally unsuccessful in his treatment of diseases, and thus soon forfeited the favour, Haller says, both of his prince and the public. In his anatomical researches he was more successful, as he was the first who accurately described the nervous papillæ of the tongue, and discovered them to be the organ of taste, of which he gave an account in his "Gustus Organum novissimè Deprehensum;" Bonon. 1665, 1660.; and he had before, viz. in 1662, published "De Structura Renum," Florent. 4to. which had been well received, as containing additional information on the anatomy of that organ. These works have been frequently reprinted, though now, from the great improvements that have been made in anatomy, but little noticed. In 1683, he published "De Urinis et Pulsibus;" De Missione Sanguinis;" "De Morbis Capitis et Pectoris;" being in all, distinct treatises on those subjects, 4to. Bonon. This is a work of much research and observation, though often obscure and too theoretical.

It was much celebrated in its time; and Boerhaave, who published an edition of it in 1717, accompanied it with a commendatory preface. For the titles of the remainder of Bellini's productions, see Haller's *Bib. Med. et Anatom.* He died in 1704. *Gen. Biog.*

BELLINI, GENTILE, a painter of history and portrait, was born at Venice in 1421, and instructed by his father Giacomo, who was himself an artist in the art of painting, both in distemper and in oil. He was employed by the doge to paint the hall of the great council, and he executed several considerable works for others of the nobility. His reputation reaching to the Ottoman court, he was invited by Mahomet II. to Constantinople, where he was honorably entertained, and employed in painting the portrait of the emperor, and in various other performances. It is said, however, that the emperor ordered the head of a slave to be cut off in the presence of Bellini, in order to convince him of the incorrectness of a picture which he had painted, of the decollation of St. John the Baptist; but the sight affected his mind to such a degree, that he was never easy till he obtained leave to return to his own country. Mahomet, before his departure, put a gold chain about his neck, and dismissed him with letters of recommendation to the senate of Venice, which procured for him a pension for life, and an admission into the order of St. Mark. Vasari mentions a sea-fight, painted by this master, which had extraordinary merit. He died in 1501. Pilkington.

BELLINI, GIOVANNI, the brother of the former, was born at Venice in 1422, and surpassed both his father and brother in every branch of painting. He is accounted the founder of the Venetian school, by introducing the practice of painting in oil, which had been communicated to his father by Domenico and Andrea del Castagno, as some say; or which, according to De Piles, he obtained from Antonia of Messina: and by teaching his scholars to paint after nature, the school of Giovanni produced two memorable disciples, Titian, and Giorgione, who brought the art of colouring to its highest perfection; and Giovanni himself, by observing the works of these famous artists, improved his own manner very considerably; so that in his latter pictures the colouring is much better, and the airs of his head are noble, although his design is somewhat gothic, and his attitudes not well chosen. He died in 1512. Pilkington.

BELLINO, *Str. in Geography*, a town of Italy, in the Polesino di Rovigno, 10 miles W. S. W. of Rovigno.

BELLINZONE, or BELLENZ, one of the Italian bailliages of Switzerland, on the east side of the river Tesino, north of the lake Maggiore, or lake of Locarno, and on the confines of the Milanese, which, together with the two bailliages of Riviera or Poleso, and Val di Blenzo, Bregno or Brenna, comprehend 110 square geographical miles, and 33,000 inhabitants, and before the French revolution belonged to the cantons of Uri, Schweiz, and Underwalden. In the 15th century, this country belonged to the counts of Sax, who sold it in 1422 to the original cantons; but Philip Maria, duke of Milan, opposing this sale or exchange, exerted himself to prevent from falling into their hands a town like Bellinzone, so important from its situation and natural strength, to check their inroads and cover his dominions. Having therefore taken possession of it by force of arms, a body of 8000 Swifs passed the Alps. The force of both nations met; the Italians were led on by Carnagnola; a bloody battle ensued, of which both sides claimed the victory: but the Swifs retired with a standard taken from the enemy, and they remained masters of the town. In 1500, however, the three cantons obtained what they long contended for; the inhabitants of Bellinzone, vexed by the frequent changes in

the Milanese, submitted to them. The French, when they had conquered the duchy, in vain reclaimed it; the Swifs retained possession; and the seven Italian bailliages, and this amongst the rest, were formerly ceded to them by Maximilian Sforza, in gratitude for their having reinstated him in the ducal seat. It was likewise made an article of the perpetual peace concluded between Francis I. king of France, and the cantons. The bailiff remains in office two years; he is nominated alternately by the three cantons, and is generally removed from Riviera the poorest, to Bellinzone, the most lucrative of the three governments. An appeal lies from his decision to the syndicate, and from that court to the three cantons: in ecclesiastical affairs, the inhabitants are cognizable to the bishop of Como, excepting three parishes. The inhabitants are catholics; and most of the natives understand Italian, but the language is a corrupt German. After the French revolution, Bellinzone, according to the division of 1798, became a distinct department or canton, including the bailliages of Bellinzone, Riviera, and Val Leventina, of which the chief town was Bellinzone. By the constitution of 1801, the Italian bailliages formed the 17th department or canton of Switzerland, and was empowered to send five representatives to the diet. The riches of this district consist in its pastures and cattle; the deficiency of corn is supplied by the Milanese; and the plain near Bellinzone produces good wine.

BELLINZONE, or BELLINZ, *Lat. Bilitio, Bilitiana, Bellinona, or Berinzona*, the capital of the above bailliage or department, is a beautiful town, situate at the foot of mount Cenero, on a delightful plain on the east side of the Tesino, a little below its junction with the Moesa or Mufa, and about $5\frac{1}{2}$ British miles above the northern extremity of the lake Maggiore. The town is encircled with ancient walls and battlements in good repair; on the right are seen the majestic ruins of an ancient castle, and on the left, separately embosomed in trees, are the castles of the bailiffs of the three regent cantons, Uri, Schweiz, and Underwalden. The interior of Bellinzone is far from corresponding with its external beauty and situation; the streets being narrow, and the houses ill-built. It is, however, rich in fine churches, dedicated to St. Peter, St. Stephen, St. Blaise, and St. Rock; and it has numerous convents of Augustines, Ursulines, and Recollects. There is also a convent, or seminary, called the "Residence," lately founded for the education of youth. The valley that lies between this town and the lake is level, and laid waste by numerous torrents: the road runs along the sides of the hills through continued vineyards bounded on the west, and also on the east, by ridges which are clothed to their summits with woods of chestnuts and walnut trees, half concealing frequent spires and numerous hamlets. N. lat. 46° 4' E. long. 8° 43'.

BELLIS, formed from *bellus*, pretty or handsome, *Eng. daisy*, *Fr. paquerette*, in *Botany*. *Lin. gen. n.* 962. *Reich.* 1042. *Schreb.* 1300. *Tournef.* 280. *Juss.* 183. *Gærtn. t.* 168. *Clafs* and order, *syngenesia polygamia superflua*. *Nat. Ord. Compositæ Discoidæa. Corymbifera.* *Juss. Gen. Char. Cal.* common, hemispheric, upright; leaflets ten to twenty in a double row, lanceolate, equal. *Cor.* compound radiate; corollules hermaphrodite, tubular, numerous in the disk; female ligulate, more in number than the leaves of the calyx in the ray:—proper of the hermaphrodite funnel-form, five-cleft: of the female ligulate, lanceolate, scarcely three-toothed. *Stam.* of the hermaphrodite filaments five, capillary, very short; anthers cylindrical, tubular. *Pist.* germ ovate; of the hermaphrodite, style simple, stigma emarginate, of the female, style filiform; stigmas two, patulous. *Per.* none. *Calyx* unchanged. *Seeds* solitary, obovate, compressed; down none. *Ree.* naked, conical.

Fl. Char. Cal. lobes oblong, with equal scales. Sepals 6, with no dew. Rec. naked, conical.

Species. 1. *B. prolifera*, perennial or common daisy. Lin. Syst. 1248. Franch. Angl. 370. Wither. Arr. 733. Hüll. 184. Rell. 220. Sibth. 263. Abbot. 184. Curt. Lond. fasc. 1. 2. Pl. Dan. t. 503. Mor. Hist. f. 6. t. 8. f. 29. Penn. Brit. t. 19. f. 2. Ger. 510. L. Park. Theat. 530. 11. Rell. Hist. 249. 2. Sibth. 172. *B. sylvestris* minor. R. Syn. 187. Ger. com. 676. Luchf. Hist. 147. P. minor. Mart. Valer. v. 2. 213. *Pranula veris*. Frag. Hist. 161. 3. *B. hortensis*, double or garden daisy. Mill. Dict. r. 3. Curtis Magaz. t. 225. Rell. Hist. 350. n. 4. 4. *B. multifida*, quilled daisy. 5. *B. prolifera*, proliferous or hen and chicken daisy. "Scape naked." The common daisy is readily distinguished by its creeping, ramose, and long fibrous roots; by its radical, depressed, obovate, crenate, and pointed leaves; by its erect, simple, single-severed, round, and naked scape; by its beautiful flower, with a conic, golden disk, and white, or more frequently reddish ray; by its linear-obovate, plane, emarginate, very numerous, potent fibrous rays; by its compressed, hairy seeds; and by its concave, acute, punctated, concave receptacle. Smith. Flor. Brit. v. 2. 298. A native of most parts of Europe in meadows and pastures; it grows almost all the year, and shutting up close every night and in wet weather. The taste of the leaves is somewhat acrid, but in some countries used as a pot-herb. The roots have a penetrating pungency. It is injurious to cattle, and even to geese. It occupies a large share of pasture land, to the exclusion of grass and profitable herbs. It has been much recommended for fresh wounds externally, and against inflammatory disorders internally; but it is now totally out of use. The varieties of the garden daisy are double-white, red, white, and red striped, variegated, scarlet and pied; double quilled, or with singular flowers; double cock's-comb shaped, white red and speckled; proliferous, chiding or hen chicken daisy. 2. *B. annua*, annual daisy. Lin. Spec. 1249. Syst. 570. "Stem four what leafy." A low annual plant, seldom rising more than three inches high, with an upright stem having leaves on the lower part, and its upper part naked, the latter a single row like that of the common double smaller. A native of Sicily, Spain, about Montpellier, Verona, and Nice. Cultivated in 1759 by Miller.

Propagation and Culture. The garden daisies flower in April and May, and make a pretty variety when intermixed with plants of the same growth; they should be planted in a shady border and a heavy soil without dung, on which they may be preserved without varying, provided the roots are preserved, and parted every autumn. They should be kept in flower beds. They were formerly planted for edging to borders; but for this purpose they are unfit, because when fully exposed to the sun, they frequently die in large patches. Mr. Curtis, however, thinks they appear to most advantage when used to border, as they serve to soften them and to add brilliancy to the gaiety of the garden. He recommends the roots to be taken up in the last week of September, or the first of October, to be divided into single plants, and to be preserved in a dry place in a trench, spreading out the fibres, and preventing the earth from drying them, as they will continue to grow, and be drawn out of the ground by worms. Such daisies should be replanted every autumn; otherwise they will spread too wide. Martyn's Miller's Dict. According to Mr. Curtis, the plants that remain undisturbed in the flower beds, will recur to their natural state, and become broad; but Mr. Miller says that he never observed them to do so.

BELLIS. See ANTHEMIS, ASTER, ATHANASIA, BELLIDONIA, CALTAPULA, CHRYSANTHEMUM, COLUMBA, LOKONICUM, ECLIPSA, OSMITIS, and GYRONARIA.

BELLIS major. See CHRYSANTHEMUM.

BELLIS annua. See GLOUGERIA.

BELLIS, in *Natural History*, a species of HYDRA, resembling the calyx of a flower, warted; tuberculate, and variegated. This is a *B. bellis* of Schlander and Ellis; and is found on the coast of Cornwall.

BELLIS, a species of VERTICILLATA, of a simple hemispherical form, with a contractile margin. Mill. Hist. Vertic. Found in stagnant ditch water; sometimes resembles the flower of a daisy, but small, yellowish; peduncle long, pedicel, very thin, fixed at the end; moves with a rotatory motion.

BELLISLU, in *Geography*. See BELLE ISLE.

BELLIUM, in *Botany*. Lin. gen. Reich. n. 1043. Schreb. 1571. Juss. 182. Class and order, *Synonyma perigania superflua* Nat. Ord. *Compositae Dissoideae. Compositae*. Juss. Gen. Char. Cal. common simple, with very many, equal, boat-shaped leaflets. Cor. compound radiated; in the ray female ten or twelve; in the disk hermaphrodite very many;—proper of the hermaphrodite female-shaped, quadrifid, erect; of the females elliptic, emarginate, ligulate. Stam. in the hermaphrodite filaments four, short; another cylindrical. Pist. in the hermaphrodite germ turbinate; style filiform; stigma bifid, oblong; in the females germ turbinate; style very short; stigma bifid, minute. Perianth. Calyx rather gland. Seeds turbinate; crown chaffy, eight-leaved, rounded; down with eight simple awns. Rec. naked conic. Cls. Different from *Bellis* and *Pectis*, on account of the down and five-lobed corollules.

Fl. Char. Cal. with equal leaflets. Seeds conic, with a chaffy eight-leaved crown, and awned down. Rec. pt. naked.

Species, 1. *B. bellidondy*. Lin. Syst. 770. *B. droserifolia*. Gouan. illust. 69. 2. *B. annua minima*. Triumf. Obs. t. 82. *B. maritima* min. &c. Boec. Mus. 149. t. 167. "Scares naked, filiform." This has the habit of a daisy, but differs essentially from it in having a down to the seed. A native of Italy, about Rome, and in the island of Majorca. 2. *B. minutum*. Linn. Syst. 770. *Pectis minuta*. Linn. Spec. 1250. Schreb. Act. Ups. Nov. 1. 84. t. 5. f. 2. *Bellis cretica* for the common *minima*. Tournef. cor. 37. Vaill. Act. 547. "Stem leafy." One of the minutest of plants; stem capillary, an inch long; the whole plant smooth and ascending; examined with a glass it appears to have hairs scattered over it. A native of the Levant. Introduced in 1722 by M. Richard.

BELLIO, in *Geography*, a town of Italy, in the kingdom of Naples, and province of Basilicata; 2 miles S. W. of Muro.

BELLOI, PIER LAURENCE BRETTE DE, in *Biography*, a French dramatic writer, was born at St. Flour, in Auvergne, in 1727, and educated for the bar at Paris. But quitting the profession for which he was designed, he left his country, and went to Russia in the capacity of actor. After having exercised his literary talents in the composition of various favorite pieces, he returned to Paris in 1758, and brought on the stage, first his "Tito," and next his "Zelmira." But his tragedy of the "Sage of Calais," exhibited in 1755, was the most popular, and contributed in the greatest degree to establish his reputation. For this performance the king presented him with a gold medal and a considerable pecuniary reward; and the magistrates of the town sent him the freedom of the town in a gold box, and placed his portrait in the hall among their principal benefactors. Voltaire also wrote a complimentary

letter to the author, though after Belloi's death he retracted his praises. This piece was succeeded by his "Bayard," "Peter the Cruel," and "Gabrielle de Vergey." But the failure of the second of these hastened his death in 1755, to the regret of numerous friends, who were attached to him by the goodness of his heart. As a dramatic writer his distinguishing excellence consisted in his knowledge of stage effect, and of the method of producing it by new and uncommon situations; but in pursuing these he quitted the true and natural pathetic, and aided in degrading the modern theatre. His versification is often negligent, and his style hard and inflated. M. Gaillard of the French academy, published a collection of his works in 6 vols. 8vo. 1779, with a life of the author prefixed. *Nouv. Dict. Hist.*

BELLON, or **BELLAND**, in *Medicine*, a distemper very common in Derbyshire and other counties, where they smelt lead ore, to which beasts, and even poultry, as well as men, are subject; and for this reason a certain space round the smelting-houses is called bellon-ground, where it is dangerous for any animal to feed. This disorder is attended with languors, weakness, and intolerable pains, sensation of gripings in the belly, and generally costiveness. It frequently proves fatal.

The method of cure which has been found most successful in this distemper, is, to give *cremor*, or crystals of tartar, in small doses, and to repeat them frequently, as two or three times a day.

BELLONA, in *Mythology*, the goddess of war, sister or wife to Mars.

Hyginus (fab. 274.) says, that Bellona was the inventress of the needle, called in Greek *βελονη*, and hence her name has been fancifully derived. Others with greater probability, deduce it a *bello*, war; and Bryant (*Anal. Anc. Mythol.* vol. i. p. 45.) supposes it to be formed from Bel-on, a compound of Bel, Bal, or Baal, the original Babylonish title appropriated to the sun. This goddess was of a savage disposition, and delighted in slaughter and blood; and she was not only represented as the attendant of Mars, who prepared his chariot and horses for war, but as taking pleasure in sharing his dangers. She is commonly represented in an attitude expressive of fury and distraction, her hair being composed of snakes clotted with gore, and her garments stained with blood. She is generally exhibited driving the chariot of Mars, with a bloody whip in her hand, and sometimes as holding a lighted torch or brand, and at other times a trumpet. Bellona had a temple at Rome, near the Porta Carmentalis, in which the senate gave audience to ambassadors; and before it stood the pillar or column of war, against which a lance was thrown whenever war was declared. She was also worshipped at two places called Comana, one of which was in Cappadocia, and the other in the kingdom of Pontus; and Camden observes, that in the time of Severus, there was a temple of Bellona in the city of York. Poets and artists have often confounded Bellona with Pallas.

BELLONA, in *Entomology*. Under this name Cramer describes *papilio brassolis* of Fabricius. The species *bellona* of Fabricius and Gmelin is a native of North America, has denotated fulvous wings, spotted with black; posterior ones, beneath silvery at the tip, with six ocellar fulvous spots. A variety of it β is figured by Cramer under the trivial name of *hegestia*.

BELLONARII, in *Antiquity*, priests of Bellona, the goddess of war and battles.

The Bellonarii cut and mangled their bodies with knives and daggers in a cruel manner, to pacify the deity. In this they are singular, that they offered their own blood, not

that of other creatures, in sacrifice. In the fury and enthusiasm with which they were seized on these occasions, they ran about raging, uttering prophecies, and foretelling blood and slaughter, devastations of cities, revolutions of state, and the like: whence Martial calls them "turba entheata Bellonæ." *Lactant.* *Inst.* lib. i. cap. i. *Lucian.* lib. i. *Tertul.* *Apol.* cap. 9. *Minut.* *Felix*, p. 298. In after-times they seem to have abated much of their zeal and transport, and to have turned the whole into a kind of farce, contenting themselves with making signs and appearances of cutting and wounds. *Lampridius* tells us, the emperor *Commodus*, out of a spirit of cruelty, turned the farce again into a tragedy, obliging them actually to cut and mangle their bodies. *Lamp.* in *Commod.* cap. 9.

The Bellonarii celebrated feasts on the eve of the nones of June, and the ninth of the calends of April, on which occasion they chewed a plant called Bellonaria, which produced a kind of fury, and disposed them to mangle their bodies in the manner which characterised these feasts.

BELLONIA, so called by Plumier, after the name of M. Bellon, a physician of Caen, in *Botany*. *Lin.* gen. 226. *Reich.* 242. *Schreb.* 298. *Plum.* 31. *Juss.* 200. Class and order, *pentandria monogynia*. *Nat. Ord.* *Rubiacea*. *Juss.* *Gen. Char.* *Cal.* perianth, one-leaved, superior, semiquinquesid, permanent; divisions lanceolate, acute. *Cor.* monopetalous, wheel-shaped; tube very short; border flat, semiquinquesid, obtuse, large. *Stam.* filaments five, subulate, erect, very short; anthers erect, converging, short. *Pist.* germ inferior; style subulate, straight, longer than the stamens; stigma acute. *Per.* capsule turbinate-ovate, wrapped up in the calyx, and beaked with its converging divisions, one-celled. *Seeds* numerous, roundish, small.

Ess. Char. *Cor.* wheel-shaped. *Caps.* one celled, inferior, many-seeded, beaked with the calyx.

Species, 1. *B. aspera*. *Lin.* *Spec.* 244. *Plum.* gen. 19. *ic.* 47. *Swartz.* *Prodrom.* 42. 2. *Obf.* 69. "Leaves ovate-ferrate, flowered corymbed terminating." A shrub ten or twelve feet high, from which issue many lateral branches. This species is said to rest wholly upon the authority of Plumier. Mr. Miller says, that it is very common in several of the warm islands of America, whence he has received the seeds. 2. *B. spinosa*. *Swartz.* *Prodr.* 42. "Thorny; leaves ovate, angular, tooth-ferrate, peduncles axillary, one-flowered."

Propagation and Culture. It is propagated by seeds which should be sown early in the spring, in a pot filled with light fresh earth, and plunged into a hot-bed of tanner's bark, and frequently watered. When the plants are come up half an inch high, they should be transplanted into pots filled with light fresh earth, and plunged again into the hot-bed, watered and shaded till they have taken root; then air should be admitted to them every day in warm weather, and they should be frequently watered. When the plants have filled these pots with their roots, they should be carefully shaken out of them, and their roots trimmed, and put into larger pots filled with light fresh earth, and put into the hot-bed again. In warm weather fresh air should be admitted to them every day; but in autumn they must be plunged into the bark-stove, and treated like other tender exotic plants. These plants will sometimes flower in the second year, but they rarely produce good seeds in this climate. Nevertheless, they may be propagated by cuttings in the summer months, provided they are planted in light earth on a moderate hot-bed, and carefully watered and shaded till they have taken root. They must be constantly kept in the stove, and have a large share of free

air in warm weather; but if they are set abroad, they will not thrive in this climate. *Martyn's Miller's Dict.*

BELLORI, JOHN PETER, in *Biography*, a celebrated antiquary, was a native of Rome, and derived from his uncle Francis Angeloni, under whose care he was placed, his taste for antiquities. He was appointed by Christina, queen of Sweden, the keeper of her library and cabinet of curiosities; and by pope Clement X. antiquary of Rome. He died in 1676, above 80 years of age. His valuable cabinet was afterwards annexed to that of the king of Prussia at Berlin. Of his various works, relating to his favourite pursuit, the principal are the following: viz. "Notæ in Numismatibus Episcopatus aliarum urbium apud Italiam," 1658, 2to.; "Fragmenta Vestigii veteris Romæ," 1672, fol.; "La Colonna Trajana," fol.; "Le Pitture Antiche del Sepolcro de' Nasoni," 1680, fol.; "Le Antiche lucerne sepolcrali figurate," 1691, fol.; "Gli antichi sepolcri del Mausoleo Romano & Etrusco," 1699, fol.; "Veteres Arcus Augustorum," 1690, fol.; "Vite de Pittori, Scultori, et Architelli Moderni," 1692, 4to.; "Imagines veterum Philosophorum," 1685, fol. Several treatises of this author are inserted in the 7th volume of Gronovius's Greek Antiquities. He also reprinted, in 1685, with large additions, Angeloni's "Historia Augusta," illustrated by Medals. *Moreri. Gen. Biog.*

BELLOSTE, AUGUSTIN, a surgeon of eminence in his time, inventor of a mercurial composition, called after his name, "Belloste's pill," by which he is supposed to have acquired a considerable fortune. After practising several years at Paris, where he was born in 1654, and as an army surgeon, he was invited to Sardinia, and made principal surgeon to the queen's mother, and continued to reside at Turin to the time of his death, which happened July 15th, 1730. The work by which he is principally known, is his "Chirurgien de l'Hospital," published 1695. It has passed through numerous editions, and been translated into all the European languages. In 1725, he published a continuation of it, under the title of "La suite du Chirurgien de l'Hospital." Among other useful observations, he recommends piercing carious bones, with the view of accelerating exhalation, a practice advised by Celsus, though long discontinued. He reproves the custom of frequently removing the dressings of wounds, as tending to retard the cure. The work has much merit, though now little noticed, being superseded by later publications. *Haller Bib. Med. Pract. et Chir.*

BELLOTTI, PIERRO, a painter of history and portrait, was born at Venice in 1625, and learned the art of colouring from Michael Forabosco, whose disciple he was. As a portrait painter, he attained the first rank, but was less eminent in the composition of his historical subjects. In the imitation of nature he was peculiarly happy; the colouring of his portraits appears to be real flesh, and the variety in the cast of his head is inconceivable; in all his attitude there is much grace, and the disposition of his figures is natural and becoming. He died in 1700. *Pilkington.*

BELLOVACI, in *Ancient Geography*, a people of Gaul, considered in the nation of the Belgæ, and seated south of the Ambiani. Their country was particularly distinguished by the name of Belgium, and corresponded to the modern Brabant; their chief city was called by the Latins Caesaroborgus; and Cæsar speaks with commendation of their valour and their number.

BELLOWING, among *Sportsmen*, is used for the noise which does make in rutting-time.

BELLOWS, a machine used to give a brisk agitation to the air, by enlarging and contracting its capacity, and thus expiring and inspiring the air by turns.

This machine is used in chambers and kitchens, in forges, furnaces, and founderies, for blowing up the fire; and it is annexed to organs and other pneumatic instruments, in order to supply them with a due degree of air. They are constructed of various forms, and furnished with different kinds of apparatus for giving them motion, and for discharging their air, according to the purposes which they are intended to serve. However, they are in general composed of two flat boards, sometimes of an oval and sometimes of a triangular figure; between these boards are placed two or more hoops, bent so as to suit their figure; on the edges of the boards is nailed a piece of leather, broad in the middle and narrow at the ends, which unite them together, and it is also affixed to the hoops of the boards, that the leather may the more easily open and fold again; to the undermost board is fastened a pipe of iron, brass, or copper; and within is a valve, which covers the holes in the under board so as to keep in the air. Strabo informs us (*Geog. l. viii. vol. i. p. 464.*), from an old historian, that Anacharsis, the Scythian philosopher, who lived in the time of Solon, about 600 years before Christ, invented the bellows, as well as the anchor and potter's wheel; but this account is very doubtful, as Pliny, Seneca, Diogenes Laertius, and Suidas, who likewise speak of the inventions ascribed to that philosopher, mention only the two last, and not the bellows. It appears, however, that they were known in ancient times to the Greeks; and Virgil mentions them in the following passage (*Georg. iv. 170.*):

“— Alii taurinis follibus auras
Accipiunt, redduntque.”—

Upon which it may be remarked, that bull's leather is unfit for bellows, and ox and cow's leather only can be used for that purpose; but accuracy, in the description of a mechanical engine, is not to be expected in a poet. In more modern times, wooden bellows have been introduced in metallurgical operations, instead of those of leather. The latter require careful management: the repairs of them are expensive; and they seldom last more than six or seven years. When thin leather is employed, it suffers a great deal of air to escape through it; and this evil must be guarded against by continually besmearing it with train oil, or other fat substances; and this is even necessary when thick leather is used, to prevent it from cracking in the folds. Whenever they are repaired, it is necessary again to soften the leather with oil, and this occasions a considerable loss of time. To obviate these, and similar inconveniences, and with a view to some peculiar advantages, wooden bellows have been invented in modern times, of which we shall give some account in the sequel of this article. In the oldest smelting-houses, the bellows were moved by a handle, like those of the smith's forge, or by the pressure of the foot upon a treadle, or by other means, requiring the strength of man. But since the force of water has been employed to move them, the quantity of ore run down has not only been far greater, but the separation of the metal more complete; inasmuch, that great part of the iron now prepared at some considerable works, particularly in the county of Gloucester, has been no other than what had been left in the slag of cinders, for want of sufficient force of air.

The action and effect of bellows of every kind, whether leathern or wooden, wrought by water or man, depend on this, that the air which enters them, and which they contain when raised, is again compressed into a narrower space when they are closed. And as the air, like all other fluids, flows to that place where it meets the least resistance, it must of consequence fly out of the pipe or aperture with a velocity propor-

proportional to the force by which it is compressed, and must therefore blow stronger or weaker, as the velocity with which the top and bottom of the bellows meet is greater or lesser. The blast also will last in proportion to the quantity of air that was drawn into the bellows through the valve or wind-clap.

The action of bellows bears a near affinity to that of the lungs; and what we call blowing in the latter, affords a pertinent illustration of what is called respiring in the former. Accordingly, bellows have been employed in restoring suspended animation; and Dr. Hooke found, by renewing the interrupted action of the lungs by blowing air into them, by cutting away the ribs and diaphragm, and pericardium, &c. and laying the thorax of a dog bare, and having cut off the *aspera arteria* below the epiglottis, and bound it on the nose of a bellows, that as he blowed the dog recovered, and as he ceased, became convulsive: and thus the animal remained alternately alive and dead above the space of an hour. See the methods of recovering suspended animation, under the article DROWNING.

The bellows of smiths and founders, whether single or double, are wrought by means of a rocker, with a string or chain fastened to it, and pulled by the workman. The bellows-pipe is fitted into that of the tewel. One of the boards is fixed, so as not to play at all. By drawing down the handle of the rocker, the moveable board rises, and by means of a weight on the top of the upper board, sinks again.

The bellows of the Chinese smiths is of a very simple kind, and is composed of a square pipe of wood ABCDE (*Plate XIII. Pneumatics, fig. 107.*) with a square board G, which exactly fits it, moved by the handle FG. At the farther end is the blast pipe HK, and on each side of it a valve in the end of the square pipe, opening inwards. The piston is sufficiently tight for their purposes without any leathering.

The bellows of forges and furnaces of mines usually receive their motion from the wheels of a water-mill, or in our large furnaces they are worked by a steam-engine. Others, as the bellows of enamellers, are wrought by means of one or more steps or treadles under the workman's feet.

The bellows of an organ are six feet long, and four broad; each having an aperture of four inches, that the valve may play easy. There should likewise be a valve at the nose of the bellows, that one may not take the air from the other. To blow an organ of sixteen feet, there are required four pair of these bellows.

The bellows of organs are wrought by a man called the blower; and, in small organs, by the foot of the player. See ORGAN.

The method of constructing wooden bellows for the purposes of metallurgy, was an important and useful invention, for which we are indebted to the Germans. This is expressly affirmed by Grignon in his "*Memoires sur l'art de fabriquer le fer,*" Paris, 1775; and in the time of Becher, they were to be found in Germany, but not in England. Geoffrains, in his "*Traité de la fonte des mines par le feu du charbon de terre,*" Paris, 1770, erroneously ascribes the invention to the Swils; being probably led into this error in consequence of a Swils having first made known these bellows in France. The name of the real inventor, however, has not been ascertained. From a catalogue of machines given to the magistrates of Nuremberg in 1550, by an artist, called Hans Lobfingler, Doppelmayr concludes, that he understood the art of making small and large bellows without leather, and entirely of wood, which could be used in smelting-houses and for organs, and likewise copper-bellows, that always emitted a like degree of wind. As

Lobfingler made organs, Beckman (*Hist. Inventions, vol. i. p. 109.*) suggests, that this invention might occur to him; but he has not been able to learn in what it actually consisted, or whether it might not die with him. Agricola, who died in 1555, makes no mention of wooden bellows. Samuel Reyher, formerly professor at Kiel, in the improved edition of his dissertation on air, printed there in 1669, reprinted with additions at Hamburg in 1725, and entitled "*De Pneumatica, sive de Aere et Aerometria,*" informs us, that "about 80 years ago a new kind of bellows, which ought to be called the pneumatic chests, was invented in the village of Schmalebuche, in the principality of Cobourg, in Franconia," by two brothers, Martin and Nicholas Schlhoru, who were millers in that village. These brothers kept the invention secret, but not so concealed as to elude conjecture. Reyher relates, how he himself formed an idea of it. Schluter, who has given a complete description and figure of these bellows in his "*Unterricht von Hütten-Werken,*" Brunswick, 1738, fol. ascribes the invention of them to a bishop of Bamberg; and according to his account they were employed so early as the year 1620, in the forest of Hartz, to which they were first brought by some persons from Bamberg. "What Calvor says (according to Beckman, *ubi supra*) respecting the introduction of these bellows into the forest of Hartz, is much more probable; that in 1621 Lewis Pfannenuschmid, from Thuringia, settled at Orsfeld near Goslar, and begun to make wooden bellows. The bellows-makers of that place conspired therefore against him, and swore they would put him to death; but he was protected by the government. He would disclose his art to no one but his son, who, as well as his grandson, a few years ago had the making of all the bellows in the forest." From Germany, the art of making these bellows was introduced into some parts of France, and into Sweden, and became general though various parts of Europe. This kind of bellows consists of two boxes placed upon one another; the uppermost of which may be moved up and down upon the lower one, in the same manner as the lid of a snuff-box, which has a hinge, moves up and down, when it is opened or shut: but the sides of the uppermost box are so broad as to contain the lower one between them, when it is raised to its utmost extent. Both boxes are bound together, at the smallest end, where the pipe is, by a strong iron bolt. It may be readily comprehended, that when both boxes fit each other exactly, and the upper one is raised over the under one which is at rest, the space contained by both will be enlarged; and consequently more air will rush in through the valve in the bottom of the lower one; and when the upper box is again forced down, this air will be expelled through the pipe. The only difficulty is to prevent the air, which forces its way in, from escaping any where else than through the pipe; for it is not to be expected, that the boxes will fit each other so closely as entirely to prevent the air from making its way between them. This difficulty, however, is obviated by the following simple and ingenious method. On the inner sides of the uppermost box there are placed moveable slips of wood, which, by means of metal springs, are pressed to the sides of the other box, and fill up the space between them. As these long slips of wood might not be sufficiently pliable to suffer themselves to be pressed close enough; and as, though planed perfectly straight at first, they would, in time, become warped in various directions, incisions are made in them across their whole length, at the distance of from 15 to 18 inches from each other, so as to leave only a small space in their thickness, by which means they acquire sufficient pliability to be every where pressed close enough to the sides. This description may be illus-

B E L L O W S.

illustrated by a figure, (see *Plate XIII. Pneumatics. fig. 108.*) in which the outer box ABCPFE has its top and two sides flat or straight, and the end BAEe formed into an arched or cylindrical surface, of which the line FP at the other end is the axis. This box is open below, and receives within it the shallow box KIIIGNML (*fig. 109.*) which exactly fills it. The line FP of the one coincides with FP of the other, and along this line is a set of hinges on which the upper box turns, as it rises and sinks. The lower box is fastened to a frame fixed in the ground. A pipe OQ proceeds from the end of it, and terminates at the furnace, in a small pipe called the "tewer," or "tuyere." This lower box is open above, and has in its bottom two large valves V, V, opening inwards. (See *fig. 110.*) The conducting pipe is sometimes furnished with a valve opening outwards, to prevent burning coals from being sucked into the bellows, when the upper box is drawn up. The joint along PF is made tight by thin leather nailed along it. The sides and ends of the fixed box are made to fit the sides and curved end of the upper box, so that this last can be raised and lowered round the joint FP without sensible friction, and yet without suffering much air to escape; but as this would not be sufficiently air-tight by reason of the swelling and warping of the wood, a further contrivance is adopted. A slender lath of wood, divided into several joints, and covered on the outer edge with very soft leather, is laid along the upper edges of the sides and ends of the lower box. This lath is so broad, that when its inner edge is even with the inside of the box, its outer edge projects about an inch. It is kept in this position by a number of steel wires, which are driven into the bottom of the box, and stand up, touching the sides, as represented in *fig. 111*, where *abc* are the wires, and *e* the lath, projecting over the outside of the box. By this contrivance, the laths are pressed close to the sides and curved end of the moveable box, and the spring wires yield to all their inequalities. A bar of wood RS (*fig. 108.*) is fixed to the upper board, by which it is either raised by machinery, to sink again by its own weight, having an additional load on it, or it is forced downward by a crank or wiper of the machinery, and afterwards raised. The operation, in this case, is exactly similar to that of blowing with the chamber bellows. When the board is lifted up, the air enters by the valves V, V, (*fig. 110.*) and is expelled at the pipe OQ, by depressing the boards. These bellows are made of a very great size, AD (*fig. 108.*) being 16 feet, AB 5 feet, and the circular end also 5 feet. The rise, however, is but about 3 or 3½ feet. They expel at each stroke about 90 cubic feet of air, and make about 8 strokes per minute. The advantages of these wooden bellows are very considerable. When they are made of clean fir wood without knots, they will last 30 or 40 years, and even longer, though continually kept in action 45 or 43 weeks every year. Some have said, that, when properly made, they will last a century. The effect produced by them is stronger, as well as more uniform, and can be moderated according to circumstances. They are worked also with greater facility. The slips of wood on their sides are apt to be damaged; but they can soon and easily be repaired. Every three or four months, however, the outer sides only of the inner box, and the bolt which keeps the boxes together, must be smeared with oil. If we calculate the price of such bellows, and the yearly expence, they will, according to Grignon's account (*ubi supra*) be only a fifth part of those of the old leather bellows. They have, indeed, their defects, though they are less expensive and more durable than those of leather, for it is scarcely possible to make the joints so tight as to allow no exit to the compressed air, and the friction must necessarily be very great. Some, therefore, have had recourse to water, for performing

the office of the lower board of the bellows. A bellows on this principle is described by Mr. Treiwald, engineer to his Swedish majesty, in the Philosophical Transactions, under the name of a "water bellows." Of bellows of wood we have one preserved in the repository of the Royal Society; and Dr. Plot describes another, that was used at the copper-works at Ellaston in Staffordshire. *Nat. Hist. Staff. ch. iv. § 18.* Such are the bellows in general use on the continent. In this kingdom, a different, and a preferable form is adopted; for an account of which and other contrivances for animating the large fires of furnaces, &c. see BLOWING MACHINE. See also FURNACE.

BELLOWS. *Apodopnic*, so called by the inventor M. Gorcey, physician to the military hospital at Neufbrissack, and denoting "reformer of respiration," an instrument used for inflating the lungs. It is described in the "Journal de Médecine" for June 1789; and consists of a double pair of bellows BCLM (*Plate XIII. Pneumatics. fig. 112.*) the two different parts of which have no communication with each other. In the lower side BM is an aperture A for a valve, constructed on the principles of those of Mr. Nairne's air-pump. It consists of a rim of copper, closed at one end by a plate of the same metal, in which plate are seven small holes placed at equal distances. This plate is covered with a piece of silk coated with elastic gum, in which are six transverse incisions of two or three lines in length. Each incision is so made as to be situated between two of the holes, and at an equal distance from each, as represented at D, (*fig. 113.*) The silk must be made very secure, by a thread passing several times round the rim. It is obvious, that a stream of air applied to that side of the plate which is opposite the silk, will pass through the holes, and, lifting up the silk, escape through the incisions. On the contrary, a stream of air applied to the other side will press the silk upon the plate, and thus close the holes, so that it will be impossible for it to pass through them. This valve opens internally, so as to admit the air from without. At B is another valve, upon the same construction, but opening in a contrary direction, thus permitting the air to escape out of the lower part into the tube EF, but preventing its entrance. At C is another valve, opening internally to admit the air from the tube EF; and at D there is a fourth, opening externally to discharge the air from the upper part. The flexible tube EF, screwed on at the end CB, being introduced into one of the nostrils, whilst the mouth and the other nostril are closed by an assistant, if we separate the two handles L, M, which were close together at the introduction of the tube, it is evident, that the air in the lungs will rush into the upper part through the valve C, whilst the external air will fill the lower part through the valve A. The two handles being again brought into contact, the atmospheric air will be forced into the lungs through the valve B, and at the same time the air in the upper part will be discharged at the valve D. Thus, by the alternate play of the double bellows, the lungs will be alternately filled and emptied as in respiration. In using the instrument, care should be taken not to be too violent; as the more perfectly the natural motion of respiration is imitated, the better. To prevent any substances from without injuring the valves A, D, (*fig. 112.*) the rim is made with a screw B, (*fig. 114.*) in order to receive a cap A, A, (*fig. 114.*) full of small holes. This screw has also another use. If de-phlogisticated air be preferred, a bladder filled with it (*fig. 115.*) may, by means of the screw A, be fastened to the valve A, (*fig. 112.*); and to prevent waste, as this air may serve several times, a flexible tube may be screwed in the valve D, (*fig. 112.*) communicating with the bladder by means of the opening *d*, (*fig. 115.*) Thus it may be employed as

often as the operator thinks proper. There is a handle K to the partition in the middle, in order that, if it be at any time necessary to use either of the divisions alone, the other may be confined from acting. *c. b.* (*fig.* 116.) represent the two valves to be applied at the end of the instrument CB. (*fig.* 112); and (*fig.* 117.) is a section of the end CB, shewing the valves in their proper places. It is proper to add, that the capacity of the instrument should be proportioned to the quantity of air received into the lungs by inspiration, which Dr. Goodwin has ascertained to be twelve cubical inches, or somewhat more. Each division of the instrument, therefore, should be capable of containing that quantity. (See Analytical Review, vol. iv. p. 437.) Roul-land presented, and described at a meeting of the Lyceum of Arts at Paris, in 1797, the model of a pair of bellows, constructed on this plan, intended to restore life to persons drowned and in a swoon, by drawing out the vitiated air seated in their lungs, and replacing it with ordinary air, or even with oxygen, or vital air, if necessary: at the same time producing the motion of the lungs, independently of the concurrence of the patient, to the very instant when his strength shall return. The experiment was submitted to public inspection; a bladder being made up to represent the lungs.

BELLOWS, *Bone*, *φυστήρες σφυαί*, occur in Herodotus for those applied by the Scythians to the genitals of mares, in order to distend the uterus, and by this compression, make them yield a greater quantity of milk.

BELLOWS, *Hessian*, a contrivance for driving air into a mine for the respiration of the miners. This was improved by M. Papin, who changed its cylindrical into a spiral form; and with this, by working it only with his foot, he could produce a wind to raise a weight of two pounds.

BELLOWS *Hydrostatic*. See HYDROSTATIC.

BELLOWS, or *Trumpet-fish* in *Ichthyology*, a name given by Ray, Willughby, &c. to the species of CENTRISCUS SCOLOPAX. Gmelin.

BELLOWS *Rocks*, in *Geography*, rocks that lie in the Atlantic, near the west coast of Ireland, and county of Galway. N. lat. 53° 10'. W. long. 10° 4'.

BELLS, *Canterbury*, and *Coventry*, in *Botany*. See CAMPANULA.

BELLS, *Hair*. See HYACINTHUS.

BELLS *Mill*, in *Geography*, a settlement in North Carolina, near the Moravian settlements, at the source of Deep river, the north-westermost branch of the north-west branch of Cape Fear, and about 50 miles west of Hillsborough.

BELLS, in *Heraldry*, are represented as round, when fixed to the legs of a hawk; in which case the hawk is said to be *belled*.

BELLUÆ, in *Zoology*, a name of the sixth order of animals in the Linnæan system, including the genera of the *equus*, or *horse*, the *hippopotamus*, the *tapir*, and *jus*. These have obtuse-truncated fore teeth, and hoofs of feet.

BELLUCCI, ANTONIO, in *Biography*, a painter of portrait and history, was born at Venice in 1654, and manifesting an early inclination to painting, became the disciple of Domenico Definico, from whose instructions he acquired a good manner of handling and colouring, an elegant taste of historical composition, and an expertness in painting portraits with grace and resemblance. Having established, by a variety of performances, his reputation for invention, elegance and spirit, he was invited by the emperor Joseph to his court, and appointed his principal painter. But after remaining some years at Vienna, he entered into the service of the prince palatine, in which he long lived, much respected for his personal accomplishments as well as for his excellence in his profession. Pilkington.

BELLUDGE, in *Geography*, a tribe of Arabs, inhabiting that part of Persia which lies on the coast of the entrance into the Persian gulf, between Minau and cape Jalke. They are masters of several vessels, and carry on a considerable trade with Bassora, and even venture as far as the coasts of India. These Arabs are Sunnites; and unity of religious sentiments has occasioned their joining the party of the Afghans in the late revolutions of Persia. Some geographers represent these Belludges as inhabiting all along the Persian coast to the mouth of the Indus, and have described them as a warlike people addicted to piracy. Niebuhr is not able to ascertain whether they are to be considered as independent, or as tributary to Persia. He thinks it probable, however, that they acknowledge no sovereign authority but that of their own schieks.

BELLUGA, in *Ichthyology*. See BELUGA.

BELLULA Bos, a name given by Paulus Jovius to that species of RAJA called by the old Greek and Latin writers *bos marinus*; the same kind which Linnæus, and other later naturalists, name specifically OXYRINCHUS.

BELLUNESE, in *Geography*, a small mountainous territory of Italy, but rich in iron mines, forms a part of the marquisate of Treviso, and belongs to the republic of Venice. It is bounded on the north by the Cadorn and part of Friuli, on the east by a large forest, which separates it from Friuli, on the south by the Trevisan and Feltrin, and on the west by the bishopric of Trent.

BELLUNO, the capital of the Bellunese, and see of a bishop, suffragan of the archbishop of Udina, seated on the Piava, between the town Cadore and Treviso; 43 miles N. of Venice, and 48 E. of Trent. N. lat. 46° 10'. E. long. 12° 15'.

BELLY, in a general sense, denotes the whole abdomen, or that region of the body contained between the *septum transversum*, the *hypochondria*, and *pubes*.

BELLY is also used, in a more confined sense, for the intestines alone, as containing the *faces*. In this sense we speak of the looseness or tightness of the belly, &c.

BELLY is also sometimes used for a pregnant woman. In this sense we are to understand the phrase among *Civil Lawyers*, to put the belly in possession of an estate.

BELLY is also used in speaking of the bodies of animals; is synonymous with abdomen, and may be separately considered. It is variously characterized, according to their food and habits. In those which feed on vegetables, it is in general capacious, and hanging low; in the carnivorous, light, and drawn up at the flanks. In a horse, a barrel-shaped or cylindrical belly is most admired; if hanging low, he is said to be cow-bellied; if two much contracted, he is said to be tucked up at the flanks. Grass, too much water, broken wind, and in mares the gravid uterus, occasion the belly to relax and become pendulous; dry food, as oats, beans, and hay, &c. and also acute pain, contract the volume of the belly. The slow moving ruminant animals, as oxen, &c. have the belly the most capacious and pendulous of all quadrupeds. This increased volume of the intestines and stomach appears to be designed for the purpose of enlarging the surface for digestion and chylicification, and extracting more completely all the nutritious particles, so that a lesser quantity of food will suffice: this circumstance is particularly remarkable in the sheep, which can fatten on the shortest grass, and almost barren glebe.

In the abdomen of the horse, and other gramivorous quadrupeds, whilst its vast surface exposes it more to be acted upon by changes of weather, as cold, rain, wind, &c. than in the carnivorous animals, so it has appeared to us to be also provided with a thinner and less fatty membrane, or mesentery, to cover the intestines from their influence. Hence appears

appears to be a cause for the frequent indigestions in these animals, often speedily terminating in death, to which their capacity also greatly contributes by receiving too large a quantity of food at once. See the article *GRASSES of Horses*.

The abdomen of the horse and ox, and other quadrupeds of this description, from its vast size, hangs below the patella or knee, which occasions the thigh of the horse to be mostly overlooked or taken for some other part; the patella or knee being the real termination of the thigh in these animals.

In the horse, the volume of the abdomen is formed by the vast magnitude and length of the intestines, and a four-stomach not very large; in the cow, on the contrary, the feeding bulk of the abdomen is occasioned by four large stomachs, and the intestinal canal is proportionably small and short. The sheep with four stomachs possesses also a vast length of intestine.

BELLY *of a Muscle*, in *Anatomy*, denotes the body thereof, as contrarily distinguished from the two extremities, or tendons. From the condition of this, muscles are divided into monogastric, or single-bellied; and digastric, or double-bellied. *Phil. Trans. N. 58.*

Lower will have all the muscles to be digastric, or double-bellied; in which he is seconded by Hoffman and others.

BELLY-*ash-tree*, a name given in America to a species of the Jatropha.

BELLY, *Draconis, venter draconis*, is used by some *Astronomers* to denote the point in a planet's orbit, wherein it has its greatest latitude, or is farthest distant from the ecliptic; more frequently called its limit.

BELMONT, in *Geography*, a town of France, in the department of the Loire, a chief place of a canton, in the district of Roanne, 14 miles north-east of Roanne. The place contains 1716, and the canton 7244 inhabitants; the territory includes 115 kilometres and 86 communes.—Also, a town of France, in the department of the Aveyron, and chief place of a canton, in the district of St. Afrique, nine leagues east of Alby. The place contains 1561, and the canton 2522 inhabitants; the territory includes 220 kilometres and nine communes.

BELMONTÉ, a town of Italy, in the kingdom of Naples, and province of Calabria Citra, having a castle on an eminence near the sea, 11 miles W.S.W. of Cosenza. N. lat. 39° 23'. E. long. 16° 52'.—Also, a small town of Portugal, in the province of Beira, and jurisdiction of Correiço de Castello Branco, containing about 1140 inhabitants, two churches, and a district of two parishes.

BELO, or BELON, in *Ancient Geography*. See BÆLOS.

BELOAR, a name given by some to a stone, otherwise called WIDURIS.

BELOMANCY, BELLOMANTIA, a kind of divination by means of arrows, practised in the East, but chiefly among the Arabians, among whom it continued till Malometanism prevailed, which absolutely forbade it. The word is of Greek origin; computed of *βέλος, arrow*, and *μαντιν, divination*. Belomancy has been performed in different ways; one was, to mark a parcel of arrows, and put eleven, or more of them, into a bag; these were afterward drawn out; and according as they were marked, or not, they judged of futurity. These arrows resembled those with which they cast lots, being without heads or feathers, and were kept in the temple of some god, in whose presence they were consulted. Seven such arrows were kept in the temple of Mecca. Another way was to have three arrows, upon one of which was written, "My lord hath nominated me;" on another, "My lord hath rejected me;" and upon the third, nothing at all. These were put into a quiver,

out of which they drew one of the three at random; if it happened to be that with the first inscription, the thing they consulted about was to be done; if it chanced to be that with the second inscription, it was let alone; and if it proved to be that without inscription, they drew over again. These divining arrows were generally consulted before any thing of moment was undertaken; as when a man was about to marry, or to go a journey, or the like.

Belomancy is an ancient practice, and probably that which Ezekiel mentions, chap. xxi. ver. 21. At least St. Jerom understands it so, and observes, that the practice was frequent among the Assyrians and Babylonians. Something like it also is mentioned in Hosea, chap. iv. only that it was a little distinguished instead of arrows, which is rather the Belomancy than Belomancy. Grotius, as well as Jerom, contends for the two together, and shews that they prevailed much among the Hæb, Chaldeans, and Sythians, whence they passed to the Scythians, and thence to the Germans; who, as Tacitus observes, made use of Belomancy.

BELON, PETER, in *Biography*, born in the province of Meurane in the year 1518, was an industrious and ingenious naturalist, esteemed for his learning and talents by Henry II. and Charles IX. of France, and patronised by the cardinal de Tournon, at whose expence he travelled over Italy and Greece, a great part of Germany, France, England, Palestine, and Egypt, collecting and examining every where the plants, animals, and minerals proper to the places through which he journeyed. On his return, he published, in succession, the results of his observations and inquiries. The principal of his works are, "Les Observations de plusieurs singularités, et choses memorables trouvées en Grece, en Asie, Judée, Egypte, Arabie, &c." Paris, 1553. 4to.: an excellent work, Haller says, and the first of the kind that had been published from actual observation; no one before him having travelled so extensively for the purpose of improving natural history. It has been frequently reprinted, and a Latin version of it given by Clusius, in 1589. "De arboribus confertis, resiniferis, aliisque nonnullis temperatâ fronde vitentibus, &c." Paris, 1558. The descriptions are in general just; the engravings indifferent. He had seen the true cedar of Lebanon. He also gave a treatise "On the Method of embalming practised by the ancients;" "On the Defects in Agriculture;" "On the Management of Gardens," and recommends the introduction of many foreign trees into them, pointing out those most congenial to the climate of France; "On Birds;" and "On Fishes;" with their figures. More he had done; but he was stabbed by a robber in 1563, being only about 45 years of age. Haller. Bb. Botan.

BELONE, in *Ichthyology*, a species of Esox, having both jaw long and subulate. Linn. This is *acus piscis* of Salmo; *acus vulgare*, Ray; and *sea-pike*, or *gar-fish*, of the Po fish. It is sometimes called also the *sea-mole*.

The sea-pike inhabits all great seas, and was known both to the Greek and Romans. It keeps in deep water part of the year, and ventures out only in moderate shoals in the beginning of the summer, just before the mackerel makes their appearance. The sea-pike is a fish usually from 3 feet and a half to three feet; but its relation of Rorid may be depend'd upon, they are found of the length of eight feet in the eastern part of the world. A fish of this species has been taken in the Mediterranean, on the coast of Judea, upon the river Jordan. In some countries they prey to the bottom of the sea very considerable; in England they are not much esteemed, so much the fish is rarely inferior to that of the mackerel. The line of the back, when the sun is low, is of a bright green colour, from

which many people conclude, though very unjustly, that it cannot be a wholesome food.

All the upper part of the back and head of this fish is of a beautiful green colour; sides and belly silvery. The number of rays in the dorsal fin are about sixteen; pectoral thirteen; ventral eight; anal twenty-two; and in the tail twenty-two; but these are liable to vary in number, as in other fishes.

BELOW, or **BELAN**, in *Geography*, a river of England, which runs into the Eden, 2 miles north of Kirby-Stephen, in the county of Westmoreland.

BELOZÉRO. See **BIÉLO-OZÉRO**.

BELPBERG, a mountain of Switzerland, about 7 or 8 miles from Bern, being part of the chain of the Alps; the strata of which are full of different species of chamites, ostracites, globolites, splenites, strombites, and other similar petrifications.

BELPECH, a town of France, in the department of the Aude, and chief place of a canton, in the district of Castelnaudary, $3\frac{2}{3}$ miles south-west of Castelnaudary. The place contains 2081, and the canton 5318 inhabitants; the territory includes 140 kilometres and 12 communes. N. lat. $43^{\circ} 12'$. E. long. $1^{\circ} 39'$.

BELPRE, a post town and small settlement of America, in the territory north-west of the Ohio, on the north-west bank of Ohio river, between the Hockhocking and Muskingum rivers, and opposite the mouth of the little Kanaway; about 14 miles below Marietta, and 480 miles S.W. by W from Philadelphia.

BELSHAZZAR, in *Scripture History*. See **BABYLONIA**.

BELSINUM, in *Ancient Geography*, a town of Hispania Tarragonensis, in the country of the Celtiberians. Ptolemy.

BELSUNCE, **HENRY-FRANCIS-XAVIER DE**, in *Bio-graphy*, denominated, by way of honourable distinction, "the good bishop of Marseilles," was the son of the marquis of Belfunce, a nobleman of Guienne. After quitting the society of the Jesuits, into which he first entered, he was in 1709 nominated to the bishopric of Marseilles; where he distinguished himself by his fortitude and charity, during the dreadful plague which afflicted that city in 1720 and 1721. Such was the effect produced by his attention and liberality on occasion of this calamity, such the attachment cemented between him and his diocessans, by their gratitude and his own sympathy, that he declined accepting the bishopric of Laon, to which are annexed a peerage and a dukedom, which was offered to him by the king in 1723. He died in 1755. *Nouv. Dict. Hist.*

BELT, **BALTHÉUS**, and among the ancient and middle age writers, *zona*, *cingulum*, *remniculum*, *rinca*, or *ringa*, and *baldrilius*, in *Armour*, a kind of military girdle, in which a sword or some other weapon is commonly hung.

That the belt, or girdle, formed a material part of the Hebrew armour, may be gathered from the expressions frequently repeated in the sacred scriptures. *The Almighty girding himself*, imported not only his giving notable displays of power, but his readiness to act; and his girding others expressed the ability he had bestowed upon them to perform magnificent exploits.

The belts of the Hebrew soldiers, with which they girded on their arms, went not about their shoulders but their loins, and were supposed to strengthen them. (See *Neh. iv. 18. Ezek. xxiii. 15.*) They were generally valuable, especially those of commanders, and were sometimes given as rewards to soldiers. Jonathan presented his to David (*1 Sam. xviii. 4.*); and Joab tells the person, who had seen Absalom hanging from the tree, that if he had smitten him to the ground, he would have given him ten shekels of silver and a *girdle*.

The Greeks called it ζώνη, or ζώνη, and they thought it so essential to a warrior, that ζωνοβαί became a general term for clothing themselves in armour. Whence Agamemnon is described by Homer

“*Ἀργεῖος δὲ θόρον, ἰδὲ ζωνοβαί ἀνδρῶν;*”

and which no doubt occasioned Pausanias to suppose that ζώνη had a reference to the whole armour. So Herodotus, relating the flight of Xerxes to Athens, describes him, when arrived at Abdera, and believing himself free from danger, *λευσὲν τὴν ζώνην, τὸ ἔχειν διαρμηθῆναι*. (Urania. cxx.)

Among the Greeks, the belt was worn very differently fr. in the manner already described, and reached even to the thigh, whence Homer's hero, (*Odyss. λ.*)

—“*Φοσγῆαι οὐ ἐξοπαμῆος παρὰ μηρῶν;*”

and Virgil's *Æneas* (*l. x. l. 86.*)

—“*ocycus ensem*

Eripit a femore.”

Foot soldiers, we are told, wore their swords on the left; horsemen, on the right side. Josephus, describing the downfall of Jerusalem (*l. iii.*), expressly mentions horsemen with their swords on the right. But whether this was constantly the case, or frequently varied, as Lipsius has observed of the Roman sword, cannot easily be determined.

Herodotus, mentioning the military habits of the Persians, says, they had daggers suspended to the right thigh by a belt.

Beger has given a bust of Scipio, copied by Montfaucon (*vol. iv. pl. vi. f. 4.*), which has an embroidered belt hanging from the right; while a soldier on the arch of Constantine is represented in scale armour, with a belt suspended from the left shoulder. Montfaucon, *vol. iv. pl. xx. f. 2.*

In our own country, like those of ancient times, it was frequently ornamented in the richest style; and it is worthy of observation, that in some of the most magnificent illuminations of our ancient manuscripts, even in the same picture, the sword is represented as indiscriminately belted on the right side or the left. In later ages, the belt was given to a person when he was raised to knighthood; whence it has also been used as a badge of the knightly order.

BELT is also a denomination applied to a sort of bandages in use among surgeons, &c. Thus we meet with quicksilver belts, used for the itch. A later writer describes a belt for keeping the belly tight, and discharging the water in the operation of tapping. *Medic. Ed. Edinb. tom. i. p. 218.*

BELT, or **BELTIS**, in *Ecclesiastical Writers of the Middle Age*, denotes a sort of string of beads.

BELT is also a frequent disease in sheep, cured by cutting their tails off, and laying the fore bare; then casting mould on it, and applying tar and goose-grease.

BEL-TEIN, in *Mythology*, a superstitious custom, formerly observed in Scotland and Ireland; and according to Dr. Ledwich, on the authority of Wormius, in Scandinavia. Dr. O'Brien, in his Irish Dictionary, explains it *ignis Belii Dei Asiatici*; and mentions, that on the first of May the Druids were used to light large fires on the summits of hills, into which they drove four-footed beasts, using at the same time certain ceremonies, to expiate the sins of the people. This pagan ceremony of lighting these fires in honour of Belus, or the sun, gave its name to the month of May, which is called *Beal-tine*, and *May-day la Bealtine*. On this day all the inhabitants of Ireland quenched their fires, and kindled them again out of some part of the sacred fire. That celebrated Irish antiquarian, general Vallancey, infers from the name of this custom, that it was derived from the Persian-Scythians, or Phœnicians, by whom the sun was worshipped under the same name of Belus, or Bel, and on the tops of hills also, as appears from the *high places* mentioned in scripture.

scripture. In Gaul also there are traces of the same supposed deity being worshipped under the name Belinus. The Irish still preserve the custom; and to this day in many places fires are lighted on the first of May in the milking yards, which the men, women, and children pass through or leap over, and the cattle are driven through the flames of the burning straw. In the western isles of Scotland, Mr. Martin found a like ceremony called by the same name; and Mr. Pennant thus particularly describes it. "It is a kind of rural sacrifice, performed by the herdsmen of every village on the first of May. They cut a square trench on the ground, leaving a turf in the middle; on that they make a fire of wood, on which they dress a large caudle of eggs, butter, oatmeal, and milk; and bring, besides the ingredients of the caudle, plenty of beer and whiskey; for each of the company must contribute something. The rites begin with spilling some of the caudle on the ground by way of libation: on that every one takes a cake of oatmeal, upon which are raised nine square knobs, each dedicated to some particular being, the supposed preserver of their flocks and herds, or to some particular animal the real destroyer of them. Each person then turns his face to the fire, breaks off a knob, and flinging it over his shoulder, says, *This I give to thee, preserve thou my horses; this to thee, preserve thou my sheep; and so on.* After that, they use the same ceremony to the noxious animals. *This I give to thee, O fox! spare thou my lambs; this to thee, O hooded crow! this to thee, O eagle!* When the ceremony is over, they dine on the caudle; and after the feast is finished, what is left is hid by two persons deputed for the purpose; but on the next Sunday they reassemble, and finish the reliques of the first entertainment." That fire was adored in Ireland, is sufficiently proved from this celebrated festival, independently of other circumstances; but whether it can be urged in proof of the colonization of Ireland by the southern Scythians or Persians is not equally clear. Dr. Ledwich says, that fire was adored by the Celtes and Northern Scythians, and mentions from Wormius the manner of kindling it. On the other hand, the name bears a striking resemblance to that of the Asiatic deity; and the early naval expeditions of the Phœnicians render its having been communicated by themselves improbable. The writer of this article has not, however, yet met with any account of a similar practice amongst the nations in the south of Asia, or with any attempt to explain the name from those languages which are undoubtedly of Celtic origin. The circumstance, indeed, of all languages having had one common source, lessens the force of those arguments which are derived from a resemblance in words denoting the same thing; and yet great stress is laid on such resemblance in the arguments for the Persian colonization of Ireland. *Collectanea de rebus Hibernicis passim.* Pennant's *Tour in Scotland*, vol. iii. O'Brien's *Irish Dictionary*. Ledwich's *Antiquities of Ireland*. See BELINUS.

BELTS. *Fajcie*, in *Astronomy*, two zones or girdles surrounding Jupiter's body, more broad than the rest, and terminated by parallel lines; being sometimes broader, and sometime narrower, nor constantly taking up the same places in his disk. Dark spots have been frequently observed on Jupiter's belts. Cassini has also discovered a permanent one in the most northern part of the most southern belt; by this he has determined the length of Jupiter's day, that is, the time of his revolution on his axis, which is finished in nine hours and fifty-six minutes. *Phil. Trans.* N^o 10. and vol. lxxiii. part. 1. N^o 11. p. 73. Some astronomers take the belts to be seas, which alternately cover and leave bare large countries of the planet; and that the spots are gulfs in those seas, perhaps as big as our ocean, and sometimes

full, sometimes dry. M. Azout rather imagined the spots to be protuberances of the belts. *Hist. Acad. Sc.* 1708. 1692. *Phil. Trans.* No. 34. 1. 15. But other astronomers take the spots, which are transparent and moveable, for the shadows of Jupiter's satellites. The belts of Jupiter were first observed, and described by Huygens in his *Syst. Saturnin.* p. 7. See JUPITER.

Cassini also speaks of belts of Saturn; being three dark, straight, parallel bands, or *fajcie*, on the disk of that planet. Saturn's belts do not appear to be inherent on his globe, as those of Jupiter's are; but rather to be large dark rings at a distance from the planet, and surrounding his body. Some imagine them to be clouds in his atmosphere. The middlemost seems to be the shadow of Saturn's ring. *Hist. Acad. Sc.* 1715. See SATURN.

BELTS, in *Geography and Navigation*, denote certain straits near the Sound, through which ships pass from the Baltic to the German ocean. They belong to the king of Denmark, who exacts a toll, varying in its amount, and in some circumstances attending the collection of it, from all ships that pass through them as well as the Sound. (See SOUND.) They are divided into the *greater* and the *lesser*. The *greater belt* forms a communication between the Scaggerack or Cattegat sea and the Baltic, separating the islands of Zealand and Funen. The *lesser* or *little belt* forms a communication between the Cattegat and Baltic, and separates the isle of Funen from the continent. The passage from Affens to Arroë Sound, in the duchy of Sleswick, across the little belt, is 9 miles.

BELTURBET, a market and post town of Ireland, in the county of Cavan, situate on the river Erne, 81 Irish miles north-west of Dublin. It has a navigation through Lough Erne to Bellech, within three miles of Ballyshannon, where it is interrupted by considerable falls. The navigation from Lough Erne is open to the town, with water enough in winter, and by reducing a few flats might be made completely so in all seasons. No place indeed can be better situated for trade or for improvement; the beautiful expansion of water and picturesque views are highly engaging, and the land is a sound limestone. Yet the market is indifferently supplied, which may in great measure be attributed to the customs being taken in kind, without any lawful standard or measure, so that it is more advantageous for the buyers and sellers to go to other markets. These customs are individual property, and set for tool, per annum.

The town was regularly divided into compartments, termed *homesteads*; each of which contains 36 square yards, to which is annexed a proportionate quantity of bog. Every householder has also a right to graze on an extensive common belonging to the town, which was given by the Lancborough family, to which it formerly belonged, and which seems to have spared no expence for its improvement. Another grant of two hundred acres has become the property of the burgesses, who divided it, and have transmitted it down in their respective families. There are some neat houses, especially those lately erected on the part now belonging to lord Farnham; but in general they are mean and thatched. There are an excellent flour-mill, a brewery, distillery, and malt-houses in the town; and some yarn is brought to market, but no webs. Cultivation is improved in the neighbourhood; but is yet very defective. The manures used are ashes, marl, and dung; though there is good limestone, and much of the soil consists of deep clays which could be so well reclaimed with lime, yet this is never used, but sent by the lake to the county of Fermanagh. In the church-yard is the vestige of a great fortification, inclosing an extensive plot of ground, the bastions and salient angles of which are yet perfect; they were admirably planned and

of great strength. Belturbet was a borough town, and previous to the union, sent two members to parliament.

BELTZ, or BELZ, a palatinate of that part of Poland which was formerly called Little or Red Russia, and which included three districts, viz. Busk, Horodla, and Hrabowiec. Its capital, bearing the same name, is a large town, seated among marshes in the confines of Volhynia. N. lat. $50^{\circ} 15'$. E. long. $23^{\circ} 50'$.

BELTZ, a town of Croatia, 12 miles S. S. W. of Varadin.

BELVEDERE, or BELVIDERE, a town of European Turkey, and capital of a province of the same name, in the Morea, which province lies on the western coast, and is the richest and most fertile in the Morea. From this province the raisins called "Belvederes," derive their name. The town lies 20 miles south of Chiarenza. N. lat. $35^{\circ} 5'$. E. long. $22^{\circ} 0'$.

BELVEDERE, in *Architecture*. See BELVIDERE.

BELVEZ, in *Geography*, a town of France, and chief place of a canton, in the department of the Dordogne, and the district of Sarlat, $9\frac{1}{2}$ leagues S.S.E. of Perigueux. The place contains 2099, and the canton 7987 inhabitants, the territory includes $147\frac{1}{2}$ kilometres, and 15 communes. N. lat. $44^{\circ} 46'$. E. long. $0^{\circ} 54'$.

BELUGA, in *Zoology*, the name of DELPHINUS LEUCAS in Pennant's *Quadrupeds*.

BELUGA stone, in *Natural History*, the name of a calculus or stone found in the beluga fish. This stone is found in fish of both sexes, but most frequently in the male; and in those of all ages and sizes. It occurs, however, but seldom; whence it is inferred, that these stones are no natural part of the fish, but mere morbid concretions, like the bezoar stones in the animals which produce them, or like the stone in human bladders. It is of various shapes and sizes; but its most usual figure is either globular or oval. It is of a yellowish-white colour, and of a smooth and naturally polished surface, and in size it is between a pigeon's egg and that of a goose. It is usually compact, ponderous, and solid, not friable, but requiring a strong blow to break it; however, it yields easily to the saw, which defaces its internal structure, that is naturally very elegant and regular. It consists of several concentric coats, adhering firmly to one another, and form \cup about a nucleus, which generally appears to be some heterogeneous substance. It differs from all other stones of the same kind in its radiated structure, as it is composed of a number of regular and even striz proceeding from the centre to the circumference, and representing, both in colour and form, the flakes of the "terra foliata tartari," or the striated spiculae of antimony. If the stone be scraped to powder and sprinkled upon a hot iron, it gives a faint urinous smell, and calcines into a light, insipid, greyish earth. The people about the Volga hold it in high estimation, and ascribe to it great virtues. They say, it promotes delivery; and they give it in cases of the stone, and disorders of the urinary parts, in doses of from 10 grains to a dram. Phil. Transf. vol. xlv. p. 2. n. 4.

BELVIDERE, or BELVEDERE, in *Architecture*. This word meaning *beautiful view* is used in Italy, to denote those edifices built for the purpose of enjoying a fine prospect; these are of two kinds, either detached buildings, or little cupolas (or, to use the expressive English term, *look-outs*;) raised on the tops of houses which terminate them ornamentally, and where one may enjoy the freshness of the evening and the beauties of nature.

Almost all the houses in Rome have belvederes of the last kind, the others generally belong to the palaces and pleasure grounds of the great. The most celebrated and remarkable of all is the Belvedere of the Vatican. This large edifice was originally built by Bramante, detached from the pontifical palace, to which it has since been united by two long

galleries. It commands the view of the rich champaign, which surrounds the town on this side; the chain of the Apennines forms the magnificent distance of the picture, while the foreground is occupied by the city itself, which is seen in its whole extent. It is from thence that one may say with Martial:

"Hinc septem dominos videre montes
Et totum licet estimare Romanum."

Belvederes are common in France; they are generally single saloons open to the air, or enclosed with doors and windows. They are, however, sometimes composed of various apartments, vestibules, saloons, cabinets, &c. such is the Belvedere in the menagerie of Seaux. When, however, these buildings are at a considerable distance from the mansion, and contain several apartments for the purpose of entertainment, they are called *Triarons*.

In England, though the name of Belvedere is not used, it may be properly applied to many of our garden buildings. The old mansions were very commonly gloomy both in situation and in construction, but they generally possessed a *summer-house*, which was built in an elevated and agreeable part of the garden, where in the most genial months of the year the family might enjoy the air, the prospect, and the social pleasures, without the ceremony of the drawing-room. In our modern villas the beauties of situation are consulted, and every idea of gloom is banished by the long windows, the fresh doors, and the wide extended lawn; the substantial summer-house is, therefore, unnecessary; but of the temples, cottages, objects which adorn the modern grounds, while some are merely the ornaments of the landscape, others very exactly answer the description of the Belvedere.

BELVIDERE, or *Belvedere*, in *Botany*. See SCOPARIA.

BELVIDERE, in *Geography*, a new township of America, in Franklin county, and state of Vermont.—Also, a village in New Jersey, in the Sussex county, on the Delaware river, and at the mouth of Pequett river, 11 miles above Eatton, in Pennsylvania.

BELVIS, a small town of Spain, in Estremadura, with a castle, seated between two mountains.

BELULCUM, a surgical instrument of various figures, contrived for extracting darts, arrows, or the like from wounds. Hence also the denomination *belulcum*; *quasi το βελος; ειχαλν*.

BELUNUM, in *Ancient Geography*, a town of Italy, in Rhaetia, and the country of the Veneti, now *Belmo*.

BELUR, in *Geography*, the general name given to the Alpine region, which divides the southern parts of the ancient Scythia, or Great Bucharía, from Little Bucharía, lying in about N. lat. 37° , and E. long. 71° , between Kotlan to the north, and Kilan to the south, and Badakshan in Great Bucharía on the west, and Balsistan, or Little Thibet on the south-east. Strahlenberg has introduced a town of the same name into his map, but its existence is dubious. Rennell places it at the foot of the mountain, in N. lat. 37° , and E. long. 71° . He has also marked a lake near it, from whence flows the Amu, which, after its junction with several others, proceeds to Badakshan.

BELUR Tag, denoting, in the Mungl language, "the dark or cloudy mountains," part of that ridge of mountains which, in a nearly meridional course, terminates Great Bucharía on the east, and divides it from Little Bucharía. These mountains are covered with perpetual snow. They form a chain, supposed to be the ancient Imaus, which proceeds nearly north and south, and is continued by the mountains of Alakor Alak Oola, on the north of Little Bucharía, which join the Bogdo, and on the south is more intimately connected with the Hindoo Koh than with the northern ridges of Thibet. Those who live at the foot of these mountains gather a great quantity of gold and silver dust in the spring,

Spring, which is brought down by torrents when the snow melts.

BELUS, in *Entomology*, a species of **PAPILIO**, that inhabits Syria. The wings are greenish; inner margin of the posterior pair rather pale; beneath brown, with red lunar marks. Fabricius and Jablonsky.

BELUS, in *Ancient Geography*, a town of Spain, situate near the columns of Hercules. Steph. Byz. This was probably the same with Belo or Belon.

BELUS, now *Kardanab* a river of Persia, which flowed at the distance of two stadia south from Ptolemais. It had its source in mount Carmel, about 4 miles to the east of the Kithon, in the lake called by Pomy Cendevia. The sand of this river and its vicinity was peculiarly excellent, according to Strabo, for the manufacture of glass; and here, according to Pliny, the manufacture of glais was first discovered.

BELUS, in *Ancient History and Mythology*, is supposed by some to have been the Pul of scripture; and the founder of the Assyrian monarchy; and they add, that he left his kingdom to his son Nimus, or Tylath-Pileser, who caused him to be worshipped after his death, and erected to his honour the famous tower of Babel, or Belus, in the city of Babylon. Others conceive Babel to have been the Nimrod of Scripture, and more ancient than the Assyrian kingdom. (See **ASSYRIA** and **BABYLON**). The tower of Belus was afterwards used by the Chaldeans as an astronomical observatory; and it is said, that Belus himself promoted the study of astronomy, in order to encourage that faith in astrological predictions, which he knew how to apply to political purposes. Hence, as Belus was honoured with a place among the divinites, some have traced the origin of those fables that are found concerning him in the Grecian mythology, to this circumstance.

Belus, considered as the founder of the Assyrian and Babylonian empires, became the principal object of veneration and worship among the later Babylonians, Paomerians, and others, over whom the descendants of his family extended the dominion he had founded. Accordingly, a temple was erected to him in the city of Babylon, and also a tower; though it is not improbable, that the honour of this temple and tower was meant to be divided between him and the true God. This building (see **BABYLON**) consisted of eight towers raised above one another; and in the apartments was placed a magnificent bed, with a golden table near it, but without any image; nor was any person suffered to lie here in the night, except a particular woman, who, as the priests reported, was preferred by the god to all others. In this place, according to their account, he used to come and repeat himself; so that they must have regarded him as the Supreme god, who either could not be repelled, or not bear the presumption in them of attempting his residence. Beneath this there was another temple, in which was a gigantic image of Jupiter or Belus, made of solid gold, with a table and a throne of the same metal. This Jupiter, supposed to be the great Pul, or Belus, by some placed below the gods, and in some god seem to have supposed, that Belus, or Pul, divided the empire of the monarchs with him, and that as the former was the god of heaven, the other was at least a delegated god on earth, and was the visible power of the invisible appointment of the invisible monarch on thron. Some have supposed, that the Babylonians, by their worship of Belus, used to pay homage to the sun, which was undoubtedly very common, and a very general object of worship; and the appellation of Belus itself might be synonymous with that of Bel, which denoted god or lord. (See **BAAL**). In the Babylonian temples there were a set of altars, one of stone, of a moderate size, and another much larger; on the one were sacrificed

none but sucking victims, and on the other none but those that were full grown. The former seemed to have been devoted to the Supreme god; and the other to his subordinate, Jupiter. They had also sacrifices that were offered to both. Upon the whole, it seems not improbable, that by Bel, Baal, or Belus, the Babylonians understood either the sun or their deified founder Pul; but whether they transferred him into the sun, or kept the worship of this luminary, and that of their hero distinct, so as never to confound them together, is a question not easily decided. For a description of the temple of Belus, see Herodotus lib. 1. c. 81. **BABYLON**.

BELUTTA, in *Botany*. See **CELOLARIUM** and **CRINUM**.

BELY BOGUE, in *Mythology*. See **BEL** and **POGUE**.

BELZ, in *Geography*, a town of France, in the department of Morbihan, and chief place of a canton, in the district of L'Orient. The place contains 1321 and the canton 5820 inhabitants; the territory includes 147½ kilometres and 5 communes.

BELZICA, a town of Poland, in the palatinate of Lublin, 14 miles S. W. of Lublin.

BELZIG, a town of Germany, in the circle of Upper Saxony, and electorate of Saxony, seated on the Weiler, 30 miles E. of Magdeburg. The prefecture of which this is the chief town bears the same name.

BEMA, *ἔμαξ*, in *Antiquity*, denotes a step or pace.

The bema made a kind of itinerary measure among the Greeks, whose length was equivalent to one cubit, and two thirds, or ten palms.

Whence also the term *βημαζέω*, to measure a road.

BEMA, in *Ecclesiastical Writers*, denotes the altar-part, or sanctuary, in the ancient churches. In which sense, bema made the third or innermost part of the church, answering to the chancel among us.

BEMA was also used for the bishop's chair, seat, or throne, placed in the sanctuary. It was called bema, from the steps by which it was to be ascended.

BEMA was also used for the reader's desk.

This in the Greek church was denominated *βημα γλωσσῶν*, in the Latin church **AMBO**.

BEMA is more peculiarly used for the *Manichees'* altar, which was in a different place from that of the catholics.

BEMA was also a denomination given by this sect to the anniversary of the day when *Manes* was killed, which with them was a solemn feast, and a day of rejoicing.

One of the chief ceremonies of the Mass consisted in setting out and adorning their bema, or altar, with great magnificence.

BEMBEEA, or **BESINI**, in *Geography*, a province of the kingdom of Angola in Africa, which is divided into Higher and Lower, extending on one side along the sea, and on the other dividing the kingdom of Angola from the other foreign states on the south. The country is populous and abounds with large and small cattle, with the fat of which the inhabitants anoint their heads and bodies; and they also clothe themselves with the hide, coated with dressed. They are addicted to the same idolatrous superstitions, with other parts of the kingdom, but speak a quite different language. The great river Luabo, or San Francisco, waters and fertilizes most part of the province; but swarms with crocodile, alligators and men from serpents, which not only destroy much of its fish, but do great mischief to the adjacent grounds.

BEMBER, a town of Hindostan, in the district of Ladak, in the province of Cashmere; at the distance of 33 Zabbari cades (each cad being 4757 yards) on a bearing of N. a little W. from Lahore. N. lat. 33° E. long. 73° 30'.

BIMBLEX, in *Entomology*, one of the Fabrician genera of **PHYLLA**, and formerly in the Linnæan system, a section in the **VESPA** genus; they are distinguished by having the tongue

tongue inflected, and five cleft; lip advanced, mouth involved. See VESPA.

BEMBO, PETER, *Cardinal*, in *Biography*, an eminent restorer of literature, was the son of Bernardo Bembo, a Venetian nobleman, and born at Venice in 1470. Having studied Latin and polite literature, in his early youth, under Urticio, he went to Messina in 1492, to pursue the study of the Greek language, under Constantine Lascaris. At Padua, whither he removed in 1495, he received instructions in philosophy from Nicholas Leonico Tomeo. Upon his father's settlement at Ferrara in 1498, he had an opportunity of forming an intimate friendship with Leonicens, Tebaldeo, Sadoletto, and Hercules Strozzi, and he soon afterwards began to distinguish himself as a writer. His "Azolani," which were discourses on love, written in the Italian language, and so named from the castle of Azoli, where they were composed, became very popular throughout Italy. At this time he was also one of the principal ornaments of the academy, founded by Aldus Manutius in his native city. In 1512 he visited Rome, and was well received by pope Julius II. and by his successor Leo X. he was appointed secretary, with an ample salary. Although, in conformity to the licentiousness of the papal court at this time, he kept a mistress, by whom he had three children, he discharged the duties of his office, to the pope's satisfaction, and was employed by him in various important embassies. In 1520, he removed to Padua, for the recovery of his health, where, upon the death of the pope, he fixed his residence, passing a tranquil life in the prosecution of his studies, and in the conversation of men of letters. To his house, which was richly furnished with books and MSS. a select collection of medals and antiquaries, and a botanical garden, men of science resorted as to a literary academy. In 1539, he was nominated to the dignity of cardinal by pope Paul III. which with some reluctance he accepted, and he then removed to Rome. He was previously ordained priest; and, it is said, that he altogether changed his mode of life, and sedulously devoted himself to the duties of his ecclesiastical functions. Although he was nominated to the bishopric of Gubbio in 1541, and in 1544 translated to that of Bergamo, he resided at Rome, and was much honoured by the pope, as well as respected by persons of the first character in the court. He died Jan. 18, 1547, and was buried in the Dominican church, called St. Maria Alla Minerva. As a writer of Italian verse, cardinal Bembo formed himself upon the model of Petrarch, and contributed to reform and polish the poetry of his own country. His prose compositions are written with elegance and purity of expression, but without any distinguishing traces of genius. In his Latin style, he was "Ciceronian," to the extreme of affectation; and on this account he was censured and ridiculed for applying the terms "heros" to Christ, and "dea" to the Virgin Mary; and for using "persuasio" for faith, and for denoting Leo's election by "deorum immortalium beneficiis." Like many others of the Italian literati of that age, he seems to have thought lightly of his religious creed; and to have been more afraid of transgressing with regard to his Latinity than with respect to the decorum which religion required. To this purpose, he dissuaded a friend from reading St. Paul's epistles, lest he should injure his style; and it is said that he would never read the briefs or breviary for fear of corrupting his own Latinity. Nevertheless his own epistles have been charged with gross faults, and even solecisms. Some compositions of his early days were licentious and obscene. His "History of Venice," written in classical Latin, in 12 books, was undertaken in 1530, by the order of the council of ten, and is more admired for elegance of diction than for profundity and accuracy. His principal works are, "Epistolæ, nomine Leonis pont. Max. lib. xvi." Venet. 1536;

"Epist. Familiarum," lib. vi. Venet. 1552; "Le Rime," comprehending his poetical verses, in one volume, Rom. and Venet. 1548; "Le Prose," held in high estimation by the Italians, in allusion to which Apostolo Zeno says, that "Bembo was the first who explained to his countrymen the mechanism and construction of their native language." "Historia Rerum Venetarum, lib. xii." Venet. 1551. All his works, both in Italian and Latin, were collected and published in 4 vols. fol. Venice, 1729. Gen. Dict. Gen. Biog.

BEMBRIDGE POINT, in *Geography*, lies at the eastern extremity of the isle of Wight, in N. lat. 50° 40' 15", and W. long. 1° 4' 45", and is well known to seamen as a ledge that runs more than two miles into the sea, E. N. E.

BEM-CURINI, in *Botany*. See JUSTICIA.

BEMELS, in *Geography*, a town of the Netherlands, in the duchy of Luxemburg, seated on the east side of the Moselle; 2 miles N. E. of Graven Macheren.

BEMICARY POINT and BAY, are situate between Dry and Milk river, about N. W. by W. from the pitch of Portland, the southern extremity of the island of Jamaica. The point or eastern limit of the bay is in N. lat. 17° 55'. and W. long. 77° 17'.

BEMILUCIUS, in *Mythology*, a surname of Jupiter, represented young and beardless.

BEMINSTER, or BEAMINSTER, in *Geography*, a town of considerable antiquity in the county of Dorset, England. It is seated on the small river Birt, which rises near the town, and running southward falls into the British channel at Bridport harbour. This manor, and two others connected with it, belong to two of the prebends of Salisbury cathedral. Though of remote origin, Beminster does not contain any particular object of antiquity, and its chapel, a handsome large pile of building, is dependant on the parish church of Netherbury, which is nearly two miles distant. The town is large and respectable, having many manufacturers settled in it, and most of its inhabitants employed in making sail-cloth, locks, copper goods, leather, &c.: and some of these trades are greatly facilitated by the water of the river Birt, and the machinery operated on by it. Beminster has suffered repeatedly and materially by fire, and the destructive sword of civil war. These two were united on the 14th of April 1644, when prince Maurice was quartered in the town, but forced to quit it on that day, as the enemy had fired it in five places. From the report of a person who visited it soon after, we are informed it was "the pityfullest spectacle that man can behold, hardly a house left not consumed by fire. There were sevenscore and four dwelling-houses, besides barns and stables burnt," and the loss sustained was estimated at above twenty-one thousand pounds. The inhabitants soon afterwards received from the parliament 2000l. with which, and other sums, they rebuilt the town; but in June 1664, it was again consumed, when the loss amounted to nearly 10,000l. In March 1781, another fire occurred here, and in a few hours upwards of fifty dwelling-houses, with several barns, stables, outbuildings, &c. were reduced to ruins. In spite of these calamitous events, Beminster is now a populous and flourishing town, consisting of 337 houses, and 2140 inhabitants. Its principal public buildings are the chapel, a free-school, an alms-house, and a market-house. The first stands on high ground at the southern side of the town, and consists of a body, two aisles, a chancel, a chantry, and a high tower. On the western front of the latter are some emblematical statues in niches. Within the chapel are some handsome monuments to the Strodes, and other families. The free-school was founded by Mrs. Frances Tucker, in 1684, for the education of twenty of the poorest boys of the town. The Rev. Samuel Hood, father of the lords Hood and Bridport, was master of this school in 1777.

The almshouse was built and amply endowed by Sir John Suck of Parham, bart.

In this town are one annual fair, a weekly market on Thursday, and two annual public sales for cattle, cheese, &c.

About one mile south of Benlister is Parham, an ancient town belonging to Sir William Oyster, bart. At Ben-Axoller, 1st of the neighbourhood, is a hill of the same name, whence issue three springs, which are the fountains of the rivers Ax, Dal, and Simons. Hutchins's History of Dorsetshire, vol. 1.

BENMILL, WILLIAM VAN, in *Biography*, a painter of the Netherlands, was born at Utrecht in 1630, and after having been a pupil of Herman Saftleven, visited Rome for the improvement of his taste and knowledge. His colouring is lively and natural, but sometimes including too much to green; his subjects, such as boats, barges, and other vessels, are to be seen on the rivers or stationed near the banks, and well disposed, and touched with spirit. The lights and shadows of his landscapes are directed with singular skill, and his colouring is clear, warm, and natural. He died in 1703. *Pittsburgh*.

BEMNASIR, in *Geography*, a town of Persia, in the province of Kerman; 140 miles S. E. of Shiraz.

BEMOL, FR. L-MOLLE, *M.* in GUIDO'S SCALE of *Mus.*, implies B flat, the 4th of the key of F natural, and the molle hexachord.

In early times of counterpoint, before transposed keys were used, i. e. keys different from the authentic and plagal modes, (the ECCLESIASTICAL MODES,) the 4th of a major key, descending, and 6th of a minor key, were understood to be flat, and the 7th, ascending, sharp, without being marked. And though two of the modes are in the key of D minor, and two in F major, all which require one flat at the clef, and two in E minor, and two in G major, each requiring a sharp at the clef, they were left to the divination of the finger, without characters of indication. See HEXACHORD and MODE.

The Abbe Feytaud, in speaking of these mysteries, must be allowed to have exercised science and ingenuity, yet, it is to be feared, that the young student will be more puzzled and perplexed than enlightened by his subtilties in this art.

BEM-POSTA, in *Geography*, a small town of Portugal, in the province of Trás-os-Montes, containing about 400 inhabitants.

BEN, BEES, or BEHEN, *Oil of*, is a fine inodorous and rapid dried oil, prepared from the Ben nut. (Glauc. Unguentaria, Balaos Mireptiki) the fruit of the GUILLANDIA *Morinda*.

The oil of Ben is prepared in the Levant, in Egypt, Syria, and also in Italy, by expression of the nut. Geoffroy gives the quantity of oil pressed to be 30^l ounces from about 8 pounds of the nut. The oil is valuable on account of its great purity, and freedom from smell and taste; hence it may be kept for a long time without altering, or becoming in any degree rancid and acrimonious. On this account it is not disposed to become drying, like so many of the other fixed oils. It is used very largely in perfumery as a basis or vehicle to which the art of the perfumer is able to give the fine fragrant scent of various delicate flowers, that do not of themselves retain a sufficient basis in which to fix their scent. Thus a great proportion of the only essences of the East are of the perfumed oil of Ben, and the scent in the oil which is probably a very minute quantity of essential oil may be more separated from the oil of Ben, by means of alcohol. The method of preparing this perfumed oil we have described under the article ALOE.

The medicinal utility of this oil would render it the most valuable.

uable substitute for cerates or liniments in pharmacy, were it sufficiently common. It is actually employed for this purpose in many parts of Italy.

BEN DUBH, in *Geography*, a mountain of Ireland, situate partly in King's county, and partly in the county of Tipperary; 16 miles west of Kilkenny.

BEN CREACHAN, a solitary mountain of Scotland, in Argyshire, the elevation of which is 3300 feet above the sea.

BEN LEEACH, a mountain of Ireland, in the county of Galway; 4 miles S. W. of Ross.

BEN L. SOWS, Ben Lely, Ben Lomond, Ben More, Ben Venck. See GRAMPIAN HILLS.

BEN NEVIS, or BENEVIS, a mountain of Scotland, in the Highlands, reckoned to be the highest mountain in Great Britain, being estimated at 4370 feet above the level of the sea, and yet not much above the quarter of the height of Mount Blanc. It is situated in the parish of Kilmalie, Inverness-shire. This extraordinary mountain has never been sufficiently investigated by any mineralogist: but Mr. Williams says, that it consists mostly of porphyry "of a reddish cast, in which the pale rose, the blackish, and yellowish white colours are finely blended, and shaded through the body of the stone." Many specimens of green porphyry are also intermixed, with angular specks of white quartz. A red granite also prevails, which contains a vein of lead ore impregnated with silver. On the north-east side this mountain presents a precipice nearly perpendicular, and of a prodigious height, being by some accounts 1500 feet. The view from the summit is grand, exhibiting most of the western islands, from the paps of Jura to the hills of Cullen in Skey; on the east it extends to Ben Lawres in Perthshire, and the river Neffs; and the extent of view is about 80 miles. The superior half of the mountain is almost destitute of vegetation. The summit is flat, with a gentle acclivity. Snow remains in the crevices throughout the year; but here are no glaciers, nor other magnificent Alpine features. Drumalban, the "Dorsum Britannicæ," of the old writers, seems to be Ben Nevis, with the high desert moor of Rannul, extending 20 miles to the east of that mountain. To the north-west of Ben-nevis is the long mountain of Corriarok, near Fort Augustus, over which a military road has been formed in a zigzag direction. Near the foot of this mountain arises the rapid river Spey, and various other streams, all running to the west. Sinclair's Account of Scotland, vol. viii. Williams's Natural History of the Mineral Kingdom.

BEN WEA, a mountain of Scotland in the Highlands, on the west of Ross-shire, estimated at 3720 feet in height.

Several other mountains of Scotland are distinguished by the appellation *Ben*, in conjunction with some other word.

BENABARRI, or BENSABARRI, a valley, and a place of the same name, situate among the Pyrenees, in the province of Aragon, in Spain, on the frontiers of Catalonia. N. lat. 41° 55'. E. long. 0° 40'.

BENAC, a town of France, in the department of the Ille and Villaine, and chief place of a canton in the district of Redon; 8^l leagues S. of Rennes.

BEN-ALD, a populous town of Egypt, between Memphis and Assut, or Sioat. These three places, with Gizeh, constitute the chief mart of the trade of Upper Egypt.

BENAMENIL, a town of France, in the department of the Meuse, and chief place of a canton in the district of Louvillè; 2^l leagues east of Lunéville.

BENARUS, a city or province of Hindoostan, bounded on the north and north-west by Oude, on the east by Bahar, and on the south and west by Allahabad. The district is about 120 miles long, and 100 broad; and contains, with its dependencies, 12,791,190 British males; its soil is fertile, and

the country populous. The Zemindary of Benares, which includes all the circars of Gazypour and Chunar, constituted a part of the dominions of Oude, until the year 1775, when its tribute or quit-rent of 24 lacks, since increased to 40, was transferred to the English, on occasion of the cession of the province to the India Company. This Zemindary, lately in the hands of Chhet Sing, occupies the principal part of the space between Bahar and Oude, so that only a small part of the territory of the latter touches Bahar on the north-west. In 1786 the clear revenue of Benares amounted to 380,000*l*. Almost in every village of this province, which is in a very prosperous state, a person is employed in teaching the youth to read and write; and they have a singular method of teaching reading and writing at the same time. The boys are collected upon a smooth flat of sand, and with a finger or a small reed form the letters there, which they pronounce at the same time. As often as the space before each scholar is filled up with writing, it is effaced, and prepared for a new lesson: thus the expence of pens, ink, paper, and even a house is avoided. The education at Benares is chiefly instituted for the Brahmins.

BENARES, the chief city of the forementioned district, is very rich, and the most completely built of any. It occupies the north bank of the Ganges, and is distant from Calcutta by the road, about 460 miles, and by Moorshedabad 563 miles. Its ancient name was Kasi; but there are no notices concerning it in the works of the ancient geographers. If it had existed during the time of the Syrian ambassadors, Pliny would have noticed it, as he has done Methora or Matura, and Clisobara, which lay near the Jumna river. The city is about six miles long and four wide; and may be viewed in its utmost extent from the tops of the Minarets of the mosque, erected by Aurungzebe on the foundation of an ancient Hindoo temple, and lately repaired by Mr. Hallings. It abounds in costly structures; but Mr. Forster, in his "Journey from Bengal to England," says, that the irregular and compressed manner which has been invariably adopted in forming the streets, destroys the effect which symmetry and arrangement would have bestowed on a city, entitled, from its valuable buildings, to a preference of any capital, seen by him in India; and it is also very injurious to the salubrity of the town. At Benares the number of Europeans is very small; a judge, register, collector, with a few civil servants, constitute the whole of the company's establishment there; and a few private merchants and planters make up the whole society. Of natives, however, the number is great; and many of the bankers are the principal creditors of the India Company, and possess immense fortunes. The poor in Benares are still more numerous, owing to the crowd of pilgrims, who come from all parts to visit so sacred a place. Mr. Hodges, in his "Travels in India," informs us, that in examining one of the temples of Benares, he was surprized to find most of the ornamental parts of Grecian architecture in a building erected on the plains of Hindoostan. Benares has been from time immemorial the Athens of India, the residence of the most learned Brahmins, and the seat both of science and literature. Here, it is probable, whatever remains of the ancient astronomical knowledge and discoveries of the Brahmins is still preserved. M. Bernier (*Voy. ii. p. 148.*) saw, in the year 1668, a large hall in this city filled with the works of the Indian philosophers, physicians, and poets. Sir Robert Chambers has described the observatory at Benares, which he visited in 1772. (See OBSERVATORY.) He has more lately discovered in this city the "Surya Siddhanta," on the principles of which the whole Indian astronomy is founded. Several considerable extracts of this work have been trans-

lated by Samuel Davis, esq. to whom this valuable work was communicated. It is composed in the Sanskreet language, and professes to be a divine revelation, communicated to mankind more than two millions of years ago, towards the close of the Satty or Satya Jogue, the first of the four fabulous ages, into which the Hindoo mythologists divide the period during which they suppose the world to have existed. It appears from what is already known of this book, that independently of the fiction and romance which are blended in the account of its origin, it contains a very rational and elaborate system of astronomical calculation, and several rules and tables, for the calculation of eclipses, &c. which seem very much to favour the hypothesis adopted by M. Bailly, Dr. Robertson, and others, that ascribes a very high antiquity to the astronomy of the Brahmins. In the rules contained in this work, is included a system of trigonometry, founded on certain geometrical theorems, with which, though unknown to Ptolemy and the Greek geometricians, modern mathematicians are well acquainted. For an account of the astronomical computations of the Hindoos, by Samuel Davis, esq. see *Asiatic Researches, vol. ii. p. 225.* &c. 8vo. and for remarks on the astronomy of the Brahmins, and for an account of the principles on which the Hindoo system of trigonometry is founded, by professor Playfair, see *Edinb. Trans. vol. ii. p. 135.* It appears, however, from an elaborate dissertation on the antiquity of the Surya Siddhanta, by Mr. J. Bentley, published in the *Asiatic Researches, vol. vi. p. 540,* &c. that the system, so eagerly applauded and referred to by the above mentioned writers to such remote antiquity, cannot be of a greater age than 731 years; or that it was composed about A.D. 1068.

Notwithstanding the science and literature that have been cultivated by the Brahmins at Benares, we discover traces of superstition, and even of inhumanity, in some of their customs, which, it is hoped, the interference of the court of justice, established there in 1783, will gradually restrain and reform. As the person of a Brahmin is inviolate, no atonement can expiate the crime of occasioning his death. Hence originated a practice, which was formerly frequent at Benares, and which in its effects approaches the nearest to our caption, or arrest. The Brahmin, who adopts this expedient, in order to procure redress, proceeds, armed with a dagger or poison, to the door of his adversary's house: where he deliberately sets himself down, and threatens to commit suicide, if the offender should attempt to pass or molest him. He falls with inflexible rigour, to which the other party likewise submits, and perseveres in his resolution until satisfaction is obtained. This practice, called sitting in "Dherma," is not confined to the male Brahmins only; for an instance occurred at Benares in 1789, of a widow's recurring to this expedient, in order to obtain, in a litigation with her brother-in-law, that justice, which neither the award of arbitration nor the decision of the court had granted her. Both failed pertinaciously during thirteen days, when, worn out with hunger, her antagonist at last yielded the contest. Another instance occurred in 1794. An inhabitant of a district in the province of Benares sat in Dherma before the house of some Rajepoots, for the purpose of obtaining the payment of "Birt," or a charitable subsistence, to which he had a claim; and in this situation destroyed himself by swallowing poison. Some of the relations of the deceased retained his corpse for two days before the house of the Rajepoots, who were thus compelled to forego taking sustenance, in order to induce them to settle the Birt on the heirs of the deceased Brahmin. This practice is not specifically pointed out by the shaster, but depends merely on the sanction of usage. Another practice of the Brahmins,

equally

equally frequent, and more cruel, is called a "Koor." Having contrived a circular pile of wood, and placed upon it a cone, or an old woman, they are to continue the wood burning. The object of this practice is to intimidate the officers of government, or others, from urging importunate demands, or levying grievous exactions, as the effect of the sacrifice is supposed to induce in great guilt the person whose conduct obliges the constructor of the Koor to adopt this expedient. The only case of setting up a Koor, that occurred for many years, happened near Benares in 1783; but the sacrifice was prevented by the timely interposition of authority. There are still influences of still more atrocious acts, by which the Brahmans seek to repel injuries, or to wreak their feeble vengeance; as by murdering, with mutual consent, their nearest and most beloved relations, from a persuasion that horror of the deed will redound on the head of their oppressor. Sir John Shore (*ubi infra*) relates three shocking cases of that nature, which, so late as the years 1791 and 1793, came under his cognizance in the province of Benares. It further appears by Sir John Shore's report, that a whole tribe of Hindoos, denominated "Rajekoomars," and resident on the frontiers of Jaunpore, a district of the province of Benares, adjoining to the country of Oude, have been long accustomed to the savage practice of causing mothers to starve to death their female offspring; and that the only reason assigned for this inhuman custom was the great expence of procuring suitable matches for their daughters, if they suffered them to grow up. Measures have been taken and rigidly enforced for abolishing this barbarous practice, to which, however, there are some few exceptions; as certain families among the Rajekoomars allow, at least, one female child to be reared, and one village furnishes a complete exception to the general custom. Among the superstitions prevailing in the province of Benares, we may mention the following circumstance relating to the sugar-cane. If any of the old cane remains unemployed in the new plantation, the proprietor repairs to the spot previously to the 25th of June, or 11th of July, and having sacrificed to Nagbele, the tutelary deity of that plant, he carefully sets fire to the whole; it being firmly believed by the "ryots," or husbandmen, that if a single cane should flower after that term, it would portend the most dreadful calamities to themselves and their families. We shall here add, that faith in charms, amulets, sorcery, fascination, and astrology, still prevails in the east. See SOONTAAR, Asiatic Researches, vol. iv. p. 329, &c. 8vo. The Hindoo observatory at Benares is situated in N. lat. 25° 15' 36". E. long. 83° 10'.

BENARU, a town of Persia, in the province of Farissan, 108 miles S. S. E. of Schiras.

BENARVILLE, a town of France, in the department of the Lower Seine, 5 leagues N. E. of Montivilliers.

BENASCIII, JOHN BAPTIST, in *Biography*, a painter and engraver, was born in Piedmont, A. D. 1636, and became a disciple of Pietro del Po. He imitated the works of Lanfranchi so successfully, that his pictures have been mistaken for the performances of that master. He is represented as a man of great genius, and the freedom and facility, which appear in his pictures, are highly commended. He died at Rome in 1690. He etched for his amusement "A holy family," from Dominicus Cerini, his intimate friend. Strutt.

BENATKY, or **BENATEK**, in *Geography*, a small town of Bohemia, with a citadel, in the circle of Bolestaw, seated on the Elbe, 22 miles N. E. of Prague.

BENAVARRI. See **BENABARRI**.

BENAVENTE, a town of Spain, in the country of Leon,

seated on the Ulla, and containing about 3,000 inhabitants; 13 leagues W. of Leon.

BENAVIDIO, MARCUS MANTUA BENAVIDIUS, in *Biography*, a celebrated civilian, was born at Padua in 1490, and taught the civil and canon law in his native city for 60 years, with high reputation. He there received the honour of knighthood, viz. from the emperors Charles V. and Ferdinand I. and from pope Pius IV. He died in 1582, and was the author of several works in his own profession; among which are "Collectanea super jus Cæsareum;" "Observationum Legalium," lib. x. and "De Illustribus Jurisconsultis." Moseri.

BENBECULA, in *Geography*, is the name of one of those islands of Scotland called the Hebrides. It lies between the isles of N. and S. Uid, from the last of which it is separated by a narrow channel, nearly dry at low water. This island is rather flat, and measures only about nine miles in transverse diameter. Its soil is sandy and barren; but the quantity of seaweed constantly driven on shore, is appropriated to meliorate some portions of the land. In one part of the island is an ancient fort called Elvine Neau Ruarie, and several stone monuments are found in different parts of it. It has a harbour for small fishing vessels, and several fresh water lakes, floored with fish and fowl.

BENBRICK, a mountain of Scotland, in the county of Perth; 12 miles N. N. W. of Crieff.

BENBALBEN, mountains of Ireland, in the county of Sligo; 7 miles N. of Sligo.

BENCH. See **BANC**, **BANK**, &c.

BENCH, *Amicable*. See **AMICABLE**.

BENCH, *King's*. See **COURT of King's Bench**.

BENCH, *Free*. See **FREE-BENCH**.

BENCH island, in *Geography*, lies within the south-east point of what is called South-east bay, in the southern part of New Zealand.

BENCH-widow. See **WIDOW**.

BENCHIERS, in the *Inns of Court*, the senior members of the house, who have the government and direction thereof; and out of whom is yearly chosen a treasurer, &c.

BENCOOLEN, in *Geography*, a sea-port town and fort on the south-west coast of the island of Sumatra, where the English have a settlement and a factory. This is one of the four English presidencies, or governments, to which all the other factories are subordinate; the other three are Madras, Bengal, and Bombay. Bencoolen, which is about 2 miles in compass, is known at sea by a high slender mountain, called the "Sugar Loaf," and rising 20 miles beyond it in the country. Before the town lies an island, within which the ships usually ride, and with this, the point of Sillebar, extending 2 or 3 leagues southward of it, forms a large and commodious bay. A convenient river on its north-west side brings the pepper, of which the trade of the town chiefly consists, from the inland country: but it is shipped with inconvenience, on account of a dangerous bar at the mouth of the river. It is principally inhabited by natives, who build their houses on pillars of ben-beo wood. The English, Portuguese, and Chinese, have each a separate quarter. The adjacent country is mountainous and woody, and there are many volcanos in the island. As the town stands upon a morass, the air is loaded with vapours, and the mountains are covered with thick clouds, that produce lightning, thunder, and rain. The climate of Bencoolen has proved more sickly and fatal than that of any of the other British settlements, not only to the English, but to all who have been accustomed to live in a pure air. In 1763, upon the cession of Manilla to the Spaniards, and the restoration of Bencoolen to the English, many Chinese merchants, with

their families, quitted Manilla in order to settle under the English government at this place; but the air of this country proved so fatal, that most of those Chinese and their families died soon after their arrival. Many English have also fallen a sacrifice to the intemperature of this climate; and, indeed, few of them survived until they built a fort on a dry elevated situation, at the distance of about 3 miles from the town. This is called "Fort Marlborough," where, during the rage of sickness at Bencoolen, the garrison is sometimes very healthy. Tame buffaloes may here be had in great plenty; but fish and poultry are scarce and dear. The soil is a fertile clay, producing high grass; but near the sea it is a morass. N. lat. 3° 49' 3". E. long. 102. See SUMATRA.

BEND, a town of Persia, in the province of Farsistan, 100 miles N. E. of Schiras.

BEND Dexter, in *Heraldry*. The bend was a sash worn across the shoulder from the Italian *la benda*; it is one of the nine ordinaries in heraldry, and occupies one-third part of the escutcheon when charged, and one-fifth when plain; it consists of two equal lines drawn diagonally from the dexter chief to the sinister base of the shield. This ordinary hath more subdivisions or diminutives than any of the others, viz. the bend-let, gortier, cottise, and ribbon, none of which diminutives can properly be charged.

BEND Sinister, denotes lines drawn diagonally from the sinister chief, to the dexter base of the shield; it hath not the same diminutives as those of the bend dexter; but according to some heraldic writers, is subdivided into a scarf, or scarf, which is in breadth half that of the bend sinister; and a batton, or siffure, as Upton and Holme call it, containing half the breadth of the scarf. Here, however, arises an objection to the admitting the batton to be a diminutive of the bend sinister, or as any part of one of the ordinaries. According to many years practice, the batton doth not touch the extremities of the shield, nor the extremities of the quarter where the paternal arms are placed, as all the ordinaries and their diminutives constantly do; but on the contrary, is coupé, that is, cut short, and so borne as a mark of illegitimacy, and not as an ordinary or charge, or any part of the coat: for, although some instances are to be met with of ancient arms, where a batton sinister is passed from the sinister chief to the dexter base, over all; and others, where it passes from corner to corner, over the paternal quarter, and not over the other quarters; yet, in every one of those instances, the batton is used as a mark of bastardy, and not either as an ordinary or charge. Hence, therefore, we may fairly conclude, that the batton is not to be deemed as any part diminutive of the bend, but as a mark of illegitimacy; which mark or batton, when granted by princes to their illegitimate children, may be of metal or fur, or both; but, when granted to any under their degree, must be of colour only.

BENDA, in *Architecture*. See FASCIA.

BENDA, *Francis*, in *Biography*, concert-master to the late Frederick II. king of Prussia, from the year 1738 to the time of his death. He was one of the most touching and expressive players on the violin in Europe, during the last century. He was a native of Alt Benatzky in Bohemia 1709, and a chorister at Prague and Dresden, till he lost his treble voice. There is a very natural and amusing life of this excellent musician, composed from his own materials, by M. Hiller of Leipzig; but as we have no room for stories of mere amusement, we must adhere to matters of fact.

It was not, till he was dismissed as a singer, that he seriously applied to the fiddle to procure him a subsistence; but he knew not when or under what master; but remembered that, as soon as he was able, he joined a company of strolling

Jews, in playing dances about the country; in which, however, there was a blind Hebrew of the name of Löbel, who, in his way, was an extraordinary player. He drew a good tone from his instrument, and composed his own pieces, which were wild, but pretty: some of his dances went up to A in *altissimo*; however, he played them with the utmost purity and neatness.

The performance of this man excited in Benda so much emulation, that he redoubled his diligence in trying to equal him; and not to be inferior in any part of his trade, he composed dances for his own hand, which were far from easy. He often speaks of his obligations to the old Jew for stimulating him to excel on the violin.

It has often excited our wonder, that in the principal capitals of Europe, wherever there is a synagogue, we generally found a vocal performer or two, who sung in the Italian manner, and in exquisite taste, though the rest of the singing in the service of religion, was to the last degree incoherent, rude, and barbarous. Where it was acquired, or by what kind demon this taste was inspired exclusively, is not easy to conjecture; but so it was at Paris, Amsterdam, Milan, Venice, Rome, and Naples; and we have had instances at home of exquisite Hebrew singing in our own country.

After various adventures, our young violinist entered into the band of count Uhlefeld at Vienna, with whom he had frequently the advantage of hearing the famous Francischello, who taught the count, and of playing trios with this great musician and his scholar.

Francischello was the most exquisite performer on the base-viol of his time. Gemisiani related of him, that in accompanying Nicolini, at Rome, in a cantata composed by Alessandro Scarlatti, for the violoncello, the author, who was at the harpsichord, would not believe that a mortal could play so divinely; but said, that it was an angel who had assumed the figure of Francischello; so far did his performance surpass all that Scarlatti had conceived in composing the cantata, or imagined possible for man to express.

At length, Benda was invited by Quantz, the German flute master to the late Frederick II. king of Prussia, during the time when he was only prince of Prussia, and resided at Ruppin, before his accession to the throne.

It was by stealth, that this prince indulged his passion for music, during the life of his father, the late king, who had forbidden him not only to study and practice music, but to hear it. M. Quantz told us afterwards, that it was the late queen-mother, who at this time encouraged the prince in his favourite amusement, and who engaged musicians for his service; but so necessary was secrecy in all these negotiations, that if the king his father had discovered that he was disobeyed, all these sons of Apollo would have incurred the danger of being hanged. The prince frequently took occasion to meet his musicians a hunting, and had his concerts either in a forest or cavern.

Benda still, in 1772, led the king of Prussia's band at the opera, and at his concerts; and could boast of having had the honour of accompanying his majesty, during the 40 years which he had been in his service, in nearly 50,000 different concerts. What an excellent economist of time must his late Prussian majesty have been; who, though his own minister, could spare two hours every day, when he was not in the field, for music!

When we heard the admirable Benda perform, it was an excellent composition of his own, which he played *con sordino*; his hand, he said, wanted force sufficient to play without. The gout had long enfeebled his fingers, and age, perhaps, still more. There were, however, fine remains of a great hand, though he was probably always more remarkable

able for feeling than force. His style was so truly simple, that scarcely a passage could be found in his compositions, which it would not have been in the power of the lowly artist to form; and when he was at his best, he was so very affecting, that even the most insensible of the general professors declared that the tears drew from them in profusion. How he acquired this style of writing and painting may be ascribed to musical students to trace and develop. His style was not that of Tasso, Somis, Veracini, or that of the head of any one schooler noticed, of which we have the least knowledge; it was his own, and formed from that model which should be ever studied by all instrumental performers, *and singing*.

BENDALIA, in *Geography*, a town of Africa, lying between the confines of Dar-fur and Wera, the capital of Bergoo. It is inhabited by the slaves of the sultan of Bergoo. The people are idolaters.

BENDALI, a town of Persia, in the province of Ker-man, 125 miles S. of Sirgjan.

BENDARMALANKA, a town of Hindoostan, in the circuit of Rajamundry, situate between the branches of the river Bris, at their outlet into the ocean, 55 miles S. of Rajamundry, 50 N. E. of Masulpatan, and 358 miles N. E. of Madras. N. lat. 16° 30'. E. long. 82° 30'.

BENDEIRG, a mountain of Scotland, in the county of Perth, 7 miles N. of Blair Athol.

BENDER, formerly called *Uzin*, and denoting in the Turkish language "a pass," a fortified town of European Turkey, in Bithynia, seated on the Dniester. It is celebrated as the place of retreat and residence of Charles XII. of Sweden, when he put himself under the protection of the Turks, after being defeated by the Russians at the battle of Poltowa in 1709; but upon refusing to leave their territory, he was attacked, taken prisoner, and removed to Adrianople, where, after a year's confinement, he returned freely to his own dominions. It was besieged by the Persians in 1770, and after a resistance of nearly three months, surrendered to Panin, the Russian general; and the capture of the fortress was effected by the submission of the Tartar of Bulzjak and Otchakof to the Russian sceptre. The loss which Bender, in 1770, sustained from the Russians was remarkable, on account of the desperate defence made by the garrison, the carnage which attended its reduction, and the adoption on the part of the besiegers, of that dreadful instrument of modern warfare, the globe of compression. The Russian army, commanded by count Panin, opened their trenches on both sides of the river, the 30th July, after which, a furious cannonade and bombardment were begun from all quarters, and vigorously returned from the town. The garrison and inhabitants defended themselves with the utmost bravery: in sixteen days they made seven fortifications, with little advantage, but great loss on both sides, and held out for more than two months with unabated courage, even when the defeat of the main army by the Russian general Romanzow seemed to deprive them of every hope of relief. The besiegers in the mean time pushed forward their mines (See *MINE*) with industry, particularly one of an improved construction lately invented by a French engineer, and which has been since denominated the globe of compression. In this labyrinth of mine, interwoven and included one within another, it was maintained, that a certain quantity of gunpowder would cause a greater explosion, and throw up a greater portion of earth than in any other method. The globe of compression being brought to perfection, was charged with the amazing quantity of 16,000 lb. of powder, and the garrison continuing obstinately to refuse every proposal of surrender, count Panin prepared for a

general assault to take place on the night of the 27th of Sept. The firing of the mine was to be the signal of attack, and it was hoped, that besides ruining the outworks, it might make a breach in some of the principal walls of the town, and bury the defenders in the ruins. The Russians themselves were apprehensive of the consequences, as it was not easy to define how far the effects of such an enormous mass of powder might extend, and the troops declined to make the assault in that quarter were stationed at a considerable distance. In fact, the globe of compression, which was blown up at 10 o'clock at night, with a most horrible concussion, shook the whole adjacent country, and amidst the astonishment and confusion excited by this dreadful phenomenon, the attack began in three places with great fury. Nothing could restrain the impetuosity of the Russian soldiers, who pushed forward at the main point of assault. The double ditches before the glacis were passed and filled up; the double row of pallisades before the covered way destroyed; the main ditch surmounted, and all the outworks carried in succession. The body of the place could not oppose an effectual resistance to enemies who had already overcome such difficulties: the Russians got over the walls in every quarter, and a new and dreadful contest commenced in the dark, as well among the fortifications, as in the streets, lanes, and passages, and from the houses. The desperate resistance of the garrison and inhabitants obliged the Russians to set fire to the town, which they did in several places at the same time, but the contest nevertheless continued, amidst the ruins and the blazing houses, for the whole of the night, nor seemed decided, but by the almost total extermination of the Turks. At eight in the morning, the seraskier, with most of those that survived, retired to the citadel, which the flames had already reached. A select body of 1500 cavalry and 500 infantry, attempting to cut their way through the besiegers, were surrounded and cut off to a man. As for the seraskier, after demanding in vain an honourable capitulation, the fury of the flames, which had now reached every part of the citadel, obliged him to surrender with his followers, as prisoners of war. The fire raged for three days, and could not be restrained till it had consumed the whole city. The total number of prisoners, including the inhabitants of all ages, amounted to 11,749, of whom 5,554 were janisaries and spahis, with their commanders, besides the seraskier and two bahaws. The residue of a population of 30,000 souls, of whom one half were soldiers, perished in the storm. The Russians found in the place a vast quantity of arms, bombs, grenades, gun-powder, and other military stores, besides above 200 pieces of brass cannon, and 85 mortars. They also took 4 horse-tails, 14 batons of command, and 40 pair of colours.

Bender, hardly recovered from this blow, was again taken, but not till after a long siege, by prince Potemkin, in November 1789. It was, however, restored to Turkey by the subsequent treaty of peace in 1792. Bender is reckoned to contain between 10 and 12,000 inhabitants; and its governor is a bashaw. It is distant 100 miles W. of Otchakof or Oczakow, and as many miles S. E. of Jaffy. N. lat. 47°. E. long. 29° 20'.

BENDER-Abassi. See *GOMBRON*.

BENDER-Congo. See *CONGO*.

BENDER-Delem, a town of Persia, in the province of Farsistan, on the north coast of the Persian gulf; 130 miles W. of Schiras.

BENDER du Ser, a town of Persia, in the province of Ker-man, 160 miles S. of Sirgjan.

BENDER Ibrahim, a town of Persia, at the mouth of the river Ibrahim, in the Persian gulf.

BENDER *Maffin*, or *Benjar-Maffin*, the capital of a kingdom of the same name in the southern part of the island of Borneo, possessing a good harbour, formed by the river Benjar, flowing from the centre of the country almost due south. S. lat. $2^{\circ} 40'$. E. long. $113^{\circ} 50'$.

BENDER *Rieber*, a town of Persia, on the north coast of the Persian gulf, in the province of Farfutan; 160 miles S.S.W. of Schiras.

BENDER *Rigk*, a city of Persia, in the province of Kerman, on the north-east coast of the Persian gulf. It is encompassed with walls in an indifferent state, and lies north from Abuschæhr or Busheer. The petty state, of which this is the capital, comprehends several other places in Kermefir, which render its sovereign in some measure dependent upon Kerim Khan. The Arabs of this principality are chiefly addicted to a sea-faring life; the Persians inhabiting its back parts are husbandmen. The reigning family of Bender Rigk is of the Arabian tribe of Beni Saab, and proceeds originally from Oman; but the grandfather of one of its princes, having become a Shiite, and married a Persian lady, this family is no longer reckoned by the Arabs among their genuine nobility. A late reigning prince of Bender Rigk, Mir Mahenna, was notorious through the country for his vices and cruelties, as one of the most execrable tyrants that ever existed. He caused his servants to murder his father in his own presence, because the old man had a predilection for his eldest son. He killed his mother, because she reproached him for his crimes. He caused his brother, and sixteen other relations, to be assassinated, that he might establish himself in the undisturbed possession of the throne. He drowned two of his sisters, because a neighbouring prince had asked one of them in marriage. He exposes all the children that happen to be born to him. In 1765, this detestable monster was under the age of thirty years. After having been twice captured by Kerim Khan, he recovered his liberty, and immediately upon his return to his own dominions began to pillage the caravans which travelled between Schiras and Abuschæhr, and to practise piracy. Kerim Khan laid unsuccessful siege to his capital; and when he sent in 1765, to demand payment of the tribute due for his possessions in Kermefir, Mir Mahenna maltreated the officer deputed for this purpose, and caused his beard to be shaven. Upon which Kerim Khan sent against him a powerful army, which conquered Bender Rigk and all its territories. Mir Mahenna, however, had previously retired with all his troops, and some of his subjects, into a desert isle called Khoueri, where he waited till the Persian army retired from his country. As soon as they were gone, he left the island, expelled the garrison from Bender Rigk, and regained possession of his dominions. The tyrant had abandoned himself to drunkenness; and had begun to exercise such cruelties upon his troops, that he cut off the noses and ears of some of the principal officers; and yet so attached to him were his soldiers, that, in the period of his exile, he took the isle of Karek from the Dutch. Bender Rigk is distant 132 miles W.S.W. from Schiras. N. lat. $29^{\circ} 26'$. E. long. $51^{\circ} 20'$.

BENDIDIA, *Βενδιδα*, in *Antiquity*, solemn feasts held by the Athenians on the twenty-first day of the month Thargelion, in honour of the goddess Diana. The word is formed of *βενδι*, a denomination of Diana, according to Strabo, or of the moon, according to Suidas, which amounts to the same. The bendidia were held in the Piræus, and bore some resemblance to the bacchanalia.

BENDING, in a general sense, denotes the reduction of a straight body into a curve, or giving it a crooked form. M. Bernouilli has a discourse on the bending of springs, or

elastic bodies. (See *SPRING*.) M. Amontons gives several experiments concerning the bending of ropes. (See *ROPE*.) The friction of a rope, bent or wound round an immovable cylinder, is sufficient, with a very small power, to sustain very great weights. Mem. Acad. Sc. 1703. 1705. 1699. Divers methods have been contrived for bending timber, in order to supply crooked planks, and pieces for building ships. M. Daleme ingeniously enough proposed to have the young trees bent, while growing in the forest. The method of bending planks by a sand-heat, now used in the king's yards at Deptford, was invented by captain Cumberland. Phil. Trans. N^o 371. p. 75.

The bending of boards, and other pieces of timber for curved works in joinery, is effected by holding them to the fire, then giving them the figure required, and keeping them in this figure by tools for the purpose.

A method has been lately invented and practised for bending pieces of timber, so as to make the wheels of carriages without joints. See *WHEELS*.

The use of steaming wood for the purpose of bending it is evidently to supple it, so as to make it capable of being brought the more easily into the form required, as well as to adapt it for retaining that form, after the pressure by which it was originally reduced to that figure has been removed. By means of steaming, heat and moisture are applied to it. If it has already moisture enough, as in the case of green wood, heating in any other way, without the application of steam, may be sufficient; or the effect may be produced by heating and wetting at the same time. These arts of suppling by heat and moisture, have been practised from time immemorial in Russia, and applied to wheels, and some other sorts of wood-work. In England these, or similar modes, have been applied for a long time in the dock-yards, and also, under a patent granted to Messrs. Jacob and Viny, but now expired, in the construction of wheels; and by Mr. Bevan, under a patent still in force, to circular wooden fashies, fossits, fan-lights, door mouldings, and hand-rails for stairs; and, without patent, by cabinet and chair-makers in general. When the thickness required, compared with the sharpness of the curvature, is such as to render it impracticable to bend the piece entire, it may be divided for this purpose into different thicknesses, in the manner proposed by Mr. Samuel Bentham, under a patent obtained in 1793, for methods of working wood, metals, &c. with very little, if any, loss of strength; and if the strata are connected by proper fastenings, with a degree of strength far superior to what a piece of the same dimensions would possess, if grain-cut. In this mode, curvature may be given to the wood-work of all sorts of engines, and of carriages of all sorts; to all timbers designed for receiving a curved shape and employed in buildings; and to any of the timbers, that may be used in the construction of boats or vessels, not excepting the ribs of the largest class. Thus, it is said, a very considerable saving with respect to quantity and value might be obtained, whilst at the same time the strength would be augmented.

In the operation of bending, care should be taken that, as fast as you force any piece to adapt itself to the curvature of the mould to which you are bending it, you apply a pressure, by means of screws or wedges, &c. to that part, and along the whole piece, particularly at its sharpest convexities; so that the piece may not only be kept to its proper curvature, but the exterior fibres be prevented from starting out. In forming ship-ribs of all shapes and sizes, so as to supersede the use of crooked-grown timber, where that which is straight would be cheaper, Mr. Bentham proposes to use one or other of the two following methods, which, he says, would effectually answer the purpose. First, having

Bevel is a mould or block to the shape of the rib in question, comprising the whole of its extent from top to bottom; that is, on the ribs of the keel, bend the component parts of the ribs according to the shape of the block, and fasten them together; then, to confine the wood-rib in its curvature, apply a bar or cross-bar, in those parts where the ribs would be subject to change, and to convey the rib, together with its rays, and it has been sufficiently confined to its curvature, by the connection given to it with the planks, beams, and other parts of the ship. Or, secondly, you may form the shell of the ship first, without timbers, beginning to build as it were by the planks, using only a set of temporary moulds or false ribs, to determine the position of, and give a temporary support to, the planks. When this is done, insert the timbers afterwards, pressing and binding the component parts successively into their places and removing the false ribs, in proportion as the real ones are put together and secured. Or, thirdly, instead of the false ribs, you may insert a sufficient number of real ribs, put together as in the first method; and then proceed with the planks and the rest of the ribs, as in the second method. As to bending, it may, in this case, be performed with or without the assistance of steaming, and with or without the use of the expedient of dividing into thickness according as the degree of curvature may require. In cliker-work built boats, the ribs have been sometimes inserted by bending them to the planks, but this is only done in boats of the slightest class. See SHIP.

BENDING, in the *Sea Language*, denotes fastening one rope to another, or to different objects, and fastening a sail to its yard.—*To lay bend the cable*, when it is to be made fast to the ring of the anchor.—*To lend two cables*, signifies to tie them together with a knot, which, though less sure than splicing, is looser &c.—*To unbend the cable*, is to loosen it from the ring of the anchor; which is done when a ship is directed to be long at sea.—*To bend a main sail*, is to make it fast to its proper yard or stay.

BENDLET, in *Heraldry*, is the first diminutive of the bend, and possesses one half of the breadth of the bend.

BENDOAN, in *Geography*, a small island, 5 leagues S.W. from cape St. Martin's, on the coast of Spain, in the Mediterranean, which lies to the south of west from Yvica island. It is north-east from Alca, and forms the limit of the bay of Calvi, or Cargi, of which the mount so called is the southern end.

BENDORAN, a mountain of Scotland, in the county of Argyre.

BENDORF, a town of Germany, in the circle of Westphalia, and county of Sayn, and in a prefecture of the same name, but not far from the Rhine, into which the river Sayn empties itself at this place. It is inhabited by Roman catholics and Lutherans, each of whom enjoy the public exercise of their religion; 5 miles N. of Coblenz.

BENDORF Road, lies on the west coast of Ireland, and is the eastern end of the roads between Ballyshannon and the island of Mull, or Eastmurry, as Bundary is the more western. In both, ships may ride with safety.

BENDS, in a ship, are the same with *swales*, or *swales*, which are the outermost timbers of a ship, on which men set their feet in climbing up.

They are reckoned from the water, the *first*, *second*, and *third bend*: they help much to strengthen the ship, and have the beam, knees, and foothooks bolted into them.

BENDS denote also the small ropes used to confine the clutch of a cable. For a *common or fleet bend*, pass the end of a rope through the bight of another rope, then round and underneath the standing part; but, to prevent its jam-

ing, pass it round again under the standing part. The sheet of a sail has the end passed up through the clew, then round the clew, and down beneath the standing part. The rope of a buoy is passed as a sheet, and has the end stopped. Bends of cable-ends are passed as a seizing. For a *carriack bend*, lay the end of a rope, or hawser, across its standing part; then take the end of another rope, or hawser, and lay it under the first standing part, at the cross, and over the end: then through the bight, under the standing part; then over its own standing part, and underneath the bight again: it is often used in haste to form a greater length, or to warp or tow with. For a *fisherman's bend*, take a round turn with the end of a rope, or hawser, through the ring of an anchor, &c. and a half hitch through both parts, and another half hitch round the standing part; then stop the end. *Hawser bend* is a hitch, with a throat and end seizing made on one end, and the end of another hawser reeved through the bight, and hitched with a throat and end seizing. *Temporary bend* is commonly made to reeve through large blocks, thus: lay three fathoms of the end of two hawsers together, and put on a round seizing in the middle; then reverse the ends to each standing part, and put on a throat seizing between each end and the middle, and a round seizing on each end. See *Plate of Ship-Rigging*.

BEND-WAYS, or in *Bend*, in *Heraldry*, is such charges as are placed so as to occupy that part of the escutcheon to which the bend is allotted; or such as are placed obliquely, resembling a bend.

BENDY, a term used in *Heraldry*, when the escutcheon is divided bendways into an equal number of partitions: the field may be bendy of eight, ten, twelve, or more.

Barry-BENDY. See BARRY.

Counter-BENDY. See COUNTER.

Paly-BENDY. See PALY.

BENE. See *De Bene Eff.*

BENE, in *Geography*, a town of Italy, in the principality of Piedmont, and district of Mondovi, defended by an ancient castle, and containing about 4000 inhabitants; 28 miles south of Turin.

BENEAPED, in the *Sea Language*, is said of a ship, when the water does not flow high enough to bring her off the ground, out of the dock, or over the bar.

BENCARLO, **BENCALON**, or **BENCARDO**, in *Geography*, lies north-west from Peniscola point, on the coast of Valencia, in Spain, in the Mediterranean, seated on a bay to the north-east of the gulf of Valencia. It has no good road; so that ships usually lie at Peniscola.

BENEDETTO, in *Biography*. See CASTIGLIONE.

BENEDETTO, Sr., a town of Italy, in the duchy of Mantua, 15 miles S.S.E. of Mantua.—Also, a town of Italy, in the marquise of Gorzegno, 12 miles east of Bene.

BENEDICITE, in *Ecclesiastical History*, is a name given to the hymn, or song of the three children in the fiery furnace; by reason of its beginning with the words, "benedicite omnia opera Domini." The use of the benedicite is very ancient; it appearing to have been sung in all the Christian churches as early as St. Chrysostom's time.

BENEDICT, Sr., in *Biography*, founder of the monastic order of Benedictines, was born in the province of Nursia, in Italy, about the year 480. After having been educated at Rome, he retired, at the age of fourteen, to Subiaco, about 40 miles from that city, where he secluded himself from the world in a cavern for several years, till at length he was discovered by the monks of a neighbouring monastery, and chosen for their abbot. Dissatisfied, however, with their manners, he withdrew from their society to his solitude,

solitude, and by means of the multitude of persons that associated with him, he was enabled to build twelve monasteries, and to place in each of them twelve monks. In 528 or 529, he retired to Monte Cassino, and having cut down the grove sacred to Apollo, built a monastery, and founded his order. Being summoned to the council at Rome by pope Boniface II. he was carried, by his own desire, at the approach of death, into the oratory of St. John the Baptist, where, during his attention to the service, he expired, in the year 542 or 543, according to Cave, or, according to others, in 547. His extraordinary miracles are recorded in the "Dialogues" of St. Gregory the Great; and by the church of Rome, he is honoured as a saint. The only genuine work of St. Benedict, according to Dupin, is the "Regula Monachorum;" but other works have been ascribed to him, and they are published together in the 9th volume of the "Bibliotheca Patrum." Cave's Hist. Lit. t. i. p. 52. Dupin. Eccl. Hist. vol. iii. p. 44.

BENEDICT, abbot of Aniane in Languedoc, was born in 751, and educated at the court of king Pepin. Having served this prince and his successor Charlemagne, he retired to a monastery in Languedoc, where he distinguished himself by his mortifications. He afterwards built a hermitage on the rivulet called Anian, which, in process of time, became a considerable monastery. Lewis the Meek employed this monk in reforming the monasteries, first in Aquitaine, and afterwards through the whole kingdom of France, and in restoring, by new and salutary laws, the monastic discipline which had been neglected and fallen into decay. In 817, he presided in the council of Aix-la-Chapelle, and subjected, by the authority of the emperor, all the monks to the rule of Benedict of Monte Cassino, prescribed to them all one uniform mode of living, and thus united the various orders into one general body or society. Hence he was regarded as the second father of the western monks. He died in 821. His collection of rules for the eastern and western monks, intitled, "Codex Regularum," and his concordance of monastic rules, and also a collection of homilies of the fathers, were published by Hollstenius at Rome. This abbot has been beatified by the church of Rome. Moreri. Mosheim's Eccl. Hist. vol. ii. p. 310.

BENEDICT, BISHOP, an English abbot of the seventh century, was born of a noble family among the English Saxons, and in the 25th year of his age devoted himself wholly to religion. Accordingly, in 653, he took a journey, in order to acquaint himself with the ecclesiastical discipline, and on his return he laboured to establish it in Britain. Upon his return from a second journey to Rome, in the course of which he received the tonsure, he assumed the government of the monastery of Canterbury, to which he had been elected during his absence. After a third journey to Rome, whence he brought back a large collection of valuable books, he resorted to the court of Egfrid, king of Northumberland, who had succeeded Oswy. On a tract of land, given to him by that prince, he erected a monastery, which, from its situation on the river Were, was called "Weremouth;" in which he is said to have placed 300 Benedictine monks. The church of this convent was built of stone by artificers fetched from France, in 674; and both the church and convent were dedicated to St. Peter. From a fourth excursion to Rome, in 678, he returned laden with books, relics of the apostles and martyrs, images, and pictures. In 682, he built another monastery on the banks of the Tyne, four miles from Newcastle, called "Girwy," or "Jarron," and dedicated to St. Paul. Soon after this establishment, he took a fifth journey to Rome, and came back enriched with a further supply of ecclesiastical orna-

ments. Soon after his return he was seized with a palsy; and at length closed his life in a truly Christian and exemplary manner, in the year 690, and was buried in his monastery of Weremouth. He wrote some works on monastic discipline and the church ritual. He was a celebrated singer; and in one of his expeditions to Rome, brought with him a chorister who introduced the Roman method of singing mass. Biog. Brit.

BENEDICT, abbot of Peterborough, in the twelfth century, was educated at Oxford, and became a monk in the monastery of Canterbury, and afterwards prior. By the influence of Henry II. he was elected abbot of Peterborough in 1177. He assisted at the coronation of Richard I. in 1189, and was advanced to be keeper of the great seal in 1191. But death deprived him of this dignity in 1193. Bishop Nelson says, that he died in 1200. Besides his "Life and Miracles of Archbishop Becket," characterised by Leland as an elegant performance, but treated by Bale as a mere heap of lies and forgeries, he composed a "History of Henry II. and Richard I. from 1170 to 1192," which, says Dr. Henry, hath been much and justly esteemed by many of our greatest antiquaries, as containing one of the best accounts of the transactions of those times. A beautiful edition of this work was published at Oxford, in 2 vol. by Mr. Hearne, A. D. 1735. Henry's Hist. vol. vi. p. 143.

BENEDICT, ALEXANDER, one of the early cultivators and restorers of anatomy, was born at Verona about the middle of the 14th century. After travelling over various parts of Greece, he returned to Italy, and was appointed teacher of anatomy at Padua, where his lectures were numerous attended. In 1497, he published "Anatomicon, five historiam corporis humani." The first edition was dedicated to the emperor Maximilian, with whom he appears to have been in great favour. It is principally copied from Galen, but with some observations from his own practice. He is the first, Haller says, that described the concretions called gallstones. The language used by Benedict, is much purer than is found in any of the early anatomical writers. "De omnium a vertice ad plantam morborum signis, causis, &c." fol. 1500, taken principally from Galen, Paulus Ægin. & Oribasius, whose works he appears to have read in their own language. He also wrote, "De Peitilentia," "De Medici Officio," and other smaller pieces. The whole of his works were collected, and published under the title of "Opera Omnia," fol. Venet. 1533. Haller. Bib. Anat. Eloy. Dict. Hist.

BENEDICT, a name assumed by several of the popes. The first of this name, called by the Greeks *Bonifus*, was advanced to the pontifical chair in 574, at the period when the Lombards overran Italy, and fixed their seat in it under Alboin; and he is said to have died after four years, in consequence of the grief occasioned by their ravages. *Benedict II.* was elected in 683, and distinguished by his learning and virtues. He died in 685, and obtained the honour of canonization. *Benedict III.* was advanced to the pontificate in 855, and by the firmness of the Roman clergy, supported on the papal throne in opposition to Anastasius, which he occupied with mildness, piety, and charity. In his time, Ethelwolf, king of the west Saxons, visited Rome with his son Alfred. Two epistles of this pope are extant. *Benedict IV.* was raised to the papal chair about the year 900; and died with a good character in 903. *Benedict V.* was elected pope in 964, and although he was a man of extraordinary learning and sanctity, he was stripped of the pontifical and priestly dignity by the authority of the emperor Otho, and sentenced to exile; upon which he retired to Hamburgh, where he

B E N E D I C T.

died in 965 or 966. *Benedict VI.* was elevated to the papacy in 972; and being seized by a faction which attacked the Lateran palace, he was imprisoned in the castle of St. Angelo, where he was either strangled or starved in 974. *Benedict VII.* was elected in 975, and after a prudent government of nine years, died in 984. *Benedict VIII.* was made pope in 1012, but displaced by Gregory an anti-pope, and afterwards restored. Under his pontificate Henry, king of Germany, marched to Rome; and Benedict crowned him emperor under the title of Henry II., and his queen Cunegunda, empress. In 1016, this pope, collecting his dependents, defeated the Saracens, who made a descent at Luna in Tuscany, and put them all to the sword. He also waged war with the Greeks, who ravaged Puglia. In 1019, the emperor bestowed on him and his successors the newly erected see of Bamberg. He died, after having approved himself a great friend to the monks, and zealous for the order and discipline of the church, in 1024. *Benedict IX.* succeeded his uncle John XIX. in 1023, in his 18th year; was expelled from his see on account of his vices, but restored by the emperor Conrad; and after a life of various expulsions and restorations, sold or resigned the pontificate in 1045. He resumed it, however, occasionally under succeeding pontificates, and finished his scandalous career in 1054. *Benedict X.* was elected to the popedom by a party in 1058, and after holding the see nine months and twenty days, was deposed and excommunicated. *Benedict XI.* was the son of a shepherd, or of a notary, at Trevigi, in the state of Venice, became a schoolmaster, general of the Dominicans, and cardinal bishop, first of Sabina, and afterwards of Ostia, and succeeded pope Boniface VIII. in 1303. He exerted himself by various efforts for the good of the church, but death terminated his labours on the ninth month of his pontificate, A.D. 1304. This pope conducted himself with moderation, and behaved with singular respect to his mother and relations; but would not suffer any interference on their part in public affairs. He wrote commentaries on the books of Job, the Psalms, St. Matthew, and the Revelations, as well as a ritual, and some sermons. *Benedict XII.* was the son of a miller in the county of Foix, and after several subordinate ecclesiastical promotions, was advanced to the papal see in 1324. He was skilful in law and theology, and distinguished by his probity, but little versed in politics. Wishing to restore the apostolic see to Italy, but obliged by the circumstances of the times to remain at Avignon, he laid the foundation of a magnificent and strongly fortified palace, which, however, he did not live to finish. He observed a laudable caution in the creation of cardinals, and the appointment of benefices; and he exercised singular self-denial with respect to his own relations, observing, that "James Fournier (his family name) has relations, but pope Benedict none." As he was industrious and active in restoring discipline and moral among several religious orders that were become corrupt, he incurred the ill-will and enmity of the monks. During his efforts for reconciling the kings of England and France, he was seized with an illness, which terminated his life in 1342. Among his printed works are his "Decretum de animalibus separatis," and his "Constitutions for the reforms of various religious orders." He left also sermons for the chief festivals of the year, commentaries on the Psalms, letters, and poems. *Benedict XIII.* was of a noble family, being the eldest son of the duke of Gravina, in the kingdom of Naples, and born at Rome in 1649. Against the views and wishes of his family, he took the habit of the Dominican order in 1667, and applied with diligence to the studies and duties of his office, preferring the humble life of a monk to that of a superior station. However, by the alliance of his family with

that of the pope Clement X. he was promoted, against his inclination, to the cardinalate in 1672; and after several successive advancements to different sees, in which he maintained the character of an exemplary pastor, he was elected to the papacy in 1724, and constrained to accept it against his own remonstrances. In the exercise of his office, he laboured incessantly in repressing the luxury of the pontifical court, and in correcting the licentiousness of the clergy; but he was thwarted in his projects by the Jesuits, on account of his attachment to the Dominican doctrine concerning grace and predestination, which less resembled theirs than that of the Jansenists. His well-meant attempt to unite all Christian saints in one church and faith, manifested a greater degree of charity, than of discernment and knowledge of the world. Avoiding all the pomp connected with its high station, and restricting the expences of his own table to 6d. per day, in the disuse of wine and animal food, he lived in the Vatican like a monk in his cloister. Nevertheless, the doors of his palace were always open to the poor, and he was ever ready to hear their complaints, and to the utmost of his power to relieve their distress. Divesting himself of all the marks of sovereignty, and wishing even to dismiss his guards, he frequently went out in the evening in the most private manner, for the purpose of visiting the sick. He closed his pontificate of six years, in 1730, at the age of 80 years. His sermons, poems, and other writings, together with his bulls, were published at Rome in 3 vols. fol. in 1728. *Benedict XIV.* was descended of the noble family of Lambertini, at Bologna, and born in that city in 1675. After several previous promotions, he received a cardinal's hat in 1728; and from the archbishopric of Bologna, to which he was nominated by Clement XII. in 1731, he was advanced in 1740 to the papal see. Possessing a quietness of temper, united with profound learning, an elegant taste, liberal sentiments, and great goodness of heart, he was singularly amiable; and as he diminished the number of festivals, abolished idle ceremonies, and manifested a dislike of superstitious practices and pious frauds, he was calumniated by some of his enemies as a "protestant pope." As a munificent patron of literature, he founded academies at Rome, bestowed benefactions on that of Bologna, corresponded with, and rewarded learned men at home and abroad, caused a meridian line to be drawn, retired from the dust the celebrated Egyptian obelisk, called that of Sesostris, and adorned Rome with various other monuments of antiquity. Fond of the pleasures of literary retirement, and of occasionally enjoying the mirth of the lower classes, his aversion to business was invincible, and he frequently lamented the drudgery and fatigue of his official situation. Attached to life, he dreaded the symptoms of dissolution; and, as it were, confiding in the prayers of the Jesuits for his life, he would not consent to sign the bull for the reform of their order in Portugal, till he was absolutely given over. On the king of Portugal he conferred the title of "his most faithful vassal." He governed the church with great mildness, and manifested on all occasions a strong desire of reconciling those differences with regard to doctrine by which it was divided. After a pontificate of 28 years, he died in 1758, at the age of 83 years. His works have been published at Rome in 12 vols. 4to.; and they display a greater degree of professional knowledge and of application, than his levity and factious disposition would lead one to expect. Bower's Hist. of the Popes. Mosheim's Eccl. Hist. Nov. Test. III.

BENEDICT, St. in *Geography*, a town of Hungary, seated on the Gran, with a fortified castle; 30 miles north of Gran.

BENEDICT, a town of America, in Charles county, Maryland,

ryland, on Patuxent river; opposite Mackall's ferry; 30 miles south-east from the Federal city.

BENEDICTINS, or **BENEDICTIN Order**, in *Ecclesiastical History*, is an order of monks, who profess to follow the rule of St. Benedict, which he formed only for the Cenobites, or for those who live in a monastery under the direction of an abbot.

Having given instructions as to the qualifications and duty of the abbot, he proceeds to recommend to the monks obedience, silence, and humility; to note the hours for divine service by day and night, as well as the order and manner of performing it; and to specify the punishments that were to be inflicted on offenders. These punishments were to be excommunication or a separation from the fellowship of the brethren, at table or at prayers; the chastisement of the more disorderly with rods; and expulsion from the monastery. He further states the mode of their admission, the dress they were to wear, and the labour in which they were to be employed. From his rule, which is still extant, we learn that it was not his intention to impose it upon all the monastic societies; for he expressly excludes the Anachorets, who, having learned the exercises of a monastic life in a convent, retired separately into deserts, the Sarabaites, who live two or three together in a cell, and the Gyrovagi, who removed from one monastery to another without fixing anywhere. It was his purpose to form an order, whose discipline should be milder, their establishment more solid, and their manners more regular, than those of other monastic bodies; and whose members, during the course of a holy and peaceful life, were to divide their time between prayer, reading, the education of youth, and other pious and learned labours. However, in process of time, the followers of this celebrated ecclesiastical d^egenerated very lamentably from the piety of their founder, and lost sight of the duties of their station, and the great end of their establishment. Having acquired immense riches from the devout liberality of the benevolent, they sunk into luxury, intemperance, and sloth, abandoned themselves to all sorts of vices, extended their zeal and attention to worldly affairs, took part in political cabals and court factions, made a vast augmentation of superfluous rites and ceremonies in their order, to blind the multitude, and supply the place of their expiring virtue; and among other meritorious enterprises, laboured most ardently to swell the arrogance, by enlarging the power and authority of the Roman pontiff.

This new order made a very rapid progress in the west, and, in a short interval of time, arrived at the most flourishing state. In Gaul, its interests were promoted by Maurus; in Sicily and Sardinia, by Placidus; in England, by Augustin and Mellitus; in Italy, and other countries, by Gregory the Great, who himself is reported to have been for some time a member of this society; and in Germany it was afterwards received by the instrumentality of Boniface. This sudden and amazing progress of the new order was ascribed by the Benedictins to the wisdom and sanctity of their discipline, and to the miracles wrought by their founder and his followers. But upon a more attentive view, the impartial observer will be convinced, that the protection of the Roman pontiffs, to the advancement of whose grandeur and authority the Benedictins were most fervently devoted, contributed much more to the lustre and influence of their order than any circumstances, nay, than all other considerations united together.

The Benedictins are those properly called *monachi*, monks; the other orders are better denominated *friars*, or *religious*. In the canon law, the Benedictins are called *Black Monks*; being distinguished from the other orders by the colour of

their habit, and not by the name of their patriarch St. Benedict. Among us they were formerly also denominated *Black Friars*. The Benedictins wear a loose black gown, with large wide sleeves, and a capuche on their heads, ending in a point behind. The list of saints of the Benedictin order is very ample; but they are accused by Baronius, and many other writers, of putting many in the list who were never of the order. For six hundred years after the erection of the Benedictin order, most of the European monks were followers of this rule: whatever other names they went by, Carthusians, Cistercians, Grandmonteneses, Premonstratenses, Cluniacs, &c. they were but different branches of the Benedictins, till about the year 1220, when the Dominicans and Franciscans took new rules. Hospinian reckons no less than twenty-three religious orders that sprang from this one. According to the Benedictin computation, there have been of this order 24 popes, 200 cardinals, 7000 archbishops, 15,000 bishops, 15,700 abbots, 4000 saints, 40,000 confessors, above 3000 martyrs and apostles, who have converted 30 provinces to the Christian faith, besides emperors, kings, &c. This order has produced a great number of eminent writers and learned men.

The Benedictins, though but one order, are divided into several congregations, which have their peculiar customs and observances different from the rest. Each of these is subdivided into provinces, which have their general chapters. This order is said to have been brought into England about the year 596. The English congregation, which had subsisted from the time of the mission of St. Aulin, was destroyed under Henry VIII. and by degrees reduced to one single man, father Buckley; who, in 1607, procured a re-establishment of the congregation at Doway, in the Netherlands, where it still subsists in a kind of dependency on that of St. Valladolid in Spain. At the general chapters, they chuse provincials, with their assistants, for each of the provinces of Canterbury and York, who have jurisdiction over the missionaries employed therein. They are governed by a president-general, and three definitors, chosen every three years. At their admission they make a fourth vow, *viz.* that they will go to the mission in England, and return when their superiors think fit.

BENEDICTIN Nuns, are religious women, who embrace the rule of St. Benedict.

BENEDICTION, in a general sense, the act of blessing, or giving praise to God, or returning thanks for his favours. Hence also benediction is still applied to the act of laying grace before or after meals. Neither the ancient Jews, nor Christians, ever ate without a short prayer. The Jews are obliged to rehearse a hundred benedictions per day; of which, eighty are to be spoken in the morning. Vitring. de Synag. Vet. lib. iii. Rabbi Nehemiah Baruch, in 1688, published a discourse on the manner wherein the sacerdotal benediction is to be pronounced. In the synagogue of Ferrara, it is rather sung than spoken. Among the ancient Jews, as well as Christians, benedictions were attended with the imposition of hands; and Christians, in process of time, added the sign of the cross, which was made with the same hand, elevated or extended. Hence, in the Romish church, benediction was used to denote the sign of the cross, made by a bishop or prelate, from an idea that it conferred some grace on the people. The custom of receiving benediction by bowing the head before the bishops, is very ancient, and was so universal, that emperors themselves did not decline this mark of submission. Under the name benediction the Hebrews also frequently understand the presents which friends make to one another, in all probability because they are generally attended with blessings and

and compliments, both from those who give and those who receive them.

BENEDICTION, Nuptial, the external ceremony performed by the priest in the office of matrimony. The nuptial benediction is not essential to, but the confirmation of a marriage in the civil law.

BENEDICTION, beatic, benedictio beatica, is the *viaticum* given to dying persons. The pope begins all his bulls with this form: "Salutem et apostolicam benedictionem."

BENEDICTION, regular, that conferred by abbots on their monks, or by a senior monk on a junior.

BENEDICTIONE privati, to be deprived of benediction, was a kind of punishment inflicted on monks, whereby, when the next received the abbot's blessing, the offenders were dismissed without it.

BENEDICTION is also used for an ecclesiastical ceremony, whereby a thing is rendered sacred or venerable. In this sense benediction differs from consecration, as in the latter unctio is applied, which is not in the former. Thus the chalice is consecrated, and the pix blessed, as the former, not the latter, is anointed; though in the common usage these two words are applied promiscuously. The spirit of piety, or rather of superstition, has introduced into the Romish church benedictions for almost every thing. We read of forms of benedictions for wax-candles, for boughs, for ashes, for church-vessels, and ornaments; for flags or ensigns, arms, first-fruits, houses, ships, paschal eggs, *cilicium*, or the hair-cloth of penitents, church-yards, horses, moles, &c. which are sprinkled with holy water.

BENEDICTION of Arms, was a sort of public consecration of the weapons and ensigns, before the entering on a war, by a *formula* of words, and ceremonies appointed for that purpose.

BENEDICTIONALIS LIBER, an ancient church book, containing the forms of the divers sorts of benedictions given by bishops, priests, &c. Such was the *benedictionalis liber* of Gregory the Great, described by Lambecius.

BENEDICTUM, an epithet, formerly given to lenient or gentle operating medicines, more especially rhubarb. In this sense we find, in some dispensatory writers, *benedictum laxativum* used for lenitive electuary. Though in others, *benedicta laxativa*, or the *blest laxative*, denotes another easy purge, made up of turbit, diagyridium, spurges, hermodactyls, anise-seeds, funnel-seeds, sal gemma, and honey. Schroder also gives the appellation *aqua benedicta* to his emetic; and Myrsicht does the same to his *aqua serpenti*, or water of wild thyme. Some have called the philosopher's stone *lapis benedictus*.

BENEDICTUM VINUM. See VINUM.

BENEDICTUS CARDUS. See THISTLE.

BENEDITTO SACCO. See SAN BENITO.

BENEFACA, in *Geography*, a town of Spain, in the province of Valencia, 10 leagues from Valencia.

BENEFICE, BENEFICIUM, in the *Feudal System*, is a term applied to those portions of land which the kings and christians bestowed on their adherents. As long as they had no fixed property in land, they could only bestow an horse, a suit of armour, or such like recompence, on those who in peace or war were attached to their person, and devoted to their service. But upon their settling in the country which they conquered, and when the value of property came to be understood among them, they conferred upon their followers the more substantial recompence of land. Accordingly the term *benefice* was the primitive name, and most simple form of the feudal possession. These grants were called "beneficia," because they were gratuitous donations; and they were also called "honores," because they were regarded

as marks of distinction. What were the services originally exacted in return for these "beneficia," cannot be determined with absolute precision; because there are no records so ancient. M. de Montesquieu (*Sp. of Laws*, b. iii. c. 3. & 16.) considers these "beneficia" as fiefs, which originally subjected those who held them to military tenure. M. de Mably (*Observ. sur l'Histoire de France*, i. 356.) contends, that such as held them were at first subjected to no other service than what was incumbent on every free man. But when it is considered, that allodial property subjected those who possessed it to serve the community, it is reasonable to conclude, that "beneficia" subjected such as held them to personal service and fidelity to him from whom they received these lands. They were granted originally only during pleasure. (See Montesquieu, *ubi supra*, and Du-Cange voc. *Beneficium* and *Feudum*.) But the possession of benefices did not continue long in this state. A precarious tenure during pleasure was not sufficient to satisfy those who held it, and to attach them to their superior lord; and, therefore, they soon obtained the confirmation of their benefices during life. (Du-Cange Gloss. voc. *Beneficium*.) After this it was easy to obtain or extort charters rendering "beneficia" hereditary, first in the direct line, then in the collateral, and at last in the female line. Leg. Longob. lib. iii. tit. viii. Du-Cange.

It is not easy to ascertain the precise period when each of these changes took place. M. de Mably (*ubi supra*, tom. i. p. 103—160. 429.) conjectures, with some probability, that Charles Martel first introduced the practice of granting "beneficia" for life; and that Louis le Debonnaire was among the first who rendered them hereditary. Mabillon, however, (*De Re Diplomatica*, l. vi. p. 353.) has published a placitum of Louis le Debonnaire, A. D. 860, by which it appears, that he still continued to grant some "beneficia" only during life. And in 889, Odo, king of France, granted lands to Ricabodo "fideli suo jure beneficiario et fructuario," during his own life; and if he should die, and a son were born to him, that right was to continue during the life of his son. This was an intermediate step between fiefs merely during life, and fiefs hereditary to perpetuity. While "beneficia" continued under their first form, and were held only during pleasure, he who granted them not only exercised the "dominium," or prerogative of superior lord, but he retained the property, giving his vassal only the usufruct. But under the latter form, when they became hereditary, although feudal lawyers continued to define a "beneficium" agreeably to its original nature, the property was in effect taken out of the hands of the superior lord, and lodged in those of the vassal. At length the word "feudum" came to be substituted in the room of "beneficium;" but Muratori observes (*Antiq. Med. Aevi*, v. 1. p. 594.) that no instance of this kind occurs in any authentic charter previous to the eleventh century; and Dr. Robertson (*Hist. Ch. V. vol. i. p. 269.*) informs us, that a charter of king Robert of France, A. D. 1008, is the earliest deed in which he has met with the word "feudum."

BENEFICE, Beneficium, in an *Ecclesiastical Sense*, a church endowed with a revenue for the performance of divine service; or the revenue itself, assigned to an ecclesiastical person for life, in return for his performing the service of the church.

All church preferments, except bishoprics, are called *benefices*; but they must be given for life, not for years, or at will; and all benefices are, by the canonists, sometimes called *divinites*. But we now ordinarily distinguish between benefice and dignity, by applying the word *dignity* to bishop-

rics, deaneries, archdeaconries, and prebends; and benefice to parsonages, vicarages, and donatives.

There is an obvious reference in the term benefice to the feudal system, which was incorporated in all the governments of Europe. As the lands of all private proprietors were holden of the prince, and because they were originally gratuitous donations, denominated "*beneficia*," the pope assumed the privilege of a feudal lord, and claimed the authority of distributing the preferments of the church at pleasure, which commenced first in Italy, and gradually extended itself to England; and hence the care of the souls of a parish came to be called a benefice. Blackstone's Comm. vol. iv. p. 106.

Hence, doubtless, came the term benefice to be applied to church livings; for, beside that the ecclesiastics held for life like the soldiers, the riches of the church arose from the beneficence of princes.

In all Christian churches, the benefices of the clergy are a sort of freeholds, which they enjoy, not during pleasure, but during life or good behaviour. If they held them by a more precarious tenure, and were liable to be turned out upon every slight disobligation either of the sovereign or of his ministers, it would perhaps be impossible for them to maintain their authority with the people, who would then consider them as mercenary dependants upon the court, in the sincerity of whose instructions they could no longer have any confidence.

As to the origin of ecclesiastical benefices, it is hard to determine when the revenues of the church were first divided: it is certain that, till the fourth century, all the revenues were in the hands of the bishops, who distributed them by their economy; they consisted principally in alms, and voluntary contributions. As the church came to have lands, parts thereof were assigned for the subsistence of the clerks, and called benefices; of which we find some traces in the fifth and sixth century: but then there does not appear to have been any certain partition, nor any precise quota allotted to each particular; but the allotments were absolutely discretionary till about the twelfth century.

At first, each was contented with a single benefice, but pluralities were by degrees introduced on pretence of equity: for a single benefice being sometimes scarce thought a competency, the priest was allowed two; as his quality or occasions increased, so the number of benefices that were to support him were increased too. Hence some, affecting to equal princes in quality, pretend to revenues answerable to it.

The canonists distinguish three ways of vacating a benefice, viz. *de jure*, *de facto*, and *by the sentence of a judge*. A benefice is vacated "*de jure*," when the person enjoying it is guilty of certain crimes, expressed in laws, as heresy, simony, &c. A benefice is vacated "*de facto*," as well as "*de jure*," by the natural death, or the resignation of the incumbent: which resignation may be either express or tacit; as when he engages in a state, &c. inconsistent with it; as among the Romanists, by marrying, entering a religious order, or the like. A benefice becomes vacant "*by the sentence of a judge*," by way of punishment for certain crimes, as concubinage, perjury, forcery, &c. See DEGRADATION.

Benefices are divided by the canonists into *simple* and *sacerdotal*. In the first there is no obligation but to read prayers, sing, &c.: such are canonries, chaplainships, chantries, &c. The second are charged with the cure of souls, or the direction and guidance of consciences: such are the vicarages, rectories, &c.

The Romanists, again, distinguish benefices into *regular*

and *secular*. *Regular* or *titular* benefices are those held by a religious, or a regular, who has made profession of some religious order: such are abbeys, priories conventual, &c. Or rather, regular benefice is that which cannot be conferred on any but a religious; either by its foundation, by the institution of some superior, or by prescription. For prescription, forty years possession by a religious makes the benefice regular. *Secular* benefices are those which are only to be given to secular priests, i. e. to such as live in the world, and are not engaged in any monastic order. All benefices are reputed secular, till the contrary is made appear. They are called "*secular benefices*," because held by seculars; of which kind are almost all cures. Some benefices, regular in themselves, have been secularised by the pope's bull.

A *BENEFICE in commendam*, is that, the direction and management whereof, upon a vacancy, is given or recommended to an ecclesiastic for a certain time, till it may be conveniently provided for. See COMMENDAM.

BENEFICE, Possession of a. See POSSESSION.

BENEFICIARII, in *Roman Antiquity*, denote soldiers who attended the chief officers of the army, being exempted from other duty. *Beneficarii* were also soldiers discharged from the military service or duty, and provided with "*beneficia*" to subsist on. These were probably the same with the former, and both might be comprised in the same definition. They were old experienced soldiers, who, having served out their legal time, or received a discharge, as a particular mark of honour, were invited again to the service, where they were held in great esteem, exempted from all military drudgery, and appointed to guard the standard, &c. These, when thus recalled to service, were also denominated *evocati*; and before their recall, *emeriti*.

BENEFICIARI was also used for those raised to a higher rank by the favour of the tribunes, or other magistrates. The word "*beneficiarius*" frequently occurs in the Roman inscriptions found in Britain, where *consulis* is always joined with it; but besides *beneficiarius consulis*, we find in Gruter *beneficiarius tribuni, pretorii, legati, præfetti, proconsuls, &c.*

BENEFICIARY, in a general sense, something that relates to benefices.

BENEFICIARY, beneficiarius, is more particularly used for a beneficed person, or him who receives and enjoys one or more benefices.

BENEFICIARY is more particularly used among *Roman Writers*, for a person exempt from public offices. In which sense, *beneficarii* stand contradistinguished from *municipes*: It also denotes, in *Middle Age Writers*, a feudatory or vassal; and it is also used for a clerk or officer, who kept the account of the *beneficia*, and made the writings necessary for it. The same denomination was likewise given to the officers who collected the rents and duties belonging to the *sficus*.

BENEFICIO. See DEPRIVATION à *Beneficio*.

BENEFICIO, Suspendo à. See SUSPENSION.

BENEFICIO primo ecclesiastico habendo. See PRIMO.

BENEFIELD, SEBASTIAN, in *Biography*, an eminent English divine, was born at Prestonbury, in Gloucestershire, in 1559, and educated at the university of Oxford, where he occupied the chair of Margaret professor of divinity for 14 years with great reputation. Towards the close of his life he retired to his rectory of Meysey-Hampton, near Fairford, in his native country, and there died in 1630. Dr. Benefield was so eminent a scholar, disputant and divine, and particularly so well versed in the fathers and schoolmen, that he had not his equal in the university. In his theological opinions he was a rigid Calvinist; and in his general conduct he was remarkable for strictness of life and sincerity.

His

His works, consisting of commentaries on the 1st, 2d, and 3d chapters of Amos, sermons and lectures in divinity, are now sunk into oblivion.

BENEFIT, is used for a privilege granted to some person, as of an immunity, or the like.

BENEFIT of Clergy. See **CLERGY**.

BENENAIM, BENENATH, BENENASCH, or BENENAT, in *Astronomy*, the outermost star, of the second magnitude, in the tail of the *Ursa major*.

This is sometimes also called *ataloth*.

BENENCASA, Count. a Venetian nobleman, born in 1745, not more distinguished by his birth than talents, taste, and knowledge in literature, is confessed, by M. Laborde, in his "Essai sur la Musique," in 4 vols. 4to. published at Paris in 1780, to have furnished him with the chief part of his information concerning the poets, composers, musicians, and authors of Italy; and for enriching his researches. M. Laborde acknowledges with gratitude his obligations. See vol. iii. of "Essai sur la Mus." where there are many articles concerning Italian composers and singers with which count Benencasa has furnished the editor, that breathe the true spirit of taste, sensibility, and knowledge. This acknowledgment had escaped us in the first perusal of M. Laborde's work; but we always thought the articles concerning the Italian composers and singers in this work, of a different colour from the rest of the book: more liberal, more enthusiastic for genius and talents, and a taste more discriminative and refined, than either that of M. Laborde, or his guide, the Abbé Roussier.

When the account of the commemoration of Handel was writing, the editor being very desirous to know what judicious foreigners thought of those exhibitions, particularly Italians, accustomed to good music in their churches, as well as theatres, he applied to count Benencasa, who was then in London, and had been present at the performance of the Messiah in Westminster-abbey, for information concerning the comparative grandeur and excellence of the band, with any other which he had heard, or of which history or tradition had preserved the memory in his own country. As they had not time for a full discussion of the subject, when it was first proposed, *viva voce*, signor Benencasa was so obliging as to honour him with his opinion in a letter, which, before his departure from England, he entreated his permission to publish, and it will not only serve as an honourable record of this stupendous exhibition, but must have been the more flattering to the projectors of the plan, as the count is an excellent judge of music; having heard, read, meditated, and written on the subject, with a degree of feeling and intelligence, that is equally honourable to himself and the art. For this letter, see the commemoration of Handel, p. 115.

PENEPLACITO, Ital. a music term, implying a pleasure; equivalent to *ad libitum, ad suo piacere*; which see.

BLNERMOID, in *Geography*, a mountain of Scotland, in the county of Sutherland.

BENESCHAU, a town of Silesia, in the province of Oppau, 8 miles east of Troppau.

BENESSOW, a town of Bohemia, in the circle of Kaurzim, in which fairs are held.

BENESSOW, Benfen, Penfen, or Panzen, a town of Bohemia, in the circle of Leutmeritz, 6 miles S. S. W. of Kamantz; famous for the manufacture of the best paper that is made in Bohemia.

BENET, a town of France, in the department of Vendée, and chief place of a canton, in the district of Fontenay le Comte, 3 leagues south-east of Fontenay.

BENET Cape, a bay, lying on the south-side of the western peninsula of the island of St. Domingo, and forming with

the line to Petit Goave on the north side, the narrowest part or isthmus. N. lat. 18° 20'. W. long. 72° 47'. The cape is the west point of the bay, and cape Jacquemel the east point, nearly east and west from each other.

BENETTO, a river in the island of Ceylon, 2 miles south from Barberain island, having on the south side a small fort upon a hill, under which is a good road in 15 fathoms.

BENEVEN, a mountain of Scotland, in the county of Inverness, 21 miles east of Fort William. See **BEN N'vie**.

BENEVENTE, a town of France, in the department of the Creute, and chief place of a canton, in the district of Bourgaueuf; 10 miles N. N. W. of Bourgaueuf. The place contains 1141, and the canton 8378 inhabitants: the territory includes 225 kilometres and 12 communes.—Also, a town of Spain, in the province of Leon, seated on the river Eda. N. lat. 42° 4'. W. long. 5° 5'.

BENEVENTO, a city of Italy, in the kingdom of Naples, in a duchy of the same name, comprehending, besides the city, a district of some miles. This capital of the Principato Ultra, or principality of Benevento, and see of an archbishop belonging to the pope, is situated at the point of a hill, between two narrow vallies, in one of which runs the river Sabato, and in the other the Calore, near the confluence of these two streams. N. lat. 41° 6'. E. long. 14° 57'.

One of the entrances into the city is through the arch of Trajan, now called the "Porta Aurea," which is in tolerable preservation, and one of the most magnificent remains of Roman grandeur out of Rome. The architecture and sculpture are both singularly beautiful. This elegant monument was erected in the year of Christ 114, about the commencement of the Parthian war, and after the submission of Decebalus had entitled Trajan to the name of Dacicus. The order is composite; the materials, white marble; the height, 60 palms; length, 37½; and depth, 24. It consists of a single arch, the space of which is 20 palms, and the height 35. On each side of it, two fluted columns, upon a joint pedestal, support an entablement and an attic. The intercolumniations and frieze are covered with basso-relievos, representing the battles and triumph of the Dacian war. In the attic is the inscription. As the sixth year of Trajan's consulate, marked on this arch, is also to be seen on all the military columns erected by him along his new road to Brundisium, it is probable, the arch was built to commemorate so beneficial an undertaking. No city in Italy, Rome excepted, can boast of so many remains of ancient sculpture, as are to be found in Benevento. Scarcely a wall is built of any thing but altars, tombs, columns, and remains of entablatures. The most considerable are in the upper town, supposed by Swinburne (Travels in the two Sicilies, vol. ii. p. 336.) to be the site of the old one.

The cathedral is a clumsy edifice, in a style of Gothic, or rather Lombard, architecture. This church, dedicated to the Virgin Mary, was built in the sixth century, enlarged in the eleventh, and altered considerably in the thirteenth, when archbishop Roger adorned it with a new front. In the court stands a small Egyptian obelisk, of red granite, crowded with hieroglyphics. In the adjoining square, are a fountain, and a very indifferent statue of Benedict XIII., long archbishop of Benevento.

The writers of the Benedictine history fix its origin in the years immediately succeeding the Trojan war, and claim Diomed, the Etolian chief, as its founder. Others assign it to the Samnites, who made it one of their chief towns, whither they frequently resorted for refuge, when worsted by the Romans. In their time, its name was "Maleventum," of uncertain etymology, but after the conquest of Samnium, changed by the Romans into "Beneventum," in order to introduce their colony under fortunate auspices. Near this place,

place, in the 479th year of Rome, Pyrrhus was defeated by Curius Dentatus. In the war against Hannibal, Beneventum signalized its attachment to Rome, by liberal tenders of succour, and by real services. Its reception of Gracchus after his defeat of Hanno, is extolled by Livy, and from the gratitude of the senate, many solid advantages accrued to the Beneventines. However, it shared the devastations of the Roman empire, attending the irruption of the northern nations. When the Lombards invaded Italy, they fixed the seat of their empire at Pavia, and sent a detachment to take possession of the southern provinces. In 571, Zotto was appointed duke of Benevento, as a feudatory to the king of Lombardy, and seems to have confined his government to the city alone, from which he occasionally sallied forth to seek for booty. The second duke, called Arechis, conquered almost the whole country that now constitutes the kingdom of Naples. Upon the fall of Desiderius, last king of the Lombards, the state of Benevento was not materially affected. Arechis the second kept possession, and availing himself of this favourable conjuncture, asserted his independence; threw off all feudal submission; assumed the title of prince; and coined money with his own image upon it; a prerogative exercised by none of his predecessors, as dukes of Benevento. Afterwards, when Radelchis and Siconulph aspired to the principality, each of them invited the Saracens to his aid. For the termination of these fatal dissensions, the dominions of these competitors were divided into two distinct sovereignties. In 851, Radelchis reigned as prince at Benevento; and his adversary fixed his court, with the same title at Salerno. From this treaty of partition, the ruin of the Lombards became inevitable; and the erection of Capua into a third principality was another destructive operation. From this time the inroads of the Saracens, and the attacks of the eastern and western emperors, together with anarchy and animosity at home, reduced the Lombards to such wretchedness, that they were able to make a very feeble resistance to the Norman arms. Benevento, however, was chiefly governed by its own dukes and sovereigns, till in the year 1053, the emperor Henry III. transferred it conditionally to pope Leo IX. From the year 1054, to this day, the Roman see, with some short interruptions of possession, has exercised temporal dominion over this city. In a plain near the city a bloody battle was fought in 1266, when Charles of Anjou defeated and killed Manfred, his competitor for the sovereignty of the two Sicilies. In 1703, this city suffered greatly from an earthquake.

BENEVIS. See **BEN NEVIS**.

BENEVOLENCE, in *Ethics*, denotes a hearty desire of the good of mankind, evidencing itself, as ability and opportunity offer, in the cheerful and diligent practice of whatever may promote the well-being of all. Some have traced the origin of this affection in self-love: others again in some "instinct" or determination of our nature, antecedent to all reason from interest, which influences us to the love of others, and they have accordingly made it the foundation of universal "virtue:" others ascribe it to the intelligent constitution of human nature, and observe, that it arises not from instinct, but from the natures and necessity of things. Hutcheson's Inquiry concerning Moral Good and Evil, p. 140, &c. Price's Review, &c. chap. iii.

BENEVOLENCE OF God, in *Theology*, denotes his disposition to do good and to communicate happiness. This perfection of the deity has been referred to the class of moral attributes. (See **ATTRIBUTES**.) For the illustration and proof of divine benevolence; see **GOODNESS**.

BENEVOLENCE is used, both in our *Statutes* and *Chronicles*, for a voluntary gratuity given by the subjects to their sove-

reign, to which each person contributes in proportion to his estate. Stow (*Annals*, p. 701.) says, that it grew from the days of Edward IV. It may be found also Anno 11, Henry VII. c. 10. yielded to that prince in regard of his great expences in war, and otherwise. (12 Rep. 19.) But as benevolences had been extorted under many succeeding princes, without a real and voluntary consent, it was made an article in the petition of right, (3 Car. I.) that no man shall be compelled to yield any gift, loan, or benevolence, &c. without common consent by act of parliament.

Nevertheless, by act of parliament, (13 Car. 2. c. 4.) it was given to his majesty king Charles II. with a proviso that it should not be drawn into future example. It was, therefore, declared by the statute 1 W. & M. st. 2. c. 2. that levying money for or to the use of the crown, by pretence of prerogative, without grant of parliament; or for longer time, or in other manner, than the same is or shall be granted, is illegal. See **AID** and **TAX**.

In this sense, benevolence amounts to much the same with what in other nations is called "subsidium charitativum," given sometimes by tenants to their lords, by the clergy to their bishops, &c.—In France it is called *free gift*, excepting that this latter is restrained to the act of the clergy.

BENEVOLENT Affections, in *Ethics*. See **AFFECTION**.

BENEVOLENTIA Regis Habenda, in *Law*, the form of purchasing the king's pardon and favour, in ancient times and submissions, to be restored to estate, title, or place. Paroch. Antiq. p. 72.

BENEVOLI, ORAZIO, in *Biography*, maestro di capella to the pope in 1650, and extremely applauded by his contemporaries for *poliphonic* compositions. Antonio Liberati, his disciple, in a letter which he published at Rome in 1684, in which he characterises all the eminent contrapuntists of that school, speaking of Benevoli, says: that he surpassed all the matters of his time in writing for four and even six choirs, in which, by the construction and order of the parts, the imitations of beautiful passages, inverted fugues, double counterpoint, new contrivances, ligatures, preparations and resolutions of discords, the texture, connection, and fluidity of the whole, which, like a river, *crescit eundo*; in short, with the wonderful richness and beauty of his harmony, he so completely vanquished envy herself, as to obtain the applause of great masters, while he excited no other wish in the rest, than to imitate his powers in the management of ecclesiastical harmony; by uniting numerous choruses, without dulcness, confusion, or breach of rule. He was many years maestro di capella of the Basilica of St. Peter at Rome, and composed his famous mass for six choirs of four parts each, for that cathedral, on the cessation of the plague. It was performed by a band of more than 200 singers, arranged in different circles of the duomo, the sixth choir occupying the summit of the eupola. Besides this mass in 24 parts, there is extant a motet by the same author, for twelve sopranos, or treble voices of equal extent. There can be little melody in any of these multiplied parts; but to make them move at all, without violation of rule, requires great meditation and experience. No author of poliphonic compositions, perhaps, ever equalled Benevoli in this kind of science, except the Netherlander, Okenhem, the master of Jusquin, and our countrymen Tallis and Bull, of whose faculties and invincible patience in such achievements, there will be further occasion to speak elsewhere. The effect of such multiplied parts can so seldom be tried, that it seems an experiment which never can be fairly made, and is only amusing to the imagination. If there had been more frequent rehearsals of the *miserere* in eight:

eight real parts by Leo, which Anfani had performed in 1781 at the Pantheon by more than forty voices, it may be supposed, from such movements as were correctly executed, that the effect of the whole would have been wonderful! but L. n lived in a more polished age, and was gifted, not only with patience, but with taste and genius.

BENYE', in *Geography*, a small island of Africa, on the river Sierra Leone, where the English had formerly a factory and a small fort, which was taken by the French in 1704, and razed to the ground.

BENFIELD, or **BENFELDEN**, a town of France, and principal place of a canton, in the district of Barr, and in the department of the Lower Rhine, seated on the Ill; $4\frac{1}{2}$ league south of Strasburg. The place contains 1220, and the canton 10,240 inhabitants; the territory includes 180 kilometres and 15 communes. N. lat. $48^{\circ} 14'$. E. long. $7^{\circ} 45'$.

BENFIOL, a mountain of Scotland, in the island of Coll.

BENG, a name given among the Mahomedans to the leaves of hemp formed into pills or conserve; the use of which, as well as opium, the more rigid Mussulmen esteem to be unlawful, though not mentioned in the Koran, because they intoxicate and disturb the understanding, as wine does, and in a more extraordinary manner. These drugs, however, are now commonly taken in the East; but those who are addicted to them are generally regarded as debauchees.

BENGAL, in *Geography*, the most eastern province of the empire of Hindoostan, lying on each side of the Ganges, and bounded by Afam, Booran, and Bahar on the north, by Bahar, Berar, and Orissa on the west, by Orissa and the bay of Bengal on the south, and by the mountains that separate it from Cassay, Aracan, and the Birman dominions on the east and south-east. It extends from about $21^{\circ} 30'$, to about $26^{\circ} 40'$ N. lat.; and from about 86° , to about $92^{\circ} 30'$ E. long. but its boundaries are not accurately ascertained. About 50 miles beyond Tacriagully, which is the termination of a stupendous range of mountains, that accompanies the course of the Ganges from the west, these mountains begin to form the northern boundary of Bengal on the western side of the Ganges; and from hence another range of mountains strikes from the south, but in a curve swelling westward, which terminates within sight of the sea, about 30 miles from Ballasore. To the north these mountains divide Bengal from the southern division of Bahar; and to the south they seem to be the natural separation of Bengal from Orissa. Eastward the province of Bengal extends as far as Ramnatty, a town belonging to the king of Afam, and seated on the river Burampooter. The sea-coast of Bengal, between the mouth of the river Hoogly and that of the Ganges, extends from east to west 100 miles; and the whole is a dangerous inhospitable shore, which sand and whirlpools render inaccessible to ships of burden. For several miles within land the country is intersected by numerous channels, through which both rivers discharge their waters, by many mouths, into the ocean; and the islands formed by these channels are covered with thickets, and excepted chiefly by light of day. According to Achar's division, Bengal is one of the eleven soubahs, or provinces, of Hindoostan proper; and its government extended to Cattaek or Cattaek, and along the river Mahanuddy, as the soubah of Orissa appears not to have been formed at that time. The British nation possess in full sovereignty, the whole soubah of Bengal, the greatest part of Bahar, and certain districts of Orissa, comprehending 149,217 square British mile, and, with the addition of Berar, 162,000 square miles, or 30,000 more than are contained in Great Britain and Ireland; and the number of inhabitants

has been estimated at nearly eleven millions. But by some later computations the number has been found to be much more considerable. From actual surveys in different districts, in which the land occupied in tillage has been distinguished, from that occupied by water or waste, and for which latter an allowance has been made of one-fourth of the whole surface, it appears, that the uncultivated land in Bengal amounts to about 31,331,499 acres; and that these cultivated acres require 5,265,432 tenants; adding to these the artificers and manufacturers, in the proportion of about 11 to 40, we shall have 6,718,514 heads of families, at five persons each; whence the whole number of inhabitants will be 33,590,770. By other estimates the population has been computed at more than 30 millions. If to these be added about 18 or 20 millions for the population of the British possessions in the Myfore and Carnatic, the dominions of the East India Company, will contain a number amounting, probably, to not less than 50 millions. With a due encouragement of industry, the present population is thought sufficient to bring into tillage the whole of the waste lands of Bengal and Bahar. The country of Bengal, independent of Bahar and Orissa, is somewhat larger than Great Britain. The revenue of Bengal is rated in the *Ayin Acbari*, towards the close of the 16th century, at 149 $\frac{1}{2}$ lacks of rupees; under Aurungzebe it is stated by Mr. Frazer, in his "Life of Nadir Shah," at 131 lacks; in Sujah Cawn's nabobship, A. D. 1727, it amounted to 142 $\frac{1}{2}$ lacks; in 1778 to 197 lacks, net-revenue. The total revenue of Bengal, Bahar, Orissa, and Benares, belonging to Great Britain, together with the subsidy from the nabob of Oude, is computed by Mr. Rennell at 4,210,000*l.* sterling; the expence of collection, military and civil charges, &c. amounts to 2,540,000*l.*; whence he infers that the clear revenue is 1,670,000*l.* The natural situation of Bengal is singularly happy with respect to security from the attacks of foreign enemies. On the north and east it has no warlike neighbours; but it is guarded by a formidable barrier of mountains, rivers, or extensive walls, towards those quarters, if such an enemy should start up. On the south is a sea-coast guarded by shallows and impenetrable woods, and with only one port, and even that of difficult access, in an extent of 300 miles. It is only on the west that any enemy is to be apprehended; and even there the natural barrier is strong; and with its population and resource, aided by the usual proportion of British troops, in addition to the Sepoy establishment, Bengal might bid defiance to all that part of Hindoostan, which might be disposed to become its enemy.

The English established a commercial intercourse with this country at an early period; and the English East India company (see *COMPANY*) made a settlement on the river Ganges, in the kingdom of Bengal, probably in the former part of the 17th century. Their first factory in that kingdom was at the town of Hoogly, on a river of the same name, about 26 miles above Calcutta. About the year 1699, the company, for their greater convenience, removed to Calcutta, on the same river, where they built the fort, named Fort William, which they still possess. Their fort and garrison were designed for the protection of their vessels that came down from Patna, laden with piece good, raw silk, and saltpetre, which were the principal staple commodities of Bengal; otherwise the rajahs, whose dominions lay on that river, and who were either tributaries to, or powerful governors under, the Mogul, were apt to make, and sometimes did actually make, arbitrary demands of duties for passing that way. However, it was in the reign of Ferokiere, great-grandson of Aurungzebe, who was deposed in 1717, that the English East India company obtained the famous "firman," or grant, by which

their

their goods of export or import were exempted from duties or customs; and this was regarded as the company's commercial charter in India, while they stood in need of protection from the princes of the country. In the years 1742 and 1743, Bengal was invaded by both the Mahratta states, with armies consisting, as it is said, of 30,000 horsemen each; nor did they depart out of the provinces until the year 1744, when they had collected a vast mass of plunder, and had established the claim of the "Chout," or a fourth part of the net revenues of the provinces, as this proportion was called in the language of Hindoostan. In 1753, the Berar Mahrattas obtained possession of the province of Orissa, partly by conquest and partly by cession from Aliverdy, the nabob of Bengal; and their proximity to Bengal, from which they were separated only by a shallow river, afforded them frequent opportunities of plundering its frontier provinces; and it was not till the year 1761, when Cossim Ally, nabob of Bengal, ceded the provinces of Burdwan and Midnapour to the English, that the Mahrattas ceased to plunder them. In 1756, Aliverdy Cawn, nabob of Bengal, was succeeded by his grandson Surajah Dowlah, who, pretending to be irritated at the conduct of the English within his dominions and really jealous of the rising power of Europeans in general, in other parts of India, determined to expel the English from Bengal, and accordingly took their fort at Calcutta, the chief British settlement in the province, upon which their trade depended, and compelled those among them, who were not made prisoners, to retire, and others he caused to perish by confining them in a small chamber called the "black-hole" of Calcutta. In the following year, however, an armament from Madras, under admiral Watson and colonel Clive, not only recovered Calcutta, but brought the nabob to terms. With a view to permanent security for the future, they negotiated with Jaffier Ally Cawn, an omrah in high trust and favour with the nabob; and he engaged, on condition of their assisting him in his views towards the throne, to be their future ally and confederate. The famous battle of Plassey, fought in June 1757, and in which Jaffier aided the accomplishment of their wishes, by remaining neuter, laid the foundation of the future power of the British nation, not only in Bengal, but in Hindoostan. From that time they became the arbiters of the succession of the nabobship of Bengal, which speedily led to the possession of the powers of government; for Cossim Ally, who had been placed in the room of Jaffier, disliking his situation, resolved at all events to hazard a change. This brought on a war, which terminated in the expulsion of Cossim, and left the Bengal provinces in the possession of the English, who restored Jaffier to the nabobship. Lord Clive, assuming the government of Bengal in 1765, seized the opportunity, afforded by the recent death of nabob Jaffier Ally, of taking possession of the Bengal provinces; and obtained from the nominal Mogul, Shah Aulum, a grant of the duanny, or administration of the revenues of Bengal, Bahar, and Orissa; on condition of paying the Mogul 26 lacks of rupees (260,000*l.*) *per annum*. Thus a territory producing at that time at least a million sterling *per annum*, after every expence was defrayed, and containing at least ten millions of inhabitants, was gained to the company, on the side of Bengal; together with the northern circars, valued at near half a million more, and for which a grant was also obtained. The Bengal provinces, which have been in our actual possession from the year 1765, have, during that whole period, enjoyed a greater share of tranquillity than any other part of India; or indeed, than those provinces had ever experienced since the days of Aurungzebe. Previous to the establishment of our influence, invasions were frequent, particularly by the Mahrattas, and one province or other was ever in rebellion;

owing to a want of energy in the ruling power, an ill-paid and mutinous army, and an excess of delegated power.

The government of Bengal, and its extensive dependencies, was first vested in a governor-general and a supreme council, consisting of a president and eleven counsellors; but in 1773, these were restricted to four, with Warren Hastings, the governor-general, who were to direct all affairs, civil and military, in the provinces of Bengal, Bahar, and Orissa; and to control the inferior governments of Madras on the east, and Bombay on the west, with Bencoolen, in the island of Sumatra. The court of judicature consists of a chief justice, and three other judges, with civil, criminal, naval, and ecclesiastical jurisdiction. The Hindoos are governed by their own laws, nor would it be easy, if practicable, to extinguish the influence of the Brahmins, or totally to abolish the castes, to whatever degree they may countenance and maintain fanaticism and superstition. The military establishment in Bengal is always respectable, but varies according to the situation of affairs. The British troops are supported by the Sepoys, a native militia, who are accustomed to have numerous idle followers, so that the effective men seldom constitute more than a quarter of the nominal army. A force of 20,000 British soldiers might probably encounter and vanquish 200,000 blacks or Hindoos. The decisive battle of Plassey, which secured to us the possession of these opulent provinces, was gained with an army of about 3000 men, of whom 900 only were Europeans; and at the battle of Buxar, in 1764, the whole number of combatants on the side of the British did not exceed 7000, and of these 1200 only might be Europeans.

The climate of Bengal is reckoned by Dr. Lind, in his "Essay on diseases incident to Europeans in hot climates, &c." the most insalubrious and fatal to Europeans of any of the British settlements in India, that of Bencoolen excepted. This is owing partly to the heat of the air, and more especially to that of the land wind, which, passing over a tract of country much heated by the season, and consisting in various districts of extensive sandy deserts, becomes so hot and suffocating that it can scarcely be endured. These hot winds, occasionally loaded with sand, are so pernicious, particularly to persons exposed to them whilst sleeping, that they produce a kind of paralytic distemper, called the "barbiers," which is attended with a total loss of the use of the limbs, and for which no relief can be obtained but by removing to some other climate. But the unhealthiness of this climate is principally owing to the inundations of its rivers, and to its level or flat surface, so that the waters stagnate; and of course when, in the month of October, the stagnated waters begin to be exhale by the heat of the sun, the air is greatly polluted by the vapours that arise from the slime and mud that are cast by the rivers, and by the putrefaction of dead fish, and other animals. Although the salubrity of the climate of Bengal has been considerably improved by clearing the country of trees and jungle, by canals, and by draining the marshes, yet fogs are at this time common, very thick and very unhealthy; and excessive fogs also prevail at other seasons, and they often occur in the months of January and February. In Bengal, the hot, or dry season, begins with March, and continues to the end of May. the thermometer sometimes rising to 110°; and this intense heat is occasionally interrupted by violent thunderstorms from the north-west. The rainy season continues from June to September or October; but the three last months of the year are generally pleasant. The cold season commences in November, and lasts till the beginning of February; northerly winds are then prevalent, and the mornings, especially before sun-rise, are cold. It is also frequently very

foggy, but about 8 or 9 o'clock, when the sun begins to be powerful, the thick mist is dissipated. For the remainder of the day the sky is perfectly clear, so that no clouds appear in the air for several days together. In the months of September and October diseases rage, and chiefly attack those that are lately arrived; but here, as in all other places, sickness is more frequent and fatal in some years than in others. The most prevalent disorders are fevers, of the remitting or intermitting kind; for though sometimes they may continue for several days without any perceptible remission, yet they have in general a great tendency to it, and are commonly accompanied with violent paroxysms of rigors or shiverings, and with discharges of bile upwards and downwards. If the season be very sickly, some are seized with a malignant fever, of which they soon die. The body is covered with blotches of a livid colour, and the corpse in a few hours becomes quite black and corrupted. At this time fluxes prevail, which may be called bilious, or putrid, the better to distinguish them from others, which are accompanied with an inflammation of the bowels. In all these diseases at Bengal, the lancet is cautiously to be used. The mode of treating fevers and bilious complaints being now well understood, they are less alarming and fatal. Dr. Lind says it is a common observation, both at Bengal and Bencoolen, that the moon or tides have a remarkable influence on intermitting fevers; and he informs us, on the testimony of a gentleman of undoubted veracity, and of great knowledge in medicine, that at Bengal he could foretel the precise time when the patient would expire; it being generally about the hour of low water. From these and other observations, the doctor deduces an useful hint, which is, to take doses of bark at the full and change of the moon, as being the seasons most liable to an attack or relapse in these intermitting fevers.

Although the rainy season does not commence in the flat countries of Bengal till the latter end of the month of June, the Ganges and other rivers begin to swell in the mountains of Thibet early in April, and by the latter end of that month, when the rain-water has reached Bengal, the rivers rise here. This circumstance is accounted for partly by the melting of the snow on the mountains, but principally, as Mr. Rennell observes, by the vast collection of vapours wafted from the sea by the southerly or south-west monsoon, and suddenly stopped by the lofty ridge of mountains that runs from east to west through Thibet. Hence it appears that the rainy season must commence sooner in places that lie near the mountains than in those that are more remote. In Bengal the rivers rise by slow degrees; the increase being only about an inch per day for the first fortnight. It then gradually augments to two and three inches, before any quantity of rain falls in the flat countries; and when the rain becomes general, the mean increase is about five inches per day. By the latter end of July, all the lower parts of Bengal, contiguous to the Ganges and Burramooter, are overflowed, and form an inundation more than 100 miles wide; nothing appearing but villages and trees, excepting, very rarely, the top of an elevated spot, the artificial mound of some deserted village, appearing like an island. The inundations in Bengal are as much occasioned by the rain that falls there, as by the waters of the Ganges; in proof of which it is alleged, that the lands in general are overflowed to a considerable height long before the bed of the river is filled. It ought to be observed, that the ground adjacent to the bank of the river, to the extent of some miles, is higher than that which is at a greater distance, and thus it serves to separate the waters of the inundation from those of the river, until it overflows. This high ground is, in some seasons, covered a foot or more; but the height of the inundation within varies, of course, ac-

ording to the irregularities of the ground; and is in some places 12 feet. When the inundation becomes general, the river appears, as well by the grass and reeds on its banks, as by its rapid and muddy stream; for the water of the inundation acquires a blackish hue, by remaining long stagnant among grass and other vegetables; nor does it ever lose this tinge, which shews the predominancy of the rain water over that of the river; and the slow rate of the motion of the inundation, which does not exceed half a mile per hour, indicates the remarkable flatness of the country.

In order to guard those tracts of land, which, by the nature of their culture and productions, and by the lowness of their situation, would be injured by too long an inundation, dikes or dams are raised at an enormous expence, extending in the whole of their length to more than a thousand English miles. Some of these are at the base equal to the thickness of an ordinary rampart, and yet, on account of the want of tenacity in the soil of which they are composed, they are often found ineffectual, and need frequent repairs. One particular branch of the Ganges, navigable only during the rainy season, and then equal to the Thames at Chelsea, is conducted between two of these dykes, through an interval of 50 miles; and when it is full, the passengers in the boats look down, as from an eminence, on the adjacent country. During the whole state of the river, the tide becomes incapable of counteracting the stream, and in a great measure of ebbing and flowing, except near the sea. At such a season, a strong wind, that blows up the river for any continuance, swells the waters two feet above their ordinary level; and such accidents have occasioned the loss of whole crops of rice. This rice is of a particular kind, for the growth of its stalk keeps pace with the increase of the flood at ordinary times, but is destroyed by too sudden a rise of the water. The harvest is often reaped in boats. There is also a kind of grass which overtops the flood in the same manner, and at a small distance has the appearance of a field of the richest verdure. Mr. Rennell informs us, that in the year 1763, a tragical event happened at Luckipour, about 50 miles from the sea, by a strong gale of wind, conspiring with a high spring-tide, at a season when the periodical flood was within 1½ foot of its highest pitch. The waters then rose 6 feet above the ordinary level. On this occasion the inhabitants of a considerable district, with their houses and cattle, were totally swept away; and the calamity was aggravated by its happening in a part of the country which scarcely produces a single tree, to which a drowning man might escape. These inundations are traversed by every kind of embarkation; such as are bound upwards taking advantage of a direct course and still water, at a season when every stream rushes like a torrent. The wind too, which at this season blows regularly from the south-east, although in the gulf or bay of Bengal the monsoon blows from the S.S.W. and S.W., favours their progress in the eastern and northern parts of Bengal, where it blows from the S.E. or E.S.E.; so that a voyage which would take up nine or ten days by the course of the river, when confined within its banks, may be performed in six days. Husbandry and grazing are at this time both suspended; and the peasant travels in his boat those fields which, in another season, he was used to plough; happy, however, that the elevated site of the river-banks places within his reach the herbage which they afford; without which his cattle must perish. Towards the middle of August, the inundation begins to subside; for though great quantities of rain fall in the flat countries in August and September, yet, by a partial cessation of the rains in the mountains, the supplies fail that are necessary to keep up the inundation. However, the decrease of the inundation does

not always keep pace with that of the river, on account of the height of the banks; but after the beginning of October, when the rain has nearly ceased, the remaining inundation goes off quickly by evaporation; and the lands are left highly manured, and in a state fit for receiving the seed, after the simple operation of ploughing. For an account of the "bore," to which the rivers of Bengal are subject; see the article BORE.

From the time of the change of the monsoon in October, to the middle of March, the rivers are in a tranquil state; and then the "north-westers" begin in the eastern parts of Bengal, and later as we advance westwards: and they may be expected once in three or four days, until the commencement of the rainy season. These "north-westers," so called from the quarter in which they usually originate, are the most formidable enemies to the inland navigation of Bengal. They are sudden and violent squalls of wind, and though they are of no long duration, they are often attended with fatal effects, and have caused whole fleets of trading boats to sink almost instantaneously. They are more frequent in the eastern than in the western part of Bengal; and happen oftener towards the close of the day than at any other time. For some hours before they arrive, they are indicated by the rising and singular appearance of the clouds; and thus the traveller is warned to seek shelter. But in the great rivers they are truly formidable; more especially about the latter end of May, and beginning of June, when the rivers are much increased in width. After the commencement of the rainy season, which period varies, in different parts, from the middle to the end of June, tempestuous weather must be occasionally expected; but at this season places of shelter are more common by the filling of the creeks and inlets, as the river increases, and, on the other hand, the bad weather is of longer continuance, than during the season of the "north-westers." The inland navigation of Bengal is performed with safety, with respect to the weather, during the long interval between the end of the rainy season, and the beginning of the "north-westers." At this latter season peculiar attention and care are necessary. For an account of the boats that are used in this inland navigation, see BUDGE-ROW.

Bengal is a low flat country, fertilized by numerous rivers and streams, and interspersed with a few ranges of hills. The triangle formed by the Cossimbazar and Hoogly rivers to the west, by the Ganges to the east, and by the sea-coast to the south, as well as a large tract on each hand to the north of this Delta (see DELTA), is as level as the lower Egypt. Such parts of this extensive plain as are not watered by the Ganges or its branches, are fertilized by many other streams from the mountains; and for the space of three months, when the sun is mostly vertical, heavy rains fall every day. The periodical rains and intense heats produce a luxuriance of vegetation, almost unknown to any other country in the globe; and therefore Aurungzebe emphatically denominated Bengal "the paradise of nations," and it has been peculiarly styled "the paradise of India." The soil is a stratum of black vegetable mould, rich and loamy, extending to the depth of six feet, and in some places fourteen, and even twenty feet, lying on a deep sand, and interspersed with shells and rotten wood, which indicate the land to have been overflowed, and to have been formed by materials deposited by the rivers. It is easily cultivated without manure, and bad harvests seldom occur. In this country they have two harvests; one in April, called the "little harvest," which consists of the smaller grain; and the second, called the "grand harvest," is only of rice. The chief grain is rice, on which the natives chiefly subsist, and which is exported from hence into other countries. Bengal produces also very good wheat; and it

furnishes the inhabitants of the mountains of Cassimere, and of the elevated plains of Thibet, with both rice and wheat, in return for their shawls, gold, and musk. Upon the failure of their crop of rice, a grievous famine ensues. Of this many melancholy instances have occurred, both in Bengal and in other parts of India. One of the most deplorable of this kind occurred in the year 1770. On this occasion, the nabob, and great men of the country, distributed rice gratis to the poor; but when their own stocks began to fail, they withdrew their donations, and Calcutta was crowded with multitudes of persons who came thither to solicit relief. But the whole stock being expended, the famine prevailed, and many thousands fell down as victims to hunger in the streets and fields; so that their bodies, mangled by dogs and vultures, corrupted the air, and seemed to threaten a plague. Many persons were employed daily, on the company's account, in throwing dead carcases into the river, so that the waters were contaminated, and the fish could not be eaten without danger. Hogs, ducks, and geese, fed chiefly on the dead bodies; and the only meat which could be procured was mutton, which, on account of the dryness of the season, was so small, that a quarter of it would scarcely weigh a pound and a half. This dreadful famine was occasioned by a preternatural drought, which caused both the great harvest of 1769, and the little one of 1770, to fail. As a preservative from the miseries attending a dry season, and as a source of supply of water for domestic purposes, the inhabited part of the country is furnished with numerous reservoirs of an oblong square shape, and of various sizes, frequently more than an acre in extent, dug in the earth, and called "tanks." These are filled with water in the rainy season, and afford the inhabitants, during the dry months, a supply of water of a better quality and appearance than that of the Ganges, which is always thick and muddy. In these tanks is bred a sort of fish, in taste resembling our carp. Among the other vegetable productions of Bengal, the most important of which are tobacco, sugar, indigo, cotton, mulberry, and poppy, we may enumerate the banian tree, the cocoa-nut palm, which supplies a manufacture of cordage, called "coir," (see COIR), guavas, plantains, pomelos, potatoes, lime trees, and orange trees. They have also the pisang, or banana; the furi tree, which affords, by incision of the stem, a clear and sweet juice, of an intoxicating quality, and when turned sour is used as vinegar; and the mango tree, the fruit of which is preferred to all others in the country, except very fine pine apples, and which is much used in the hot months. Mr. Ives (Voyage from India to England, &c. 4to. 1773) mentions a beautiful tree, called "chulta," which has a flower that is at first a hard green ball, on footstalks about four inches long. When this opens, the calyx appears to be composed of five round, thick, and succulent leaves, and the corolla of the same number of fine beautiful white petals. After one day the corolla falls off, and the ball closes again; of these there is a succession for several months. In the walks of Bengal they have a tall tree, called the "tatoon;" and near Calcutta a spreading tree, called the "russa," making a fine appearance when in full bloom. In their gardens they cultivate most of the vegetables that are natives of other climates, and fit for culinary purposes. Among the animals of Bengal, we might mention the elephant, tiger, wild buffaloes, jackals, dogs, snakes, scorpions, &c. and a kind of birds, named "argill," or "hurgill," a species of ARDEA, which are very large and ravenous, and held in great veneration by the Brahmins. Game, poultry, fish, and water-fowl of all kinds, are very plentiful in Bengal. The horses used by the Europeans in this province are either of Persian or Arabian extraction,

tradition, and consequently sell at a high price. The native mode of Bengal is thin, limpid, and contemptible, and even inferior to that of the Welsh or Highland pease, or the finest of the animals. The cattle principally used for the service of Bengal are bullocks; and the most common vehicle among the peasants is a *HATKERY*; which ferret Bengal is more numerous in it, than in any other part of India. The size of its sheep is small; their figure lank and thin; and the colour of three-fourths of a flock is black or dark grey. The quality of a fleece of wool in this country is worse, if possible, than its colour; as it is remarkably soft, thin, and hairy.

The inland commerce of Bengal is very considerable; and it is carried on by means of these rivers and canals that intersect the country, and along the banks of which are many towns and villages, with plentiful fields of arable and pasture land, which diversifies the face of the country, and renders it very beautiful. Some of the canals, formed either by the hands of men, or by the operations of nature, are wide and deep enough to be navigated by large ships. One of the most considerable of these is the "Hazi," or "Hare" channel, that runs straight through the country into the arm of the river that flows by *Dacca*. The chief articles of commerce which the country yields are silk, muslin, calicoes, cotton, and other piece-goods; opium, satapetre, gum-lac, and indigo. Rice, wheat, &c. can only be reckoned casual branches of trade. Bengal has an inland trade with *Thibet*, which it supplies with cottons, besides some wine and cloths of European manufacture, receiving in exchange musk and rhubarb; and a much more extensive commerce with *Agra*, *Delhi*, and their adjacent provinces, in salt, sugar, opium, silk, silk-stuffs, and an immense quantity of cottons and muslins. The maritime trade of Bengal, managed by the natives of the country, has been divided into two branches, *viz.* that of *Cattack* by means of its port *Balafore* with the *Maldives*, whither they transmit rice, coarse cottons, and fine silk stuffs, and where they receive in exchange cowries, used for money at Bengal, and sold to the Europeans. The inhabitants of *Cattack* also carry on a considerable trade with the country of *Afani*, which they supply with salt in great quantities, receiving in payment a small quantity of gold and silver, ivory, musk, eagle-wood, gum-lac, and a large quantity of silk. A more considerable branch of trade, which the Europeans carry on with the rest of India, is that of opium, which is cultivated at *Patna*. The Dutch send rice and sugar to the coast of *Coromandel*, for which they are usually paid in specie. They have also formerly supplied *Ceylon* with rice, *Malabar* with cottons, and *Burat* with silk, whence they brought back cotton, usually employed in the coarse manufacture of Bengal. Some ships laden with rice, gum-lac, and cotton stuffs, are sent to *Balafora*, and return with dried fruits, rose-water, and gold. The rich merchandise carried to *Arabia* is paid for entirely in gold and silver.

The articles that are disposed of to advantage in Bengal, are all kinds of spices, japan copper, sandal wood, and japan wood, and also tin, lead, pewter, and other European commodities, of various kinds. See *EAST INDIA COMPANY*, and *CALCUTTA*.

Bengal is peopled by various nations, but the principal are the *Moguls*, or *Moors*, and the *Gentoos*, *Hindoos*, or *Bengalese*; and both the *Bengalese* and *Moors* have each a distinct language.

The *Moguls*, or *Moors*, are descendants of those who between two and three centuries ago reduced this kingdom, and the whole empire of *Hindustan*, under their dominion. They were originally natives of *Tartary*. They nearly re-

semble the Europeans in traits and features; but differ more or less from them in colour. The *Moguls* are called *Moog* in the Indian language, *Mogul* signifies white. The women are very handsome, and much use bathing; like the men, they are of an olive colour, and differ in form from the women of Europe. Their legs and thighs are long, and their bodies short. According to *Tavernier*, the *Mogul* women are chaste, very fruitful, and bring forth with so much ease, that they frequently walk the streets the very next day after delivery. *Stovonius* says, that their morals are indubitably bad, and that they are addicted to the most unnatural vices. The *Moguls* are more courageous than the *Bengalese*; and their "Sepahs" form good soldiers, when they are trained and commanded by European officers. Their religion is that of *Mahomet*; and consequently they hold in abhorrence the idolatry of the *Gentoos*.

The *Bengalese*, who are much more numerous than the *Moors*, do not differ much from the Europeans in stature; their colour is dark brown; the complexion of some of them approaches to yellow; their hair black and uncurled; and they are generally handsome and well made. They are indolent, lascivious, and pusillanimous; and nothing but hunger or thirst rouses their activity. Some of them, however, are intelligent and ingenious; and though most of them are poor, some of their banyans, or merchants, are very wealthy, and very expert in matters of trade. Their women are said to be uncommonly wanton and intriguing; prostitution is not thought by them a disgrace; and they have licensed places, in which the law allows them, under a certain assessment, to distribute their favours. Their artificers in gold and silver are very ingenious, and imitate any model that is set before them with great exactness. Europeans are often surpris'd to observe the perfection to which they have arriv'd in those branches of spinning cotton, and of repairing muslins that are torn, and in almost all the handicraft operations in which they are employ'd. The common people go almost naked. They wear nothing but a piece of linen, wrapped round the waist, and pass'd between the legs. Those of a higher rank have a dress of white cotton, which doubles over before as high as the shoulders, and is fasten'd with strings round the middle, and which hangs down to their feet. Most of them shave their heads, and eradicate the hair from all parts of the body. Rich people wear turbands, and many of them wear small ear rings. The dress of the women consists of a piece of cotton cloth thrown over the shoulders, under which they wear a kind of coat and drawers. Those who can afford it adorn their hair with gold bodkins, and their arms, legs, and toes with gold and silver rings and bands, and also their ears, and the cartilage of the nose. The inferior women wear similar ornaments, made of a sort of cowries, and call'd "chandelos." Their heads are bare, and their hair turn'd up, and fasten'd at the back of the head. Rice is the chief article of their food, the remainder of which consists of vegetables and milk. They eat no fish, flesh of animals, nor any thing that has had life. Their beverage is pure water.

Both the *Moors* and *Bengalese* are fond of the amusement of dancing; and for this purpose they employ young women, who are trained up from their infancy to this diversion, and who are richly decorated whenever they are engag'd to perform. Dancing is accompanied with music, both vocal and instrumental. For an account of the other inhabitants of Bengal, see *GENTOOS* and *HINDOOS*. See also *BRAMHINS* and *FAQUIRS*. Besides these, several of the eastern nations, *Persians*, *Armenians*, and others, resort to Bengal, allur'd by the advantageous trade which they are enabled to pursue there.

Four European nations have established themselves in Bengal

B E N G A L.

gal for the purpose of commerce, *viz.* the English, the Dutch, the French, and the Danes. The English are the principal, and their chief settlement is at Calcutta, the present capital of the country. (See CALCUTTA.) Europeans lead, in Bengal, a very easy life. The men, who are almost all in the service of the company, devote a part of the morning to business, and persons of fortune keep in daily employment a black writer, for which he receives 20 or 25 rupees per month. They spend the remainder of their time in personal improvement or recreation. Besides the black writers, most Europeans have also one or two banyans, who note down all payments and receipts, and who adjust all pecuniary matters in buying and selling. Moorish domestics are kept for the menial services of the house, and "peons," to run before the palankeens, and to carry an umbrella, or parasol, over the head of their master, when he goes out; and every house has likewise a porter, whose sole occupation is to answer the door; and one or two sets of "berras," or palankeen bearers, together with a "harrymaid," or "matarani," who carries out the dirt; and a great number of slaves, both male and female.

The current coin in Bengal, and in the whole extent of Hindostan, are gold and silver RUPEES; which see. See also MOHUR. Copper coin is not seen in Bengal. For change they make use of cowries, 80 of which make a "poni," and 60 or 65 ponis, according to the scarcity or plenty of cowries in the country, make a rupee. However, there is great variation in the value of cowries in Bengal. Weights are calculated by the Sar, answering nearly to two pounds avoirdupoise, of which 40 make a maund; which see. The measures of length are cobidos, and gels or gofs, which see. Distances between places are measured by coss. See COSS. The vessels used for inland navigation are burs, budgerows, and pulwhas, which see. The general conveyance of passengers by land is on a sort of litters, called palankeens, which see. For an account of the manners and customs of the inhabitants of Bengal, and various other particulars; see CALCUTTA, HINDOSTAN, and INDIA. See also GENTOOS, HINDOOS, and BRAHMINS.

BENGAL, *bay of*, is a large gulf in the Indian ocean, between the two peninsulas of India; bounded on the north by the coast of the province of Bengal, on the east by the kingdoms of Aracar, Pegu, Siam, the peninsula of Malacca, or Malaya, and part of the island of Sumatra; on the south by the great Indian ocean; and on the west by the coasts of Orissa, Coromandel, and the island of Ceylon. The Ganges and several other rivers, discharge themselves into this gulf; it contains many islands; and it abounds with bays, harbours, and port towns. Its widest extent is about 86 leagues, and its length about 72 leagues. In a more confined view it may be said to begin at cape Palmiras.

BENGAL, *Language of*, or BENGALISE, is derived from the Shanferit (which see), and distinct from the Persian, Moors, and Hindostannic, which are spoken in several parts of this province, and each of which has its peculiar department in the business of the country. Its alphabet, like that of the Shanferit, consists of 50 letters, of the form, sound, and arrangement of which Halhed has given a very particular and detailed account in his "Grammar of the Bengal Language," printed at Hoogly in Bengal in 1778. The only impediments in acquiring the knowledge of this language are the great number of letters in its alphabet, the intricate variety of their combinations, and the difficulty of pronunciation; but the grammatical part is simple, though diffuse, and complete without being complex. Its rules are plain, and its anomalies few. The vowels are distributed into long and short, the latter of which are often omitted in

writing, and they are invariably subjoined to the consonant with which they are uttered, and never precede them. As every consonant, therefore, inherently possesses the short vowel on which its utterance depends, it is plain that no two consonants could have been joined together, and successively pronounced in the same syllable, but that a vowel must necessarily have intervened. In order to remedy this inconvenience, a set of distinct characters was invented, called "P,holaa's," or adjuncts. These are certain subordinate and subsidiary figures, eleven in number, that may be attached to each of the consonants in the alphabet respectively, and thus provide against the too frequent recurrence of the internal vowel. Exclusively of these "P,holaa's," almost any two or three consonants may be blended together, for supplying the omission of the internal vowel. The compound letters may be formed by placing one letter immediately under another; or by blending two letters together, so as by their union to make one character; or by making the first of the two consonants much smaller than the other letters, which latter mode is the most common. The genders of this language are three, and the terminations usually distinguishing the masculine are *aa*, and those of the feminine are *ee*; but it is not necessary that every noun comprehending sex should be distinguished by a particular termination, or mode of formation, expressly to denote its gender. The Bengalese has four cases besides the vocative, and in this respect it is much inferior to the Shanferit, which comprehends eight different cases. The Bengal nouns have neither dual nor plural numbers; and the same form of noun serves for the singular or plural. In compositions of this language, though the first and second persons occur very frequently, the use of the pronoun of the third is very rare; and in order to avoid the application of the words *he* and *they*, the names of persons are repeated in a manner that is very tiresome and disgusting. The second person is always ranked before the first, and the third before the second. The personal pronouns have seven cases, which are very irregularly varied. The indefinite pronouns are all aptotes in Bengalese, as they are in Latin and Greek. The Shanferit, which is the parent of the Bengalese, as well as the Arabic, Greek, and Latin verbs, are furnished with a set of inflections and terminations, so comprehensive and so complete, that by their mere form they can express all the distinctions both of person and time. By their root they denote a particular act, and by their inflection they express the time when it takes place, and the number of the agents; and thus their separate qualities are perfectly united. Every Shanferit verb has a form equivalent to the middle voice of the Greek, used through all the tenses with a reflexive sense, and the former is the most extensive of the two in its use and office; because in Greek the reflexive can only be adopted intransitively when the action of the verb descends to no extraneous subject; but in Shanferit, the verb is at the same time both reciprocal and transitive. Neither the Shanferit, nor the Bengalese, nor the Hindostannic, have any word corresponding to the sense of the verb *I have*, and therefore the idea is always expressed by *est mihi*; and of course there is no auxiliary form in the Bengalese verb answering to *I have written*, but the sense is conveyed by another mode. As the verb substantive *to be* in all languages is defective and irregular, it is called in Shanferit a "semi-verb;" and it is observed, by the ingenious writer above cited, that the present tense of this verb, both in Greek and Latin, and also in the Persian, appears evidently to be derived from the Shanferit. In the Bengalese, this verb has only two distinctions of time, the present and the past; and the terminations of the several persons of these serve as a model for those of the same tense in all other verbs

verbs respectively. The Bengalese verbs may be distributed into three classes, which are distinguished by their penultimate letter. The simple and most common form has an open consonant immediately preceding the final letter of the infinitive. The second is composed of those words whose final letter is preceded by another vowel or open consonant going before it. The third consists entirely of causals, derived from verbs of the first and second conjugation. The Greek verbs in $\mu\alpha$ are formed exactly upon the same principle with the Sanscrit conjugations, even in the minutest particular; of which instances occur in many verbs, which form from a root a new verb by adding the syllable *mi*, and doubling the first consonant. In forming the past tense, the Sanscrit applies a syllabic augment, like the Greek; and the future is characterised by a letter analogous to that of the same tense in the Greek, omitting the reduplication of the first consonant. Nor, indeed, is the reduplication of the first consonant always applied to the present tenses of the Sanscrit, any more than to those of the Greek. It is observed, that the natural simplicity and elegance of many of the Asiatic languages are very much debased and corrupted by the continual abuse of auxiliary verbs; and this inconvenience has evidently affected the Persian, the Hindostan, and the Bengal idioms. The infinitives of verbs, in the Sanscrit and Bengalese, are always used as substantive nouns; and a similar mode of signification often occurs in the Greek. In the Sanscrit language, as well as in the Greek, certain forms of infinitives and of participles comprehend time; and there are also other branches of the verb that seem to resemble the gerunds and supines of the Latin. All the terms which serve to qualify, to distinguish or to augment, either "substance" or "action," are classed by the Sanscrit grammarians under one head; and the word used to express it literally signifies increase or addition. According to their arrangement, a simple sentence consists of three members, viz. the agent, the action, and the subject: which, in a grammatical sense, are reduced to two, viz. the noun and the verb. They use a particular word for specifying such terms as amplify the noun, which imports quality, and corresponds to our adjectives or epithets. Such as are applied to denote relation or connection, are expressed by another term, which may be translated "preposition." The simple adjectives in Bengalese have no variation of gender, case, or number; neither is the adjective subject to inflection, but the sign of the case is confined to the substantive, with which it agrees; and its form is confined to the singular number, even when joined to a plural noun. But those derivative attributes, which are alternately adjectives and concrete nouns, generally preserve the distinctions of gender, which they all possess in the Sanscrit. Prepositions are substitutes for cases, which could not have been extended to the number necessary for expressing all the several relations and predicaments in which a noun may be found, without occasioning too much embarrassment in the form of a declension; these in the Greek language are too few, and hence results great inconvenience. The Latin, which is less polished than the Greek, bears a nearer resemblance to the Sanscrit, in words, inflections, and terminations.

The Bengalese method of computation, among the merchants, for the largest sums is by "fours," derived probably from the original mode of numbering by the fingers.

To this day the Bengalese reckon by the joints of their fingers, beginning with the lower joint of the little finger, and proceeding to the thumb, the value of which is also included as a joint; and thus the whole hand contains 15. From this method of performing numeration on the joints, arises that well known custom among the Indian merchants of settling all matters of purchase and sale by joining their

hands beneath a cloth, and then touching the different joints, as they would increase or diminish their demand. See BANSIANS.

It is peculiarly in the Bengalese computation, that the ninth numeral of every series of ten is not specified by the term of nine, in the common order of progression, but takes its appellation from the series immediately above it, as twenty-nine is not expressed in our manner, or by what we should conceive to be its proper denomination, but by a term denoting one less than thirty.

The Sanscrit language, besides other advantages, has a great variety in the mode of arrangement; and the words are so compacted together, that every sentence appears like one complete word. When two or more words come together "in regimine," the last of them only has the termination of a case; the others are known by their position; and the whole sentence, so connected, forms but one compound word, which is called a "foot."

For further particulars relating to the language of Bengal, its grammatical construction, and the method of acquiring it, we must refer to Halked, *ubi supra*.

The verses of the Bengalese are regulated by accent, and by the number of syllables in a line; no regard whatever being paid to quantity, but as it coincides with accent. Their poems, like those of the Arabians and Persians, are in rhyme; and the Bengal poets have many rules for contracting such words as are too long, and for extending those that are too short, for their metre. The Bengal measures are altogether borrowed from the Sanscrit, and may be divided into three species; viz. heroic, lyric, and elegiac.

In music, the Bengalese always use the minor key, and their gamut proceeds by the very smallest intervals of the chromatic scale. They have no idea of counterpoint, and always play or sing in unison or octaves.

The natives of Bengal write with a slender and tough reed, very common in all the east, which they shape almost like an European pen. They write with the hand closed, in which they hold the pen as the Chinese do their writing-pen-cil, pressing it against the ball of the thumb with the tip of the middle finger. The nib or point of the pen is turned downwards towards the writ; while the thumb pointing upwards, and lying on the pen with its whole length, keeps it firm against the middle joint of the fore-finger. As they have neither chairs nor tables, they sit upon their heels, or sometimes on their hams, whilst they are writing; and their left hand, held open, serves as a desk on which to lay the paper on which they write, which is kept in its place by the thumb.

BENGALENSIS, in *Conchology*, a species of *Venus*, described by Lister. The shell is orbicular, somewhat equilateral, with thick perpendicular stræ; and the beaks turned back. Inhabits Bengal.

BENGALENSIS, in *Ornithology*, a species of *VULTUR*, found in Bengal. It is of a brown colour, with the head and fore-part of the neck bare of feathers, and pale chestnut; bill lead colour, black at the tip. Latham. Gmelin.

BENGALENSIS, a species of *ORIS*, called by G. Edwards the *Indian Bustard*. The colour is black; space round the eyes brown; back, rump, and tail, shining black. Gmelin. Inhabits Bengal, and is about twenty-three inches in length. Brisson calls this *Pluvialis Bengaleensis major*; and Bullon, *Charge on outarde moyenne des Indes*. The beak and legs are whitish, tail streaked, and spotted with black. Edwards copied this bird from a drawing, and it does not appear that a specimen of it is known in any cabinet.

BENGALENSIS, a species of *RALLUS*, of a white colour, with the head and neck black; wings and back greenish, primary quill feathers spotted with red. Gmelin. This is

the Bengal water-rail of Albin; *Totanus Banghalensis* of Brisson; and Chevalier vert of Buffon. The bill, irides, and legs are yellow; crown, area of the eyes, lower part of the back and body beneath white, temples and throat black brown; primary quill feathers purple, secondaries green; tail purple, with fulvous spots.

BENGALLA, in *Geography*, a city of Hindostan, which existed during the early part of the 17th century, near the eastern mouth of the Ganges, but of which no traces now remain.

BENGASI, or **BERNICHE**, a sea-port town on the coast of Africa, in the Mediterranean. The merchants of this place usually join the caravan from Cairo at Augela in their way to Mourzouk, the capital of Fezzan, and import tobacco, manufactured for chewing, and snuff, and sundry wares fabricated in Turkey. N. lat. $32^{\circ} 10'$. E. long. 20° . This town is said to be the ancient Berenice, built by Ptolemy Philadelphus.

BENGEVAI, a town of Persia, in the province of Segestan, 75 miles south of Zareng.

BENGHUR, a town of Persia, in the province of Cabul; 32 miles north of Cabul.

BENGLO, a mountain of Scotland, in the county of Perth, the highest point of which is said to be 3724 feet above the level of the sea; 5 miles N. E. of Blair Athol.

BENGO, or **BENGA**, a province of the kingdom of Angola in Africa, situate along the river of its name, but more commonly known by that of Zenza. It has the sea on the west, and the province of Mofche on the east. The Portuguese have cultivated large tracts of land in this province, which now abounds with maize and manioc root, with which they make their bread. It produces also plenty of banana and cocoa trees. It is divided into several districts, of which the chiefs are natives, though tributary to Portugal. The inhabitants are Christians, and have eight churches.

BENGORE HEAD, a cape of Ireland, on the north coast of the county of Antrim, 10 miles N. E. of Coleraine. N. lat. $55^{\circ} 15'$. W. long. $6^{\circ} 19'$.

BENGUELA, a province of Angola in Africa, retaining the name of a kingdom, bounded on the east by the river Rimba, or Cumani, on the north by the Coanza, and Culogi, at about $10^{\circ} 51'$. S. lat. and reaching westward quite to cape Negro, according to the generality of geographers. But M. de Lisle extends it no farther north than Old Benguela, in $9^{\circ} 54'$. and according to him, it is bounded on the east by the Giaga Cafangi, or Giagan chief, and on the south he places the province of Ohila, between the Hottentots and Benguelas, which tract is mostly inhabited by such savage nations as the Caffres and Giagas. Benguela was formerly governed by its own kings; and most parts of the kingdom were fertile and populous; but it suffered so much from the incursions of the Giagas, and its wars with neighbouring states, that, with the protection of the Portuguese, they have not been able to recover their importance. Its valuable productions are similar to those of Angola and Congo: and from the humidity of the soil they have two fruit seasons in the year. It furnishes likewise a considerable quantity of salt, though of inferior quality to that of Chissama. The Zinbis, whose shells are current as money through several parts of Africa, are caught upon its coast, and paid in payment either by weight or measure. The country, being mostly mountainous, swarms with wild beasts, such as rhinoceroses, elephants, and wild mules. The lions, tigers, crocodiles, and other carnivorous animals, destroy great numbers of their cattle. Their fertile plains towards the sea-side formerly produced numerous herds of cattle, both small and great, but they are now become very scarce. The air of the

country is so unwholesome as to affect its produce, and taint even its waters. Few Europeans have, therefore, ventured to visit it, so that it remains in a great degree unknown. The chief towns are Old Bengueia, St. Philip, or New Bengueia, Mankikondo, and Katchul. The commerce of slaves is so prevalent in this province, that the natives will sell their relations or children from mere wantonness.

BENGUELA, *Old*, a town of Africa, in a province so called, south of a bay of the same name, near the Atlantic ocean. The town is seated on a high mountain, where large beeves, sheep, poultry, and other provisions, have been sold in great plenty, together with elephants' teeth; all which the inhabitants have bartered for muskets, and other fire-arms. S. lat. $11^{\circ} 5'$. E. long. $11^{\circ} 30'$.

BENGUELA, *New*, or *St. Philip*, a town in the province of Benguela, seated on the south of a large bay, about 2 leagues long and 1 broad, called by the Portuguese "Bahias-das-Vaceas," where they have a settlement and a fort, with a small garrison. S. lat. $12^{\circ} 8'$. E. long. $12^{\circ} 20'$.

BENHADAD, or the Son of ADAD, in *Scripture History*, the name of several kings of Syria. *Benhadad I.* was the son of Tabrimon, and began his reign about the year 940 B. C. He was induced by costly presents to assist Asa, king of Judah, against Baasha, king of Israel, whom he obliged to return to the succour of his own country, and to abandon Ramah, which he had undertaken to fortify. 1 Kings, xv. 18, &c. *Benhadad II.* was the son of the preceding, and his accession to the throne of Syria is stated to have taken place about the year 901 B. C. In his war against Ahab, king of Israel, he was totally defeated; and in the following year, renewing his attack upon the Israelites, in the plain of Aphek, he lost a great part of his army, and was reduced to the necessity of submitting to the mercy of Ahab, by whom he was treated kindly, and allowed to return peaceably into his own country. In a new war for the recovery of Ramoth-Gilead, the possession of which was retained by Benhadad, Ahab, joined by Jehoshaphat, king of Judah, marched against the Syrians, and a battle ensued, in which Naaman was the general of the Syrian army, and Ahab lost his life. Benhadad having afterwards laid siege to Samaria, and failing in his attempts to reduce it, fell sick, and sent Hazael his minister, to the prophet Elisha, with presents, in order to consult him concerning the issue of his disorder. Hazael, on his return to Damascus, informed Benhadad that his health would be restored; but Elisha having predicted that Hazael would succeed to the throne of Israel, the minister accomplished the prediction by striking Benhadad with a wet towel. Benhadad was reckoned a great prince, who contributed to advance the glory of his country, and his memory received divine honours in Syria. 1 and 2 Kings. Josephus Ant. l. viii. and ix. *Benhadad III.* succeeded his father Hazael on the throne of Syria, in the year 836 B. C. After having been several times defeated by Joash, king of Israel, he was expelled from all his father's conquests. 2 Kings. Jos. Ant. l. ix.

BEN-HINNON, or **GEH-HINNON**, the valley of the children of Hinnon, lay in the south-east suburbs of Jerusalem. See **GEHENNA**.

BENI, PAUL, in *Biography*, a learned writer, was born in Candia, about the year 1552, and educated at Eugubio in the duchy of Urbino. In early life he entered among the Jesuits, but afterwards quitted them. He was for some time professor of theology at the college of Sapienza at Rome; of philosophy, at Perugia; and of rhetoric and belles lettres, in the university of Padua, from 1599 to the time of his death in 1625. He was more lively than judicious;

cious; fond of maintaining singular opinions, and much engaged in literary controversies. He attacked the dictionary of La Crusca, in a work entitled "Anti-Crusca, &c." and defended Tasso, whom, with Ariosto, he preferred to Horace and Virgil. He also wrote on the pastor-fido of Guarini. All these works were written in Italian. The most considerable of his Latin productions are, "Commentaries on the poetry and rhetoric of Aristotle," Venice, 161, 1625; "A poetic and rhetoric, extracted from the works of Plato;" "Commentaries on the six first books of Virgil, and on Sallust;" "Disput. de annal. Eccl. Card. Baronii;" and "De Historia Scribenda," lib. iv. Ven. 1611, 4to. All his works were printed at Venice, in 5 vols. fol. Gen. Dict. Nouv. Dict. Hist.

BENI ANWER, in *Geography*, a district of the western province of Algiers, about N. lat. 35° 45'. E. long. 0° 50'.

BENI ANZIL, one of the eighteen provinces into which the Turks divided Algiers, so called from its capital.

BENI AFR, a town of Upper Egypt, on the east side of the Nile; 2 miles north of Aina, or Esneh.

BENI HAFIN, a town of Egypt, on the east side of the Nile, remarkable for its grottoes, dug in the mountains, which were formerly temples; 6 miles north of Achmounain.

BENI HABAT, called by Leo Africanus *Habat*, a province of Morocco, bounded to the north by the river Mamora, and extending south to that of Sarrat: 4 leagues from Rabat, to the east, are the provinces of Fez and Teda, and to the west the ocean. This province is very extensive, rich, and commercial; and produces wool of a very excellent quality.

BENI JEBIE a town of Egypt, on the west side of the Nile, 12 miles south of Achmounain.

BENI HEADJAH, and **BENI HORWAH**, two districts of the western province of Algiers, bordering on the Mediterranean, about N. lat. 36° 30'. and E. long. 2° 12'.

BENI JUBAR, mountains of Algiers, lying about 20 miles south of Bejeyah, or Bugia, and extending a considerable way along the coast, both in length and width, being parts of the little Atlas. They are steep and rugged, and furnish a great number of streams. They abound with fruit-trees, especially walnuts and figs, and produce plenty of barley, with which the inhabitants feed their numerous herds. The people are warlike, and have a chief of their own; and among them are excellent archers; and the whole ridge hath several villages, inhabited by the tribe or people whose name it bears.

BENI MARAN, a town of Egypt, 9 miles south of Achmounain.

BENI MASSIF, a district of the western province of Algiers, about N. lat. 36° 30'. and E. long. 2° 42'.

BENI MEZZAB, a district of the eastern province of Algiers, between 32° and 33° N. lat., and from 7° to 7° 10' E. long. This district is destitute of water, except that which they draw from wells.

BENI MIDA, a district of the western province of Algiers, N. lat. 35° 30'. E. long. 2° 12'.

BENI MISUR, a town of Egypt, on the west side of the Nile, 3 miles south of Abu Gerge.

BENI MOHAMMAD IL KIFUR, a town of Egypt, west of the Nile, and 9 miles south of Abu Gerge.

BENI RAJLID, a town of the western province of Algiers, north of the river Sheliff and near it. N. lat. 36° 10'. E. long. 2° 10'.

BENI SALIR, a town of Egypt: 6 miles N.W. of Manselout.

BENI SMAIL, and **BENI SNAUSE**, two adjoining districts of

the western province of Algiers, on the confines of the Tell, about 35° N. lat. and between 0° and 1° E. long.

BENI ZANESSI anciently *Hephaleni*, a district of the western province of Algiers, to the north of the Montes Chalkorygii, and east of the river Malva, or Mulloofah, about 34° 54' N. lat. and 0° 30' W. long.

BENI ZENAL, a branch of mount Atlas, in the western province of Algiers.

BENJA, a river on the coast of Africa, 3 leagues E.N.E. from Anperie, and E. from Commenda.

BENJAMIN, in *Biography*, the youngest son of Jacob by Rachel, and one of the twelve patriarchs of Israel. He was the object of his father's peculiar affection, and reluctantly permitted to accompany his brethren to Egypt, when his return with them was made by Joseph the condition of their receiving a supply of corn. Joseph, who was his only brother by both parents, treated him kindly, and contrived a pretext for detaining him in Egypt, but he afterwards, when he disclosed himself, permitted him to return to his aged father. The tribe of Benjamin, which formed part of Judea, properly so called, lay between the tribes of Judah and Joseph, contiguous to Samaria on the north, to Judah on the south, and to Dan on the west, which last parted it from the Mediterranean. It had not many cities and towns, but this defect was supplied by its possessing the most considerable, and the metropolis of all, the celebrated city of Jerusalem. The other cities were Jericho, Gibcon, Bethel, Gibeah, Hai, Gilgal, Anathoth, Nebo; to which may be added the two noted villages of Bethany and Gethsemane. This tribe was at length almost exterminated by the others, in revenge of the violence offered to the concubine of a Levite, in the city of Gibeah. Genesis, Joshua, Judges.

BENJAMIN OF TUDLA, a city of Navarre, a Jewish rabbi, flourished in the 12th century. Possessed of a superstitious veneration for the law of Moses, and solicitous to visit his countrymen in the east, whom he hoped to find in such a state of power and opulence as might redound to the honour of his sect, he set out from Spain in the year 1160, and travelling by land to Constantinople, proceeded through the countries to the north of the Euxine and Caspian seas, as far as Chinese Tartary. From thence he took his route towards the south, and after traversing various provinces of the farther India, he embarked on the Indian ocean, visited several of its islands, and returned, at the end of 13 years, by the way of Egypt, to Europe, with much information concerning a large district of the globe, altogether unknown at that time to the western world. He died in 1173, not long after his return from his travels. His "Itinerary" contains a narration of his travels, intermixed with many fabulous accounts, that serve to raise the credit of his nation. Caspar Oudin, however, (Comment de Script. Eccl. tom. ii. col. 1524. Loph. 1722.) represents him as a man of sagacity and judgment, and well-versed in the sacred laws; and says that his observations and accounts have been found upon examination to be generally exact, and that the author was remarkable for his love of truth. The first edition of the Itinerary appeared at Constantinople in 1543, with a translation from the Hebrew into Latin, by Benedict Arias Montanus; and it was printed by Plantin, at Antwerp, in 1575, 8vo. It was afterwards translated by the emperor Constantine, and his version was printed at Leyden, by Elzevir, in 1635, 8vo. A French translation of it was published by John Philip Barater, in 1734, 2 vol. 8vo. Robertson's America, vol. i. p. 45. Gen. Dict.

BENJAMIN TREE, in *Botany*. See LAURUS.

BENJAMIN, in *Pharmacy*. See BENZOIN.

BLNJAR RIVER, in *Geography*. See BENDERMASSIV.

BENI.

BENIBOURD, a mountain of the Highlands of Scotland, probably higher than Caringorm, which is 4060 feet.

BENICARLOS, a town of Spain, in Valencia, celebrated for the wine made in its neighbourhood; 3 miles north of Penniscola.

BENIDORME, *Mount and Cape*, lie about S.S.W. from cape St. Martin, on the south point of Altea bay, projecting eastward from the town, which gives it name; to the south of which is the island Benidorme, 2 miles off; at the north-east end of Alicante bay, on the east coast of Spain, in the Mediterranean.

BENIFAJO, a town of Spain in Valencia; 5 leagues from Valencia.

BENILET, a town of Asia, in the Arabian Irak; 145 miles N.W. of Bassora.

BENIMERINI, the denomination of an African dynasty, which succeeded that of the Almohedes, which see.

BENIN, an extensive kingdom of west Africa, comprehending the slave coast, bounded on the west by Guinea proper, or, more particularly, the Gold coast; on the north by Gago, Nigritia, and a chain of mountains; on the east by Mujaac and Makoko, and part of Congo, with the Ethiopic ocean, on the south, where it extends about one degree beyond the equinoctial line. It is commonly divided into three parts, *viz.* Whydah and Ardrah, containing the Slave coast, and Benin proper, which has the same boundaries with the former on the north, east, and south, and is terminated on the west by part of the gulf of Guinea and the Slave coast. Its extent from west to east is about 600 miles, but from north to south it is not ascertained. From the river Lagos, where it commences, its coast forms a gulf or bight, ending at cape Lopez, in which are the trading places, or villages, seated on several rivers, of Benin, Bonny, Old and New Calabar, Camaron, and Gabon. Benin is watered by several streams, of which some are considerable rivers. Towards the sea-coast the land is low and marshy, and of course the climate unhealthy; but at a greater distance from the sea the land rises, and the air is more pure. In some districts of the country, water is so scarce, that travellers are often supplied with it for money by officers, to whose department it belongs. The rivers teem with crocodiles, sea-horses, a particular species of torpedo, and various kinds of excellent fish. The country abounds with elephants, tigers, leopards, wild boars, asses, civet and mountain-cats, horses, hares, and hairy sheep; and among its birds the principal are parquets, pigeons, partridges, storks, and ostriches. The soil is generally fertile, and produces a great variety of trees and plants, such as orange, lemon, and cotton trees. The pepper of this country is not so plentiful nor so good as that of the East Indies. The native negroes are in general mild and good humoured, civil to strangers, and yet reserved, easily wrought upon by gentle means, but inflexible and resolute in resisting harsh treatment. In the conduct of business they are expert; but attached to their ancient customs and manners, which renders them slow and tedious in their negotiations. Honest and faithful in their dealings, they seldom or ever disappoint the confidence that is reposed in them. Their trade is carried on by a kind of brokers, called mercadors, or fiadors, who treat with strangers about all merchandize; but all their contracts are made with great secrecy, through fear of exciting the jealousy or avarice of their governors; and the richest persons exhibit the appearance of poverty, in order to escape the rapacious hands of their superiors.

The population of Benin is distributed into three classes of persons. The first is composed of three persons, called great lords, who attend the king, and present petitions to

him. Such is the influence of these, that the supreme government may be said to be lodged with them. The next class consists of those petty princes called "ares de roe," or street kings, of whom some preside over the commerce, others over the slaves; some over military affairs, and others over every thing pertaining to cattle and the fruits of the earth. Out of this class are chosen the viceroys and governors of provinces, who are responsible to the three great lords, to whose recommendation they owe their appointment. Each of them is presented by the king with a string of coral as a badge of office, which he is obliged always to wear about his neck, under the penalty of degradation, and even death. The third order consist of the fiadors, the mercadors, or merchants; the fulladers, or pleaders, and the veilles, or elders, all of whom are respectively distinguished by some peculiar mode of wearing the coral chain. The lowest class is formed by the plebeians, who are generally indolent and poor. The whole burden of labour, such as tilling the ground, spinning cotton, weaving cloth, and even cleaning the streets, is devolved upon the women. The chief workmen are smiths, carpenters, and leather-dressers; but in every occupation of this kind they are extremely awkward and artless. The common diet of the natives is beef, mutton, or fowls, and their bread is made of yams, beaten into a sort of cake. The meaner persons subsist on smoked or dried fish, and bread made of yams, bananas, and beans, mixed together. The drink of the poor is water, and that of the richer, water mixed with European brandy. The king, and persons of rank, support a certain number of poor, selected from the blind, lame, and infirm; the lazy, who will not labour, are suffered to starve; and by this excellent police, not a beggar or vagrant is to be seen. The natives of Benin are distinguished by their liberality; but in the exercise of it they are extravagantly vain and ostentatious. The dress of the natives is neat and ornamental; that of the rich, in which they appear in public, consisting of white calico, or cotton drawers, covered with another fine piece of calico plaited in the middle, and bound under a scarf, the ends of which are adorned with a handsome lace or fringe. The upper part of the body is mostly naked. The ladies of better fashion wear fine calico, beautifully chequered with various colours. The face and upper part of the body is covered with a thin veil, and the neck adorned with a string and chain of coral. Upon their arms and legs they wear bright copper or iron bracelets, meanly wrought. The persons of the women are not disagreeable. The children go naked till the age of ten or twelve years; their whole dress, before this period, consisting of a few strings of coral tied round the waist. The men neither curl nor adorn their hair; but they form part of it into locks, to which they suspend a bunch of coral. The women dress their hair with great art in a variety of forms, and occasionally apply to it a kind of nut-oil, which destroys its black colour, and in time changes it into green or yellow.

The men marry as many women as their circumstances allow; but they have scarcely any nuptial ceremony. Jealousy is very prevalent, and adultery is severely punished; but the violation of the marriage-bed is less known in Benin than in any other country. Male infants, as soon as they are born, are presented to the king, as rightfully belonging to him; but the females, being deemed the property of the father, are left wholly to his care and disposal. Both male and female children are circumcised, when they are about a fortnight old; and they are marked over their bodies with various incisions, that express certain figures. In some parts of Benin twin births are reckoned a happy omen; but at Aerbo, they are reputed a bad omen, and both the twins and their mother

mother are put to death. The inhabitants of Benin are less afraid of death than the other natives of the same coast. Such is their attachment to their own country, that those who die in other provinces are preserved for years, till they can be conveyed for burial to their native soil. On occasions of mourning, which is usually limited to 14 or 15 days, some shave their hair, others their beard, and others but half of either. The last obsequies of their kings are performed with some very extraordinary ceremonies. When the tomb stone is laid, they crown it with a banquet of the most delicate wines and sweetmeats, of which all are allowed to partake; and the mob, intoxicated with liquor, are guilty of the wildest excesses and riots. Those who obstruct them, as men, women, children, and even brute animals, are put to death; and having cut off their heads, they carry them to the royal sepulchre, and throw them in as offerings to the deceased king, together with all the cloaths and effects of those whom they have sacrificed to his manes. Nevertheless, amidst these barbarous customs, the kingdom of Benin is governed by laws, which breathe nothing but humanity, and sympathy for misfortune and distress.

As to the religion of this country, it is a strange mixture of good sense and absurdity. With some just notions of a Supreme Being they blend many absurd and idolatrous ceremonies. The "Fetisso" is worshipped here, as well as in all the other countries on the western coast of Africa. To every evil they give the name of devil, and worship him from fear, and to prevent his doing them injury; and they honour both God the Creator, and the evil spirit, by sacrifices and offerings. They are believers in apparitions; and they conceive that the ghosts of their deceased ancestors walk on the earth, and occasionally appear to them in their sleep to warn them of their danger, which they endeavour to elude by sacrifices. All their houses are full of idols, and they have particular huts or temples for the residence of their gods. Their priests also are numerous; and the grand, or high priest of Loebo, a town seated at the mouth of the river Formosa, is particularly famous for his skill in magic, and is never approached without the most profound veneration and awe. Besides their sabbath, a day of repose which occurs every fifth day, they have many other days appropriated to religious purposes. At some of their festivals they sacrifice not only a great variety of brutes, but likewise a number of human victims, who are usually condemned criminals, reserved for this purpose. They have one annual feast in commemoration of their ancestors; but their greatest festival is that called the coral feast, on which day alone the king appears to his people in great pomp, attended by 600 of his women. Wine and provisions are distributed on this occasion among the people, and the day ends in gluttony, drunkenness, and riot.

The government of Benin is despotic. The empire is divided into a great number of petty royalties, all of which are subject to the king of Benin, whose authority is absolute, and commands the most blind and servile obedience. The reigning monarch, when he apprehends his dissolution to be approaching, commands one of his sons to fill the throne, with an injunction, under pain of death, not to reveal the secret till after his death. When this happens, the destined sovereign is removed to the town of Ofsebo, a few miles from Benin, the capital, where he remains for some time to be instructed in the art of government, and the duties of a king. Upon his return, his first care, for securing his future tranquillity, is to murder his brothers, and thus to remove every rival to the crown. The royal revenues are very considerable; to these every governor contributes a large sum; and the inferior officers pay their taxes in cattle, fowls, cloth, and other commodities. Certain duties are also laid

upon foreign trade; besides the annual taxes paid to the governor for the privilege of commerce, a sixth of which belongs to the king. It is said that the sovereign of Benin is so powerful a prince, that, in one day, he can assemble an army of 20,000 men, and in a few days more 100,000. His troops, however, are destitute of courage and conduct, and observe neither order nor discipline; and, indeed, are merely a cowardly tumultuous rabble, which leave him exposed to the incursions of pirates and robbers, that are suffered to pillage and destroy, and sometimes to advance even to the capital. The arms used by them are swords, poniards, javelins, bows, and poisoned arrows.

The capital of this kingdom is Benin. The other principal towns, or rather villages, are Bododo, Arebo, Agatton, Awerri, and Meberg.

All the slaves purchased on this part of the African coast, except a tribe distinguished by the name of "Mocoos," are called in the West Indies "Eboes," probably from Arebo, on the river Benin. In language they differ both from the Gold Coast negroes, and those of Whydah, and in some respects from each other; and in complexion they are much more yellow than the others; but their colour is a sickly hue, and their eyes appear as if suffused with bile, even when they are in perfect health. These Eboes appear, in general, to be the lowest and most wretched of all the nations of Africa. The great objection to them as slaves is, their constitutional timidity, and dependency of mind; which lead them very frequently to seek, in a voluntary death, a refuge from their own melancholy reflections. They require, therefore, the gentlest and mildest treatment to reconcile them to their situation; but if their confidence be once gained, they manifest as great fidelity, affection, and gratitude, as can reasonably be expected from men in a state of slavery. The females of this nation are better labourers than the men, probably from having been more hardily treated in Africa. These Eboes, notwithstanding the depression and timidity which they manifest, on their first arrival in the West Indies, and which give them an air of softness and submission, forming a striking contrast to the frank and fearless temper of the Koromantyn Negroes, are in reality more savage than the people of the Gold Coast; inasmuch, that many tribes among them, and especially the Mocoos tribe, have been accustomed to the shocking practice of feeding on human flesh. In their religious worship, they adore certain reptiles, of which the guana, a species of lizard, is in the highest estimation, and in the worship of this animal, it is said, that they offer human sacrifices. *Mod. Un. Hist.* vol. xiii. p. 272, &c. *Edward's Hist. West. Ind.* vol. ii. p. 75.

BENIN, a city of Africa, and capital of the kingdom above described. It is pleasantly seated on the river Benin, or Formosa, about 69 miles from Agatton, at the mouth of the river, and is said to be 4 miles in circumference, and to contain 30 long, broad, and straight streets of low houses. The streets are adorned with a variety of shops filled with European wares, as well as the commodities of the country, such as cattle, cotton, and elephant's teeth. In their markets they expose to sale, for food, dogs, of which the Negroes are fond; and also roasted monkeys, apes, and baboons. Bats, rats, lizards, dried in the sun, palm-wine, and fruit, form the most luxurious entertainment, and stand always exposed to sale in the streets. As the country affords no stone, the houses are built with mud and clay, covered with reeds or straw: and they are separated from one another by chasms and ruins, that indicate its decay. The entrance into the city is by a gate of wood, which is defended by a bastion of mud and earth: and it is surrounded by a deep ditch 40 feet wide. A guard is stationed at this gate to receive the tolls, duties, and imposts collected from the merchandize. None but natives are permitted

permitted to live in the city; and of these some are wealthy, and carry on an extensive trade, which is committed to their wives, who go to all the circumjacent villages, and traffick in all sorts of merchandize, and who are obliged to bring the greatest part of their gains to their husbands. A principal part of the city is occupied by the royal palace, which is more distinguished by the extent of its dimensions than by the commodiousness or elegance of the structure. All the male slaves in this town are foreigners; for the inhabitants cannot be sold for slaves, and only bear the name of the king's slaves. This is one of the European marts for the purchase of slaves. N. lat. $6^{\circ} 10'$. E. long. $5^{\circ} 5'$.

BENIN, *River of*, called by Juan Alphonso de Aveiro, a Portuguese, who is said to have first discovered the country, *Formosa*, on account of the verdure and beauty of its banks; a considerable river of Africa, in the kingdom of Benin. It divides itself into several branches; and has some towns or villages on its banks, in which Europeans, and particularly the Dutch, carry on a commerce. Notwithstanding the beauty of its adjacent scenery, the air is noxious and pestilential, on account of the vapours exhaled by the sun's heat from its marshy banks; and it is much infested by the mosquito flies. The entrance into this river is in N. lat. $6^{\circ} 38'$, and E. long. $4^{\circ} 47'$.

BENIN-Daxx, *St.* a town of France, in the department of Nièvre, and chief place of a canton, in the district of Nevers. The place contains 1583, and the canton 10,565 inhabitants: the territory includes 350 kilometres, and 21 communes.

BENISH DAYS, among the Egyptians, a term for three days of the week, which are days of less ceremony in religion than the other four, and have their name from the *benish*, a garment of common use, not of ceremony. In Cairo, on Sundays, Tuesdays, and Thursdays, they go to the bashaw's divan; and these are the general days of business. Fridays they stay at home, and go to their mosques at noon; but though this is their day of devotion, they never abstain from business. The three other days of the week are the benish days, in which they throw off all business and ceremony, and go to their little summer-houses in the country.

BENISOUEF, in *Geography*, a town of Egypt, on the west side of the Nile. According to Savary, it is half a league in circumference; and Sonnini says, that of all the places situated along the Nile, from Cairo, or for the space of more than 30 leagues, this is the largest, as well as the most affluent. The houses are only cottages of brick and earth, coarsely constructed; but the lofty minarets, vying in height with the surrounding date-trees, and discovered through their highest branches, present an agreeable object to the view. A manufacture of coarse carpets renders this a commercial town; and the adjacent plains are fertile and productive, so that the people who cultivate them appear less distressed and wretched than those who live near the capital. Benisouef is the residence of a bey, or, in his absence, of a kiaschef, who levies with an armed force his arbitrary tributes. Over against Benisouef stands the village of "Baird," partly inhabited by Copts; and on the same side of the river, and at the distance of 3 leagues, is "Bebé," a large village, the residence of a kiaschef, where are a mosque and a convent of Copts. Benisouef lies in N. lat. $29^{\circ} 14'$. E. long. $30^{\circ} 58'$.

BENITO, *St.* a small island of the north Pacific Ocean, on the north-west coast of America, surrounded with rocks and islets. N. lat. $27^{\circ} 41'$. E. long. $242^{\circ} 38'$.

BENITO, *St.* or *St. Bennet*, a river of Benin, in Africa, that discharges itself 7 leagues S. by W. from the bight of Biafra, and on the fourth side of the river Campo, into the gulf of Guinea. On the north side of this river stands a great hill, called the Hayburn. N. lat. $1^{\circ} 45'$. E. long. $8^{\circ} 10'$.

BENVIVENI, GIROLAMO, in *Biography*, was born at Florence, in 1452, and contributed under the auspices of Lorenzo de Medici, to reclaim the Italian poetry from its mean and trivial state, and to renew the style and manner of Dante and Petrarch. The principal topic of Benivieni was divine love, which he clothed with the sentiments of Platonism, and thus obscured the poetical beauties of his works by mysticism. He was esteemed on account of his integrity and virtue, and employed by Pico, prince of Mirandola, as his almoner. He died at Florence in 1512, and was buried in the same tomb with his friend Pico. His works were printed at Florence in 1500, and again with additions in 1519. Nonv. Dict. Hist.

BENLAVERS, in *Geography*, a lofty mountain, being the chief summit of the Grampian chain, near Kenmore, in Perthshire, Scotland. One of its sides rises from the banks of the Tay, and, assuming a conical shape, elevates its summit about 4015 feet above the level of the sea.

BENLOJA, in *Ichthyology*, the name by which the Swedes call the common bleak, *cyprinus alburnus* of Linnaeus.

BENLOMOND, in *Geography*, a mountain of Scotland, situated in the parish of Buchanan, in Dumbartonshire. Though not so lofty as Bennevis or Benlawers, yet its intiated situation, with respect to the neighbouring hills, and broad lake of Loch Lomond spreading at its base, give it great magnitude and grandeur. It is computed to be 3260 feet above the level of the sea, and 3240 from the surface of the lake. The form it assumes nearly resembles a truncated cone, and its sides, particularly towards the lake, are finely mantled with natural woods. Its north side is exceedingly steep, but on the south-west it may be easily ascended. On the north-east side is the source of the river Forth, which, like most mountain streams, soon becomes a rapid river, and is alternately seen expanding into a lake, or darting over some craggy precipices. Benlomond is mostly composed of granite, interspersed with large masses of quartz, and near the base are large strata of micaceous schistus, some of which is also found at the top of the mountain. Sinclair's Statistical Account of Scotland.

BENNA, in *British Antiquity*, a kind of carriage, which was used for travelling rather than for war. It contained two or more persons, who were called "Combeannones," from their sitting together in this machine. The name was probably derived from the British word "Ben," or pen, which signifies head, or chief; and these carriages might, perhaps, have got this appellation from the high rank of the persons who used them.

BENNAVENNA, or **BANNAVANTO**, in *Ancient Geography*, a town of Britain, in the Itinerary of Antonine, placed by Camden, Gale, and Stukely, at Weedon, a village six miles west of Northampton, but by Mr. Horsley, for reasons which he has stated, and which seem to be satisfactory, at or near Daventry.

BENNECKSTEIN, a town of Germany, in the circle of Upper Saxony, and county of Klettenberg; 22 miles S.S.W. of Halberstadt.

BENNECUM, in *Geography*, a town of Guelderland, 2 miles north of Wageningen.

BENNET, CHRISTOPHER, in *Biography*, was born at Raynton, in Somersetshire, about the year 1617. After the usual school education, he was entered at Lincoln college, Oxford, in the year 1632, where he proceeded bachelor, and then master of arts, but seems to have acquired his knowledge of medicine at Leyden, or some other university, where he took his degree of doctor. He then came to London, was admitted fellow of the college of physicians, and appears to have had a considerable share of reputation and practice. In

1656, he published "Theatrum tabularum, seu plithifcos, an pliaz, et heticos, xenodichim," ovo. London: a work of learning and ingenuity, but abstruse and theoretical. He made a number of curious experiments to discover the qualities of the blood in plithifical patients. He had seen diseases of the breast, he says, removed by discharges from the legs; and on the other hand, plithifical complaints occasioned by suppressing theorrhage from the nostrils. He observes, that consumption not infrequently occurs in England, unattended with affections of the lungs. The work has been translated into most of the modern languages, and passed through numerous editions, though now almost forgotten. He also republished, with observations, Morf's treatise, call'd "Health's Invention." He died tabid, in April 1677, and probably had been induced to employ so much of his time and labour in acquiring a knowledge of the disease from his own sufferings. Haller. Bib. Med. Pract.

BENNET, HENRY, earl of Arlington, an eminent statesman, and favourite minister of king Charles II. was born of a good family in the county of Middlesex, in 1618, educated at Christ-church college, in the university of Oxford, where he distinguished himself by his application, and by his turn for English poetry; and upon the king's coming to Oxford, at the breaking out of the civil war, entered himself into his service, both as a volunteer in the royal army, and as private secretary to lord Digby, secretary of state. Upon the failure of the royal cause, he went over to the continent, and became secretary to the duke of York, and possessed the full confidence and esteem of the royal family. In 1658, he received the honour of knighthood from Charles II. and was sent by him in the quality of his minister to the court of Madrid. Soon after the king's restoration, sir Henry Bennet was recalled from Madrid, and in 1662, promoted to the office of secretary of state. In 1664, he was created baron of Arlington, and at that time was considered as the king's chief minister and favoured servant. He is supposed to have been at the head of the party who procured the fall of the chancellor Clarendon. The conduct of foreign affairs was chiefly entrusted to him; and he had a great share in the first Dutch war. About this time he introduced Mr. (afterwards sir) Wm. Temple, into public employment. He formed one of the principal characters in the ministry of that period, distinguished by the appellation of the *cabal*. From the execution of a treaty published by John Dalrymple it appears, that lord Arlington was one of the commissioners, who, in 1675, concluded and signed at Dover, with Monsieur de French ambassador, a secret league between Charles II. of England, and Lewis XIV. of France; by which Charles agreed to declare himself a Roman catholic, and to engage in a war for the destruction of the United Provinces. By execution of this treaty it would appear, that the small Christian ministry was to furnish the king of England, before he declared himself a catholic, with the sum of 200,000 *l.* salary. In consideration probably of the service he ever performed to procure and conclude it, and in regard to the king's return after, and in a reasonable manner for other reasons, lord Arlington was rewarded in 1672, to the dignity of earl of Arlington, and Viscount Stafford, and decorated with the order of the garter. In 1674, he succeeded, and most of his charges in office, fell under the suspicion of the court; and as a punishment was moved against him, when he was reprieved by a full parliament. In that year he exchanged the office of secretary of state for the less responsible, and more honorary office of lord chamberlain: and soon after he was distinguished, with two other commissioners, on business of importance to the private of Orange; but not succeeding in the conduct of it, his interest at court

declined. This was partly owing to his affected zeal against popery, though he had been always regarded as a secret friend to the popish party, and was in reality a convert to that religion. He retained however, in outward appearance, the favour of the king; and after the accession of James II. who had no affection for him, he retained the office of chamberlain. He died in July, 1685, having previously, on his death-bed, as it is said, reconciled himself to the church of Rome. By his wife, who was daughter of Lewis de Nassau, lord of Beverwaert in Holland, he left one daughter, married to the earl of Lulston, afterwards duke of Grafton, natural son of Charles II.

"The character of lord Arlington seems to have been that of a thorough courtier; accommodating, easy, and, with the habits of public business, rather than extensive abilities, and the moderation of timidity rather than the restraint of principle. He had little knowledge of the English constitution, and less regard to it; but he wanted firmness and resolution to take the lead in arbitrary measures. His public letters, when secretary, were published in 1701, 2 vols. 8vo." *Biog. Brit. Gen. Biog.*

BENNET, THOMAS, an eminent divine of the church of England, was born in the city of Salisbury in 1673, and sent for completing his education to St. John's college, Cambridge, in the beginning of the year 1688. Before he had attained the age of 21 years, he took the degrees of bachelor and master of arts; and he was chosen fellow of his college. In 1695, he wrote a copy of Hebrew verses on the death of queen Mary, printed in the Cambridge edition of verses on that occasion. In 1699, he entered into the controversy between the church and the dissenters, and published "An Answer to the dissenters' pleas for separation, or an abridgement of the London cases." In the year 1700, he was presented to the rectory of St. James's at Colchester, where he became a very popular preacher. During his residence in this place, he published "A confutation of Popery," several tracts of controversy with the dissenters on the subject of "Schism," and also "A confutation of Quakerism." He also published "A Paraphrase, with Annotations upon the book of Common Prayer," with two letters relating to the same subject; and "The Rights of the Clergy of the Christian Church." About the year 1711, he took the degree of doctor in divinity. As his popularity declined at Colchester, and his salary, which partly depended on voluntary subscriptions, was reduced from 300 *l.* to 60 *l.* a year, he determined to remove to London, and accordingly accepted the office of deputy chaplain to Chelsea hospital; and this appointment was succeeded by the two lectureships of St. Olave's, Southwark, and St. Lawrence Jewry. Before his removal to London in 1716, he published, in 1714, an ovoid treatise, intitled "Directions for studying;" and in the following year, his "Essay on the thirty-nine articles of Religion, &c. and the case of the subscription to the articles considered in point of law, history, and conscience, with a prefatory epistle to Anthony Collins, Esq." supposed to be the author of "Puederft in P. lectum," published in London in 1719. In 1716, he published a pamphlet, entitled "The Nonjurors' separation from the church of England examined, and found to be schismatical on their own principles," and a sermon on "The case of the Reformed Episcopal churches in Great Poland, and Polish Prussia." Soon after, he was preferred by the dean and chapter of St. Paul's to the vicarage of St. Giles, Cripplegate, which afforded him a liberal income, amounting after several deductions, to 400 *l.* a year. For this preferment he was indebted to the private interference and recommendation of bishop Hoody. After his settlement in this parish, in 1717, his tranquillity was inter-

interrupted by some law-suits in which he was engaged for recovering dues that belonged to the church. However, he published, in the same year "A Spital Sermon;" and in 1718, "A Discourse of the ever-blest Trinity in Unity, with an examination of Dr. Clarke's Scripture Doctrine of the Trinity." From this time the harassed state of his mind, and the weight of parochial duties, prevented his undertaking any new work, except "An Hebrew Grammar," published at London, in 1716, 8vo. and intended for the use of such as want to learn Hebrew without the assistance of a master. He died at London of an apoplexy, in the 56th year of his age, on the ninth of October 1728, and was buried in his own church. Dr. Bennet, though a man of strong passions, and not altogether exempt from the charge of haughtiness, was distinguished by his piety and integrity, by the diligence and zeal with which he devoted himself to the studies and duties of his profession, and by his extensive learning, more especially by his skill in the oriental and other learned languages. As an acute reasoner and accurate textuary, he had few equals. His talents for controversial writing, which perhaps he indulged to excess, gave him a decided advantage, particularly in his disputes with dissenters, over incompetent antagonists; but on some occasions they led him to recur to distinctions and refinements, which would not always bear examination, and which laid him open to the attacks of his adversaries. Several of his writings, as they related to temporary controversies, have been consigned to oblivion. Those which have excited attention in modern times, are his "Discourse of the trinity," and his "Case of Subscription to the Articles of the Church of England." His explication of the Trinity has been charged with inclining to that herodoxy which he wished to avoid, and which, without doubt, he sincerely abhorred: and his defence of subscription has undergone some severe strictures by the acute and learned author of the "Confessional." It redounds much to the honour both of Dr. Bennet and bishop Hoadly, when we consider the disparity of their opinions, that the latter contributed to the preferment of the former. Gen. Dict. Biog. Brit.

BENNET, *Herb.* in *Botany*. See GEUM.

BENNEVENAGH, in *Geography*, a large mountain in the northern part of the county of Londonderry, province of Ulster, Ireland, about 8 miles west of Coleraine.

BEN-NEVIS. See BEN-NEVIS.

BENNI, in *Ichthyology*, a name given by Bosc after Sonnini, to the species of CYPRINUS which inhabits the river Nile, and is described by Forkal under the specific name of *lynni*. See BYNNI.

BENNINGTON, in *Geography*, a county of America, in the south-west corner of Vermont, bounded by Windham county on the east, the state of New York on the west, Rutland county on the north, and the state of Massachusetts on the south. It contains 19 townships, of which Bennington and Manchester are the chief. It has 12,254 inhabitants, including 16 slaves. The mountains abound with iron ore, which employs already a furnace and two forges.

BENNINGTON, the shire town of the above county, and the principal town in Vermont, including in the compact part of the town about 160 houses, is situated near the foot of the green mountain, near the south-west corner of the state, 24 miles easterly from the junction of Hudson and Mohawk rivers, and about 52 miles from the south end of lake Champlain, at the confluence of the east and south bays; 55 miles from Rutland, 202 north-easterly from New York, and 300 in the same direction from Philadelphia. N. lat. 42° 42'. W. long. 74° 10'. It has a number of elegant houses, and is a flourishing town, containing 2400 inhabit-

ants. Its public buildings are a congregational church, a court-house, and gaol. It is the oldest town in the state, having been first settled in 1764. Within the township is mount Anthony, which rises to a great height in a conical form. The defeat of the British in two battles fought near this town, in 1777, contributed in a great measure to the subsequent surrender of general Burgoyne's army.

BENNISCH, a town of Silesia, in the principality of Jagerndorf.

BENOIST, ST. a town of France, in the department of the Loiret, and chief place of a canton in the district of Gien; 6 leagues south-east of Orleans.

BENOIST, ST. *du Sault*, a town of France, in the department of the Indre, and chief place of a canton, in the district of Argenton; 3¼ leagues S.S.W. of Argenton. N. lat. 46° 27'. E. long. 1° 17'.

BENOIST, ST. *de Seyffieu*, a town of France, in the department of the Ain, and chief place of a canton, in the district of Belley, 1¼ league south-west of Belley.

BENOIT, or BENEDICTUS, RENATUS, in *Biography*, a famous doctor of the Sorbonne, and curate of St. Eustathius at Paris, was born at Sevenieres near Angers; and being a secret favourer of the protestant religion, he published, for the benefit of the people, a French translation of the Bible, which had been made by the reformed ministers of Geneva; but as soon as it was published, it was condemned. Benoit was appointed by Henry III. in 1587, regius professor of divinity in the college of Navarre at Paris; and some time before the death of this prince, he published a book, entitled "The Catholic Apology," the design of which was to shew that the protestant religion, professed by Henry, was no just reason for depriving him of his right of succession to the crown of France. This was followed, in 1590, by a defence of the same book. Benoit afterwards assisted at the assembly in which Henry IV. abjured the reformed religion; and he was promoted by the king, in 1597, to the bishopric of Troyes in Champagne; but he was so obnoxious to the pope, on account of his translation of the Bible, his favour to the protestants, and his strenuous assertion of the liberties of the Gallican church, that he could never obtain his bull, to be installed: however, he retained the temporalities till the year 1604, when he resigned the bishopric. He died at Paris in 1608. He was the author of several treatises, which are now not worth mentioning. Gen. Dict.

BENOIT, ELIAS, a learned French protestant minister, was born at Paris in 1640. After the revocation of the edict of Nantes, he sought refuge in Holland, and became pastor in the church at Delft, where he died in 1728. He was patient, timid, submissive, and laborious, and in his domestic connection he found ample occasion for the exercise of the virtues that distinguished his character. Of his wife he gives the following account: "I married a wife possessed of all the faults that could torment a peaceable husband; covetous, pert, peevish, and capricious; by her unwearied spirit of contradiction, she plagued, in every possible way, her wretched mate for the space of 47 years." His only relief was incessant study, the fruits of which were the following publications, written in French, viz. "A History of and Apology for the Retreat of the Pastors on account of the Persecution in France," 12mo. 1688; "A History of the edict of Nantes," 5 vols. 4to. Delft. 1693; and "Miscellaneous Remarks, critical and historical, on Toland's two Dissertations," 8vo. 1712. Nouv. Dict. Hist.

BENOIT, FATHER, a learned Maronite, whose Arabic name was *Ambarach*, was born at Gulta, in Phoenicia, of a noble family, in 1663. Having studied from the age of nine years to twenty-two, in the Maronite college at Rome, he returned

returned to the east, and was ordained priest by the Maronite patriarch of Antioch, and from thence he was sent to Rome, in order to transact some affairs relating to the church at Antioch. Previously to his proposed return, he was invited to Florence by the grand duke Cosimo III. where he was employed in arranging the types which Ferdinand de Medici had caused to be founded for printing books in the oriental languages. Under his inspection several eastern manuscripts were printed. Cosimo, in order to retain Benoit in his service, appointed him Hebrew professor at the university of Pisa, where he acquired great reputation for his character and learning among the literati of Italy. At the age of 44, he entered into the society of Jesuits, and was employed by Clement XI. as one of the correctors of the editions of the Greek fathers; and on the solicitation of cardinal Quirini, whom he had assisted in his studies, he published, at an advanced age, an edition of "Ephrem Syrus;" the two first volumes of which, begun in 1730, were, after twelve years' labour, given to the public; but in 1742, whilst he was prosecuting the third, and after he had advanced through one half of it, he was carried off by a severe illness in his 80th year. This volume was completed by Assenanni, in 1743. Benoit also translated part of the Greek Menology, and wrote some dissertations relating to the works of Ephrem Syrus. *Moreri. Gen. Biog.*

BENOIT, du Sault, St. in *Geography*, a town of France, in the department of the Indre, and chief place of a canton in the district of La Blanc. The place contains 1081, and the canton 10516 inhabitants; the territory includes 355 kilometres, and 14 communes.

BENON, a town of France, in the department of the Lower Charente, and chief place of a canton, in the district of Rochefort; $5\frac{1}{2}$ leagues N.N.E. from Rochefort.

BENOU, a town of Arabia, 110 miles south-east from El Catit.

BENOWN, the capital of Ludamar, an interior kingdom of Africa, placed by Rennell in N. lat. $15^{\circ} 6'$. W. long. $6^{\circ} 58'$. See **LUDAMAR**.

BENKAD, a town of Germany, in the circle of Westphalia, and duchy of Berg; 7 miles S.S.E. of Duffeldorp.

BENSEN. See **BENESLOW**.

BENSBERG, a town of Germany, in the circle of Westphalia, and duchy of Berg; 7 miles east of Mülheim.

BENSERADE, ISAAC DE, in *Biography*, a celebrated French poet, was born at Lions, near Roan, in Normandy, in 1612. The vivacity of his genius, and the pleasantry of his conversation, were well calculated to secure his reception at court, and to promote his advancement under the patronage of cardinals de Richelieu and Mazarin, who provided for him in a liberal manner by gifts and pensions. The poetry in which he excelled was that of the gallant and satirical kind, composed for the court-ballets; before operas came into vogue; and in these he ingeniously adapted to the personages of antiquity the known characters and adventures of those who represented their parts in fiction. His success in this way induced him to make an attempt for turning all Ovid's Metamorphoses into romances; but this work, though favoured by the king, and set off by all the ornaments of engraving, was ridiculed from its first appearance. As he aimed at point and conceit, the prevalence of a better taste in the age of Lewis XIV. took him into neglect. In 1674, he was chosen a member of the French academy. Towards the close of his life, he abandoned the court, and retired to Gentilly, where he embellished his house and gardens with a variety of ornaments that indicated his poetical genius. He was much afflicted with the stone, the excruciating pain of which he is said to have endured with fortitude and resignation. His later years were consecrated to works of piety

and devotion; and he translated almost all the Psalms. He died in 1691; and after his death his works were printed in two volumes. *Gen. Dict. Nouv. Dict. Hist.*

BENSHAUSEN, in *Geography*, a town of Germany, in the circle of Francunia, and county of Henneburg; 7 miles south-east of Smalkalden.

BENSHEIM, a town of Germany, in the circle of the Upper Rhine, and archbishopric of Mayence; 20 miles north of Heidelberg.

BENSON, GEORGE, in *Biography*, a dissenting divine of considerable reputation for biblical learning, was born at Great Salkeld in Cumberland, on the 1st of September 1699. When he had finished his preparatory studies, he completed his education for the ministry at the university of Glasgow. At Abingdon in Berkshire, where he first settled as pastor in the year 1723, he continued for about seven years; and besides a sedulous attention to the duties of his office, he employed his time in a critical study of the sacred writings. His first work, published during his residence in this town, was "A Defence of the Reasonableness of Prayer," accompanied with a translation of a discourse of Maximus Tyrius, on the same subject, together with remarks upon it. A new edition of this, and of his piece on predestination, was published in 1737, under the title of "Two Letters to a Friend, &c." In 1729, he left Abingdon, and removed to the charge of a congregation in Southwark, with which he continued for eleven years. In 1731, he published "A Paraphrase and Notes on St. Paul's Epistle to Philemon," in imitation of the manner of Mr. Locke; and to this he added "An Appendix, shewing that St. Paul could neither be an enthusiast nor an impostor, and consequently the Christian religion must be, as he has represented it, heavenly and divine." This argument was afterwards illustrated and improved in the most masterly manner by lord Lyttelton. This work, being favourably received by the public, was succeeded by Paraphrases and Notes, after the same manner, on the two epistles to the Thessalonians, the first and second epistles of Timothy, and the epistle to Titus; together with dissertations on several important subjects, particularly on inspiration. In 1735, he published, in three thin volumes, 4to. "The History of the first planting of the Christian religion, taken from the Acts of the Apostles, and their Epistles, &c." A second edition of this work, commonly bound up in one large volume, was published in 1756. In 1740, Mr. Benson was chosen pastor of the congregation of protestant dissenters, in Crouched Friars, London, in the room of Dr. Harris; and in this connection, with the learned and candid Dr. Lardner as his assistant for some years, he continued till his death, which happened on the 6th of April, 1762. In 1743, he published his treatise "On the Reasonableness of the Christian Religion, as delivered in the Scriptures;" and in consideration of his great abilities and learning, the university of Aberdeen conferred upon him the degree of doctor in divinity. Dr. Benson, having finished those epistles of St. Paul, on which he intended to write Paraphrases and Notes, proceeded to explain, after the same manner, the seven catholic epistles, viz. that of St. James, the two epistles of St. Peter, that of St. Jude, and the three epistles of St. John. A volume of miscellaneous sermons, in 1747, was the last of his public works. His posthumous writings, edited by Dr. Amory, appeared two years after his death, containing a life of Christ, and other theological essays. The labours of Dr. Benson in sacred literature met with a very favourable reception in foreign countries, as well as in Great Britain and Ireland, from the truly inquisitive and learned, and introduced him to a friendly acquaintance and correspondence with many persons, eminent for their literature and rank in the established church, as well as among the dissenters. Of these

these we may enumerate Sir Peter King, lord chancellor of England; lord Barrington; archbishop Herring; bishops Hoaday, Butler, and Conybearc; Dr. Leland, and Dr. Duchal of Ireland; Dr. Jonathan Mayhew of New England; professor Michaelis of Gottingen; Dr. Wishart of Edinburgh; Dr. Watts of London; Dr. Taylor of Norwich; and Mr. Bourn of Birmingham. His commentaries and notes on the epistles are deservedly held in high estimation. The learned John David Michaelis, one of the professors in the university of Gottingen, proposed translating them into Latin, and in 1746, published his paraphrase on the epistle of St. James, with additional notes. Several of his other tracts were translated into German by M. Bamberger, a protestant divine at Berlin. As a zealous friend to religious toleration and free inquiry, and with a view of vindicating and recommending them, he published a defence of Serretus, and an account of archbishop Laud's persecution of Dr. Leighton. Biog. Brit.

BENSON, in *Geography*, the north-westernmost township of Rutland county, in the state of Vermont, North America, is situated on the east side of lake Champlain, 57 miles N.N.W. of Bennington, and has 658 inhabitants.

BENTAVEO, in *Ornithology*, the French name of that species of SHRIKE, called *Lanius pitangua*, by Linnæus.

BENTENDORF JEPLITZA, in *Geography*, a town of Hungary, 4 miles north east of Rosenberg.

BENT-GRASS, in *Botany*. See *AGROSTIS*.

BENTHAM, JAMES, in *Biography*, was born at Ely in 1708, and educated for the church at Trinity college, Cambridge. After having held in succession several livings in the counties of Cambridge and Norfolk, he obtained, in 1779, a prebendal stall in the church of Ely, where he had an opportunity of cultivating his natural taste for church architecture and antiquities. The result of his observation and research was published under the title of "The History and Antiquities of the conventual and cathedral church of Ely, from the foundation of the monastery, A. D. 675, to the year 1771, illustrated with copper-plates," Cambr. 1771, 4to. The introduction to this work contains an account of Saxon, Norman, and Gothic architecture, and has been frequently cited as authority by later writers on these subjects. The grand repair of this church, entrusted to the superintendance of Mr. Bentham, afforded him an opportunity of investigating the principles upon which edifices of this kind were constructed, and suggested to him the idea of a general history of ancient architecture in this kingdom; and for this purpose he occasionally employed himself in collecting materials almost to the close of his life. He also interested himself in the improvement of his native country, by planning turnpike roads, and proposing the drainage and inclosure of parts of the Ely Fens; and some of his schemes were beneficially executed. In such useful occupations, and the faithful discharge of his professional duties, he protracted his life, by a course of temperance which his naturally tender constitution required, to his 86th year. He died Nov. 17, 1794. G. u. Biog.

BENTHEIM, in *Geography*, a county of Germany, in the circle of Westphalia, about 40 miles long, and from 12 to 15 broad. It is surrounded by the province of Overijssel and the bishopric of Munster, and abounds with wood, quarries of stone, game, and venison. The chief part of this territory is distributed into fertile corn-fields and beautiful meadows, which feed a great number of sheep and cattle; furnishing the inhabitants with an ample supply of the necessaries of life, and enabling them to make profitable exports. The principal river is the Vechte, which traverses the whole country. It is inhabited by Lutherans, Calvinists, and Roman catholics; and its traffic consists in linen, thread, wool, yarn, stone, wood,

cattle, and honey. Its towns are Bentheim, Schutteroff, Northhorn, and Nienhus. In 1753, count Frederic Charles Philip, mortgaged this county to the house of Hanover, for an advance of money. The count of Bentheim or Benthein, has a seat and voice in the college of the Westphalian courts of the empire, and at the diets of the circle.

BENTHEIM, a town of Germany, and capital of the above county, is seated partly on an eminence, and partly on a river of the same name. It contains one Calvinist, and one Roman Catholic church. The castle or palace stands on a high rock north of the town, and is surrounded with towers. Bentheim is distant 26 miles N.N.W. from Munster, N. lat. 52° 21'. E. long. 7° 1'.

BENTHOORN, a town of Holland, 6 miles S.S.E. of Leiden.

BENTHULUD, a town of Africa, in the kingdom of Fez, at the foot of Mount Atlas.

BENTHUYSEN, a town of Holland; 6 miles south of Leiden.

BENTINCK, WILLIAM, earl of Portland, in *Biography*, a favourite minister of king William III. was born in Holland, and descended from an ancient and noble family in the province of Guelderland. He accompanied the prince of Orange to England in 1670, as gentleman of his bedchamber; and when the prince became stadtholder, he was promoted to the command of the favourite regiment of Dutch guards. In 1675, he manifested his attachment to this prince, by sleeping in the same bed with him when he had the small pox, in consequence of medical advice; and by thus exposing himself to the infection of a distemper with which he was actually seized, he laid the prince under an obligation, of which he was never unmindful. He took an active part in the preparations for the revolution in 1688, and in the progress of that event; and upon the prince of Orange's accession to the throne, he received many marks of royal favour. Sustaining several high offices near the king's person, he was naturalized, and in 1689, he was advanced to the rank of an English nobleman, with the title of baron of Cirencester, viscount Woodstock, and earl of Portland. In the following year, he acted as envoy to king William at the grand congress held at the Hague. The royal favour, however, by which he was distinguished, and particularly the grant of several lordships in Denbighshire, which were part of the demesnes of the principality of Wales, occasioned, in 1695, a warm opposition in the house of commons; but though this grant was revoked, in consequence of an address to the king, the earl was recompensed by other liberal grants from the crown, which constitute a great part of the present ample possessions of the family. This nobleman attended king William in his campaigns in Ireland and Flanders, and distinguished himself, as a military officer, on various occasions. After the conclusion of the peace of Ryswick, in the negotiation of which he had a principal concern, he was nominated ambassador-extraordinary to the court of France, where he received the highest distinctions. On occasion of a jealousy, excited by the royal favour to a young Dutchman, named Keppel, afterwards earl of Albemarle, the earl of Portland resigned his posts in the king's household, and withdrew from affairs of state; but he still retained some portion of the king's esteem and confidence, and was entrusted with the administration of Scotland, and with the negotiation of the famous treaty for the succession to the crown of Spain, called the "partition-treaty," which was afterwards the subject of an impeachment of the earl by the house of commons. The king's death, in 1701, terminated the earl of Portland's public life, and all hostilities against him. Of the attachment of his royal master, however, he had the most satisfactory evidence; when, on his death-bed, with his last words he inquired

inquired for him, and on his approach, laid hold of his hand and pressed it to his heart. The close of the earl's life was spent in retirement at Baldrode, where he employed himself in acts of charity, and in the improvement of his fine gardens. He died Nov. 23, 1709, in the 61st year of his age, and was buried in Westminster Abbey. He left children of both sexes by his two wives, Anne, daughter of sir Edward Viliherst, and Jane, daughter of sir John Tempie.

His temper was, like that of his royal master, grave, sedate, and inclined to reserve; and his demeanour somewhat lofty, without pride. Although he was an object of jealousy and enmity, these were more national and political than personal; and his general character was that of an able and upright statesman, combined with private virtue. *Biog. Brit.*

BENTIVOGLIO, GUIDO, *Cardinal*, was born of a noble family at Ferrara in 1579; and after having studied at Padua with great reputation, he returned, in 1597, to his own country, where he displayed much dexterity in reconciling his brother, the marquis Hippolito, with cardinal Aldobrandini, the general of the church, and in concluding peace between the pope and Cæsar. Having finished these transactions, he was appointed by pope Clement VIII. his private chamberlain, and allowed to complete his studies at Padua. He then settled at Rome, and by his prudence and integrity acquired general esteem. After having performed, from 1607 to 1609, the office of nuncio in Flanders; and also in France till the year 1621, he was raised to the dignity of cardinal by pope Paul V. He was also appointed by Lewis XIII. protector of the French nation in Rome; which office he declined on becoming bishop of Terracina in 1641. On the death of Urban VIII. in 1644, he was thought to be the most proper person for the honour of succeeding him; but when he entered the conclave, in the hottest and most unhappy season of the year, he was seized with a fever, which terminated in his death on the 7th of September, at the age of 65. The principal of his works, which are held in high estimation, are his "History of the Civil Wars in Flanders," written in Italian, and first published at Cologne in 1634, and since translated into foreign languages; "Memoirs" of himself, an "Account of Flanders," and a collection of "Letters," reckoned the most approved specimens of epistolary writing in the Italian language. *Moreri. Gen. Biog.*

BENTIVOGLIO, in *Geography*, a small town and fortified palace of Italy, in the states of the church; 10 miles north of Bologna.

BENTLEY, RICHARD, in *Biography*, a very eminent critic, was born at Oulton, near Wakefield in Yorkshire, on the 27th of January 1691-2, and after receiving the rudiments of classical learning at the free school of Wakefield, was entered in his 15th year at St. John's college, Cambridge. In 1691, he left the university, and became a school-master at Spalding. From this situation he was soon removed to be preceptor to the son of Dr. Stillington, dean of St. Paul's, who appointed him to be his domestic chaplain. In February 1691-2, he published his first work, which was a Latin epistle to Dr. Meibomius, containing "Critical Observations on Mada's Chronicle;" and about the same time he had the honour of being selected as the first person to preach Boyle's lecture, founded for the vindication of natural and revealed religion. The subject of the eighth discourse, which he delivered on this occasion, and which were afterwards published and translated into most of the modern languages of Europe, was the loss of atheism, or the confutation of this absurd and joyless system, from the faculties of the soul, from the structure and origin of human bodies, and the origin and frame of the world itself. Whilst

he carried on this lecture, he maintained a philosophical correspondence with sir Isaac Newton, whose friendship he ardently cultivated, nor did he write any thing on this occasion without this illustrious philosopher's approbation. In 1692, he was installed by bishop Stillington a proband of Worcester; and in the following year he was appointed keeper of the royal library at St. James's. In 1695, he was admitted to the degree of doctor of divinity; and he delivered a discourse on the day of the public commencement from 1 Pet. iii. 15. It is said, that he was soon after admitted, "ad eundem," in the university of Oxford. His "Annotations on Callimachus," were inserted in an edition of that poet, published in 1697, by Gravins; and in the same year Dr. Bentley himself published, at the end of Wotton's Reflections on ancient and modern learning, his "Dissertations on the Epistles of Themistocles, Socrates, Euripides, Phalaris, and the fables of Æsop." This publication was succeeded by a literary controversy, which engaged at the time a great degree of public attention. The immediate subject of this controversy was the genuineness of the epistles of Phalaris. In order to give our readers some notion of its rise, progress, and issue, we shall detail the following particulars. Soon after Dr. Bentley was made royal librarian, the honourable Mr. Boyle, who was about to publish an edition of the supposed epistles of Phalaris, applied, by means of a bookfeller in London, to Dr. Bentley for the use of a MS. in the king's library, which, after much solicitation and delay, was at length obtained; but before the collation could be completed, and indeed, about six days after the manuscript had been delivered, it was redemanded by Dr. Bentley, with many striking and disparaging expressions, both of Mr. Boyle, and the work. This conduct, Mr. Boyle, in the preface to his edition of Phalaris, publicly revented; and in return, Dr. Bentley, in the above-mentioned dissertation, endeavoured to evince the spuriousness of the epistles that had been published, adding some reflections on Mr. Boyle's edition and version. In 1698, Mr. Boyle retorted, with effusions of wit and personal abuse, in a treatise entitled "Dr. Bentley's Dissertation on the epistles of Phalaris, and the fables of Æsop examined," and commonly known by the title of "Boyle against Bentley," a second edition of which was published in 1742. In 1699, Bentley recriminated in the same style, in a piece usually denominated "Bentley against Boyle," reprinted in 1777, by Messrs. Bowyer and Nichols, with several notes and observations, collected from, or communicated by, bishops Warburton and Lowth, Mr. Upton, Mr. W. Clarke, Mr. Markland, Dr. Salter, Dr. Owen, and Mr. Toup. Among the wits and critics, who united as auxiliaries of Boyle, were Swift, Pope, Garth, and Malletton; and it must be allowed, that they proceeded with an unwarrantable severity in attacking the moral character and literary acquirements of their adversary. Bentley, however, though wounded, sustained the contest with unyielding firmness, and in the event with full success, so far as the authenticity of the epistles ascribed to Phalaris is concerned. Since prejudice and passion have subsided, it has been very generally acknowledged that Bentley had not only the evident advantage with respect to learning and argument, but that he is little, if at all, inferior to his antagonist in point of wit and smartness. The reputation of Dr. Bentley, during the progress of this literary dispute, was not very materially affected; for before its complete termination, he was presented by the crown, in 1703, with the honourable and lucrative office of master of Trinity college, Cambridge; and in the following year collated archdeacon of Ely. In the former station, he introduced reform, and curtailed salaries, and thus incurred

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the ill will of some of the senior members of the college; but as he appeared to have exercised an undue authority, and to have consulted his own advantage more than the public, a charge was exhibited against him in 1709, by the vice-master, thirty of the senior fellows, and other members of the college, for peculation, breach of the statutes, and other acts of mal-administration. The charge was presented to the bishop of Ely, as visitor of the college. But Dr. Bentley contended, that the crown was the visitor; and upon this a law-suit commenced, which was not terminated till the year 1731, when the crown asserted its visitorial power, but declined interfering in the present instance. It appeared afterwards, that, upon the whole, the charges against the matter were well founded.

In 1710, Dr. Bentley published at Amsterdam his critical annotations on the two first comedies of Aristophanes; and, about the same time, at Rheims, his emendations of the fragments of Menander and Philemon, under the feigned name of "Phileleutherus Liptienfis." This latter was undertaken with the view of disparaging a similar performance of Le Clerc, and thus by degrading his literary character in the public estimation, to set aside a scheme, which was then in agitation, for inviting him to England, by the offer of some considerable church preferment. In the year 1711, he published his long expected and much commended edition of "Horace." This correct and elegant edition of Horace, which was pronounced by Dr. Hare to be the completest work produced by criticism since the restoration of learning, was printed in 4to. and dedicated to the earl of Oxford. It was succeeded, in 1713, by some excellent remarks on Collins's discourse of free-thinking, published under the former name of "Phileleutherus Liptienfis," and dedicated to Dr. Hare. In 1716, Dr. Bentley was appointed regius professor of divinity; and in the same year he circulated proposals for a new edition of the Greek Testament, with St. Jerom's latin version. These proposals were the subject of severe animadversion by Dr. Middleton, who professed a serious conviction, that Dr. Bentley had neither talents nor materials proper for the work, and that religion was much more likely to receive detriment than service from it. Several pamphlets were published on the occasion; and it is much to be regretted, that a work of such importance to sacred literature and biblical criticism was abandoned. The completion of this noble undertaking was the principal employment of the latter part of Dr. Bentley's life. In the prosecution of it he had collected and collated all the MSS. of Europe to which access could be obtained; and for this purpose, his nephew, Thomas Bentley, L.L.D. well known in the republic of letters, had travelled through Europe at his uncle's expence; the whole was completed for publication; but when he determined not to let it appear during his own life, the sum of 2000*l.* which he had received in part of the subscriptions, was returned to the subscribers. A circumstance occurred in 1717, which materially affected the doctor's reputation, and which was attended, at least for a time, with detrimental consequences to himself. Upon the creation, by royal mandate, of several doctors in divinity, Dr. Bentley demanded from each of them, besides the customary perquisite, an extraordinary fee of four guineas. In this demand they acquiesced, on condition that the money should be restored, if it should appear that Dr. Bentley had no right to enforce it. Dr. Middleton, however, some time after, obtained a decree for the repayment of the money; and in consequence of this decree, Dr. Bentley was arrested, and appeared by his proctor before the court of the vice-chancellor. On this occasion, the beadle testified on oath, that Dr. Bentley had declared, "I will not be concluded by what the

vice-chancellor and two or three of his friends shall determine over a bottle;" and for this expression he was suspended by the vice-chancellor, without a citation or hearing, from all his degrees, and afterwards by the caput deprived of all his privileges and honours, as well as degrees, in the university. Dr. Bentley appealed to the king, and after successive references to the council and to a committee of council, and to the court of king's bench, and many delays, the university received a mandamus in February 1718, which reversed all their proceedings, and required a restoration of Dr. Bentley to all degrees, honours, &c. of which he had been deprived. In 1726, he published an edition of "Terence and Phædrus;" and in 1732, the last of his works, which was his edition of "Milton's Paradise Lost;" and which made no addition to his reputation, though it has been said that many of his corrections of that poet have been unreasonably objected to by bishops Pearce and Newton. This work was undertaken at the request of queen Caroline. Dr. Bentley died on the 14th of July 1742, in the 81st year of his age, and was buried in the chapel of Trinity college. When we consider the unquestionable abilities and erudition of Dr. Bentley, it may excite some degree of surprize, that his literary character should have been held in much higher estimation by foreigners, than by his own countrymen. This may be partly owing to that pride, petulance, and irritability of temper, with which he, in common with many others who have excelled in verbal criticism, seems to have been chargeable; to the personal disputes in which he was engaged; and to the political differences that disquieted the period in which he lived. But, perhaps, it arose principally from his having, in the class of his adversaries, the poets and wits of the age, and from their having made him the object of their satire and ridicule. The asperity of Mr. Pope, who attacked him in the character of Aristarchus (works, vol. iii. p. 207—211.) has, however, been ascribed to personal resentment. Whilst they were both together at dinner with bishop Atterbury, Dr. Bentley was questioned as to his opinion of the English Homer; and, after some demur, being urged to speak out, he said "the verses are good verses, but the work is not Homer; it is Spondanus." Another circumstance, which contributed to degrade Dr. Bentley in the estimation of some of his contemporaries was that love of money, which he seems to have unduly indulged, and which involved him in disputes that were dishonourable to him. As to the charge of scepticism, with respect to revelation, alleged against him by Mr. Whiston, it does not appear to have been well founded. Dr. Salter describes him as having been a very amiable and pleasant man in private life, and as possessing much good nature, though he has been otherwise represented. Against the disparaging judgment of the learned bishop Lowth, who allows him to rank only among grammatical and verbal critics, may be contrasted the encomium of Dr. Samuel Clarke, eminently distinguished by his literature and critical discernment, who, in the preface to his edition of Cæsar's Commentaries, speaks of him as "vir in hujusmodi rebus peritâ plane incredibili et criticos omnes longè longéque judicio et sagacitate antecellens." The judgment of posterity, more impartial than that of his contemporaries, has allowed Dr. Bentley's profound skill in the idiom of the Latin and Greek languages; and though, as a verbal critic, many of his emendations are unsanctioned by the authority of ancient MSS. they frequently approve themselves as just and reasonable, and are regarded as real improvements. It must be acknowledged, however, that those corrections of ancient and modern authors, which depend upon mere conjecture, and which suggest what might, or ought to have been written, rather than what

what they really did write, extend the province of criticism beyond its just limits; and whilst they afford scope for the unwarrantable exercise of fancy or judgment, they should be very cautiously admitted. In this way doctor Bentley is said to have incurred the charge of temerity and presumption. The son of Dr. Bentley, who was called after his own name, was a gentleman of acknowledged ingenuity, taste, and learning, and known as the author of several publications, and particularly of a tragedy, entitled "Philodamus," published by D. Foy in 1767, and esteemed by the late eminent poet M. Gray, as one of the most capital poems in the English language. His youngest daughter married a grandson of the learned Dr. Cumberland, Bishop of Peterborough, whose famous book, "De Legibus Naturæ," Dr. Bentley is said to have corrected upon a visit to his forsaken, who was Bishop of Kilmore in Ireland. The son of this bishop, Richard Cumberland, esq. is well known by his ingenious writings, and especially by his judly applauded dramatic pieces. D. G. B. U.

BENTON in *Geography*. See **CULTURA**.

BENVORLICH, a mountain of Scotland, in the county of Perth; 5520 feet high. See **GRAMPIAN MOUNTAINS**.

BENY, a town of France, in the department of the Calvados, and the district of Caen, 2½ leagues N. N. W. of Caen.

BENY-BOURGE, Le, a town of France, in the department of the Calvados, and chief place of a canton, in the district of Vire, 7½ leagues S. W. of Caen. The place contains 704, and the canton 13,941 inhabitants; the territory includes 175 kilometres and 21 communes.

BENY, a small town of Hungary, in the county of Zemping, seated on the river Bodrog, and noted for its excellent wine, not inferior to Tokay.

BENYOWSKY, MAURITIUS AUGUSTUS, *Count de*, in *Biography*, magnate of the kingdoms of Hungary and Poland, a singular adventurer, was born at Verbowa, in the county of Nitria, in Hungary, in the year 1741, and educated for military service, to which he devoted himself from his youth. Being wronged in his paternal inheritance by his family, he seized by force the cattle which was his father's residence; in consequence of which he was deprived of his whole property by a decree of the chancery at Vienna, and was obliged to fly for refuge into Poland. Here he engaged, in 1767, in the conspiracy against king Stanislaus, and in the course of this irregular service he was taken prisoner, first in 1768, and afterwards in 1769, by the Russians, who treated him with severity, because he had violated his parole, and because he was forming plans for the liberation of himself and his companion. The Russians conveyed him to Casaf, where he was allowed to live at large, under the notice of the garrison, as a state-prisoner; but here his enterprising disposition recommended him to a party, which was then forming a conspiracy against the Russian government, in the execution of which he was invited to associate. But the plot being discovered, he was exiled to Sberna; and after a tedious journey and voyage of twelve months, during which the count made some unsuccessful efforts for escaping, he arrived on the 2d of December 1770, at Kamtschatka, and was conducted to the town called Boloretzkoy Odrog, or Bolcheretse, where he and his companions in exile were informed that they must provide for themselves, and where they were furnished for that purpose with the necessary arms and implements. Dissatisfied with the prescribed mode of savage life, the count soon began to concert measures with his fellow-prisoners for their escape; and in the mean time, he improved his circumstances by opening a school, in which he educated the son and three

daughters of the governor, M. Nilow, or Niloff, and by his knowledge of the game of chess, at which he played with some merchants, on behalf of the Hattman of the Cossacks, who allowed him a certain proportion of the furs which he won. Having gained the confidence of the governor and the affections of Aphanasia, one of his daughters, he proceeded in maturing and accomplishing his plan of liberation; but before its execution, the secret was discovered, and the force of the settlement was employed in reducing the malcontents. In the conflict on this occasion, the governor was killed; but the exiles at last succeeded, secured a vessel, and, accompanied by Aphanasia, who chose to follow the count, took their final leave of Kamtschatka. Their whole number, including the exiles, women, and the ship's crew, amounted to 96 persons. After enduring many naval hardships at sea, the vessel arrived at Japan; and on the 14th of August 1771, he anchored on the island of Uimby Ligon, which he places in N. lat. 29°, and which must consequently lie between Japan and the island of Lekeio. This island, according to his account, is absolutely independent both of China and Japan; its inhabitants are mild, virtuous, and in a high state of civilization; and they are said to have been converted to Christianity by a Portuguese missionary Jesuit, Ignatio Salis, who arrived in the island in 1749. Upon quitting this island, whither he promised to return, he sailed for Formosa, and arrived there on the 27th of August; but meeting with an opposition on his landing, he made a great slaughter among the natives. At length he opened, by means of a Spaniard, who resided on the island, a more friendly intercourse with the inhabitants of another canton, and assisted Huapo, their prince, in a war against one of his neighbours. After a stay of about sixteen days on this island, he departed and steered for Macao, in the harbour of Canton, in China. Here his female companion, Aphanasia Nilow, died. During his stay in this place, he made some attempts for procuring leave to go to Canton; but when these proved ineffectual, he determined to sail for Europe. Accordingly, in his way thither, he arrived at the isle of France, March 16th 1772, and having touched at the isle of Madagascar, he landed in France in July, and was well received by the French ministry.

Of the proposals made to the ministers of France by this adventurer, we have no documents; but he seems to have been regarded by them as a fit person to be employed in establishing a settlement in the island of Madagascar. With this view they furnished him with a body of troops, in 1773; and in his way thither he touched at the isle of France, in order to solicit the co-operation of the chiefs of that island. Jealousy, and the dread of a rival settlement, prevented his obtaining their concurrence; and therefore, after some delay, he proceeded to Madagascar, and landed there in February, 1774; forming his settlement at the bottom of the bay of Antongill, at the mouth of the river Finghalle. The count made little progress in accomplishing the object of his mission, although he expended on account of the French government a sum amounting to 50,000*l.* and therefore, towards the end of the year 1776, commissioners were deputed to examine the state of the settlement, and to convey the count to France. In the mean time, this enterprising adventurer had contrived to raise himself to consequence in the island by a curious stratagem. The Sanbarives, constituting one of the distinct nations of Madagascar, had been formerly governed by a chief, whose name was Kamini; and as he had left only one daughter, who had been taken prisoner and sold to foreigners, his family was supposed to be extinct. Of this circumstance the count artfully availed himself; and obtaining the testimony of an old negroe woman whom he had brought with him from the

isle of France, who declared that she knew him to be the son of Ramini's daughter, her own companion in slavery, he succeeded in his views of being publicly acknowledged as the heir of Ramini. Under this character he was vested with sovereignty, formed alliances with other tribes, made war and peace, and received submissions from the vanquished. But as his European resources were withheld, he renounced the service of France, and persuaded his subjects to permit him to return to Europe, for the purpose of forming an alliance with France, or some other power, and for making commercial arrangements with a view to the improvement of a settlement on the island. Accordingly, he departed for Europe in November 1776, on board a brig which he had freighted to the Cape of Good Hope. With this event his own narrative terminates. Among his state papers, however, we find his proposal to the king of Great Britain, dated Dec. 25, 1783; of which the preliminary article is his being acknowledged sovereign of the island of Madagascar; under which character he offers terms for an offensive and defensive alliance with this country. But it appears, from a declaration prefixed to this paper, that he had previously applied, probably with similar views, to the emperor of Germany. The application to the British ministry, if it was ever made, and if it was ever the subject of discussion, as some have asserted, was not attended with success. The count, therefore, determined to return to Madagascar with such supplies as he could obtain from individuals; and having procured goods and merchandize in London to the amount of 4000*l.* and finding it difficult to get the flag of any European power to sail beyond the Cape of Good Hope, he departed for Maryland in America, in April 1784. A respectable commercial house engaged in his undertaking, and supplied him with a vessel and goods to a considerable amount. In this vessel he sailed for Madagascar; and after eluding the hazard of shipwreck on the lee shore of America, and doubling the Cape of Good Hope, he touched at Sofala, and on the 7th of July 1785, anchored in Antangara bay, 10 leagues S.W. of cape St. Sebastian, in Madagascar, where the cargo was landed. Under an apprehension that the count had been cut off by the natives, the party on board the ship set sail for the island of Joanna, and at Oibo, on the opposite continent, sold the ship. The count heading a body of natives, commenced hostilities against the French by seizing their store-house at Angoutzi. Here he began to build a town after the manner of the country, and from thence he detached 100 men to seize their factory at Foul Point, who desisted on seeing a frigate at anchor. In consequence of these transactions, M. de Scullac, governor of the isle of France, sent a ship with sixty regulars, who landed, and attacked the count on the 23d of May 1786, in a redoubt which he had constructed, mounting two cannon, and in which he, with two Europeans, and thirty natives, waited their approach. The blacks fled, and Benyowsky, receiving a ball in his breast, fell behind the parapet, whence he was dragged by the hair, and soon expired.

Whilst none can question the ability and bravery of count Benyowsky, the principles of his conduct are not easily ascertained. His enemies represent him as a tyrant and a robber; and his friends, on the contrary, exhibit him as distinguished by a noble, humane, and generous disposition. Mr. Nicholson, the editor of his "Memoirs and Travels," who had all the letters and documents before him, declares, that he has "not yet seen any thing against the count, which will not bear two interpretations, or which has not been written by men who contradict each other, and had an interest in traducing him." "His conduct in Madagascar," says Wadstrom, in his "Essay on Colonization," "deserves no small portion of admiration, and even of respect; and, all

things duly considered, I see no reason, why a monument might not be erected to his memory, inscribed "MAGNIS TAMEN EXCIDIT AUSIS." A very different character is given of him by M. de Lessops, in his "Travels in Kamtschatka;" who represents him as perfidious and cruel, and by the Abbé Rochon, in his "Voyage a Madagascar, &c." who says, "that he aimed at the conquest of Madagascar by fire and sword, and treated the natives with such cruelty, that he was called by no other name by them than the "Wicked White." Memoirs and Travels of count Benyowsky, written by himself, 2 vols. 4to. 1750.

BENZELIUS, ERIC, a learned Swedish divine, was born in 1642, in Westro-Gothland, and educated under the patronage of a rich uncle at Upsal. He was first preceptor to the sons of the count de la Gardie, chancellor of Sweden; and having completed their education, he travelled through various parts of Europe, cultivating an acquaintance with the learned, and consulting the principal libraries. Upon his return to Upsal in 1665, he was appointed professor of history and morality in the university, and afterwards promoted to the theological chair, and to a seat in the consistory. In 1675, he was made doctor in theology; in 1677, bishop of Strengnes; and, in 1700, archbishop of Upsal, occupying also the vice-chancellorship of the university. He died in 1709; and was the author of several dissertations on the lives of the patriarchs, and other parts of ecclesiastical history. He wrote also various theological works, and translated the whole Bible into the Swedish language. *Moreri.*

BENZELIUS, ERIC, son of the former, was born at Upsal in 1673, where he began and completed his studies. Having travelled into Germany, England, and France, he returned to Upsal in 1702, and was appointed librarian to the university, an office which he held for 22 years. In 1724, he was nominated professor of divinity; and afterwards successively created bishop of Gotheborg, Lindkiöping, and archbishop of Upsal. He died in 1743. Benzelius undertook, in conjunction with other learned men, a review, as well of all books published in Sweden, or by Swedes abroad, as of those works printed in other countries, which had any relation to this kingdom. This publication, containing, besides reviews, some few original acts, was denominated "Acta Literaria Suecicæ," and conducted for 10 years on this plan by a society of gentlemen, who afterwards formed the royal society of Upsal. See SOCIETY.

BENZIE ISLAND, in *Geography*, lies on a river of the same name, within Sierra Leone, on the coast of Africa.

BENZOE, in *Botany*. See CROTONA.

BENZOIN. See LAURUS.

BENZOIN, *Benjamin Gum*, and *Benzoic Acid*, in *Chemistry* and *Pharmacy*.

The resin benzöin or benzöe, by some called also *Asia Dulcis*, is a very fragrant resin, procured from a large tree found in many parts of the East Indies, Sumatra, Arabia, Persia, &c. See STYRAX *Benzöe*.

The resin is brought in large brittle masses of a light yellow, interspersed with white nodules, which last are considered as the finest, and called by some *Benzöe Amygdaloides*. The smell of Benzoïn is extremely fragrant, especially when rubbed or heated: it has scarcely any taste, except previously dissolved in spirit of wine, which it does with ease, into a yellowish tincture. On adding water to this tincture, the resin again separates into a white pulverulent mass, which has received the singular name of *Lac Virginale*, and also *Magistery of Benzoïn*. When gently dried, it forms a white powder, formerly in great request as a cosmetic. It is at least innocent, and its scent is one of the most agreeable. But the most striking ingredient of this resin is the

Benzoic Acid, which is of sufficient importance to require being

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being described more at large. If benzoin is gently heated a little above the degree of boiling water, it melts into an adhesive mass, and at the same time sends out a very copious, dense, white fume, of an extremely fragrant, diffusive, penetrating smell, and so acrid as irresistibly to excite coughing and tears in those who are in any degree exposed to it. This fume soon condenses on the first cool body, and then appears in the form of very beautiful spicular crystals, which gradually collect into a bulky feathery mass extremely light, and of remarkable elegance and lustre. This crystalline mass is the benzoic acid, and its acid property is proved by reddening litmus, neutralizing alkalies, and forming with them peculiar salts: in modern chemical nomenclature called *Benzoates*. After the greater part of the acid has risen by sublimation, or before it, if the heat be at all increased, a thin yellowish oil rises slightly empyreumatic, but strongly imbued with the fragrance of the resin. On further heating, an acidulous liquor comes over, together with a thick bituminous matter: still, however, containing some of the crystallizable acid, which is not totally expelled till the end of the process.

This acid is readily soluble in alcohol, and in hot water, but so sparingly in cold water that a hot saturated solution will deposit in crystals almost its saline contents by cooling.

Several methods have been devised for obtaining the benzoic acid. The oldest and most expeditious is by simple sublimation. To procure any quantities of it, put benzoin in an earthen pipkin; apply to the vessel a large cone of clean white paper, patted down to the edges of the pot, and set it over an extremely slow charcoal, or other fire, just sufficient to melt the benzoin. The acid will rise and crystallize upon the inside of the paper cone. However, as in this method the vapour has hardly room to condense, instead of the paper cone, another vessel inverted over that which contains the resin, and with a small hole drilled through its bottom, may be substituted; and when full, it may be gently shaken, to detach the acid, and again applied. From nine to twelve drachms may be thus obtained from sixteen ounces of benzoin. The remaining resin is still very aromatic, and should not be lost.

Another method has been recommended by Scheele, who in his excellent practical observations upon this salt, has treated it with that precision and ingenuity which so eminently distinguish this chemist in every subject, of greater or less importance and difficulty, which he has illustrated by his labours.

He observes, that besides sublimation, the acid may be extracted by lixiviation, and with the advantage of obtaining it free from any admixture of oil, which is apt to impair its whiteness and lustre. If benzoin is boiled with water, and the solution strained while hot, and filtered to cool, most of the acid taken up by the hot water deposits when cold, and may then be collected pure. This method, however, is imperfect; for as the water does not mix with and divide the gum, this last soon softens, and sinks down, closely adhering to the bottom of the vessel, and does not allow the water easily to penetrate it. Hence the solution takes place only at the surface of the benzoin.

The same chemist boiled powdered chalk and benzoin in water, and filtered the liquor. No crystals were now deposited on cooling, for the acid had dissolved part of the chalk into a benzoate of lime, which, being very soluble, remained in the liquor. But on adding some drops of vitriolic acid, the benzoic acid was again separated from the lime, and fell to the bottom in a powdery form. Substituting alkali for the chalk, the same effect took place, and the benzoic acid, as before, was precipitated by the vitriolic. But this method

was still attended with the inconvenience of the benzoic acid concreting together, which floated on the surface during the boiling. But on substituting quick-lime this inconvenience was avoided; and it is therefore in the following method that the benzoic acid may be procured the most copiously and the purest. Upon four ounces of unslacked lime pour twelve ounces of water, and after the ebullition is over, add six pounds more of water; then put a pound of benzoin, finely powdered, into a tin pan; pour on it at first about six ounces of the above lime water; mix them well together, and then successively the rest of the lime water. By this method the resin will be prevented from running together into one mass. Boil the mixture for half an hour, with constant stirring, then let it stand, and pour off the clear liquor. On the remainder in the pan, pour more lime water, and proceed as before, adding the clear liquor to that first obtained, and also filter the residue, to exhaust the liquor, which is now a weak solution of benzoic acid, with the lime of the lime water. Boil down this liquor (which is of a light yellow) to two pounds, and strain. When cold, add to the liquor muriatic acid gradually, which will produce a white crystalline deposition, and continue to add the acid till the liquor is supersaturated, and tastes sourish. The stronger acid thus unites with the lime, and the benzoic acid, now free, being of itself scarcely soluble in cold water, falls down as a white coagulum, which should be washed with more cold water, and gently dried. To give it a crystalline appearance, dissolve it in boiling water, filter it through a cloth, and by cooling it will separate in the form of spicular crystals, but with some loss of the acid.

The above process of Scheele's may however be a little shortened, if the lime in substance be mixed with the lime water, previous to the addition of the benzoin; for by this method the solution may be at once made more concentrated, and less of the liquid will suffice, so that much of the evaporation will be saved. Any of the stronger acids will displace the benzoic from lime, but the muriatic is the most convenient.

Scheele obtained from 12 to 14 drachms of the concrete acid from a pound of benzoin by this process.

The benzoic acid, when pure, is quite white; for if yellow, it is mixed with a small portion of the oil of the resin. Though crystallized, it is considerably elastic, and difficult to be reduced to powder. Its taste is sharp, pungent, and acidulous. It reddens tincture of litmus. When cold, it is without smell, but on applying heat it sends forth the peculiar grateful odour by which it is characterized. Heated by itself, it chiefly sublimes, but a part is decomposed, giving an acid phlegm, much oil, and carburcted hydrogen gas. It is not alterable in the air, and does not evaporate by keeping in a moderate temperature. Cold water dissolves only about $\frac{1}{20}$ of its weight, but boiling water $\frac{1}{10}$; and hence the copious crystallization from a hot water solution. It unites readily to most of the alkalies and earths forming benzoates, the properties of which have been but little examined.

The benzoate of lime is almost the only salt of this kind found native. It is contained in the urine of some animals, particularly the herbivorous quadrupeds, and is ascertained by adding to this secretion some muriatic acid, by which the benzoic acid is made perceptible.

With potash this acid forms a readily crystallizable salt, decomposable, like the rest of the benzoates, by a strong acid. Most of the metallic oxides are dissolved by this acid, but not the pure metals.

Mr. Hermbstadt, in a series of experiments on the action of nitrous acid on the benzoic, found that the latter regularly assumed in the process a smell like that of water distilled over bitter almonds, but on the whole, this acid is but with diffi-

culty altered in its nature by the nitrous. Distilling the nitro-benzoic acid with pure alcohol, he obtained ethereal liquor, part of which was nitrous ether, but the remainder appeared, by the smell of almonds, to be a dulcified, or ethereal benzoic acid. But these experiments require to be repeated with accuracy, as the powerful operation of the nitric acid on vegetable matter, though highly instructive, is often not a little embarrassing.

Several other substances, besides the resin of benzoin, contain more or less of this acid. The balsam of Peru, and of Styrax, appear to owe to this acid much of their fragrant smell. Ambergris, vanilla, and some of the aromatic barks, and even urine, contain a small quantity of it. When uncombined with an alkaline or earthy base, it is generally known by a pungent fragrant smell, and dense white smoke, on applying a heat less than is necessary to burn or decompose the substance with which it is united. When kept down by an alkali or an earth (as in the case of urine), it is separated by a strong acid. It has been supposed, with probability, that the fragrant scent is not proper to the acid, but is owing to the presence of a portion of resin or essential oil, combined with it so intimately as to be inseparable by any means hitherto known, without entire decomposition of the acid; and hence too may be explained the very weak affinity of this acid for all bases, which is generally superior to no acid but the carbonic.

Gum benzoin is almost diffused in medicine, though still retained in a few preparations of the London and Edinburgh pharmacopœias. The compound tincture *Tinctura Benzœis Composita*, formerly *Balsamum Traumaticum*, contains gum benzoin, balsam of Tolu, and aloes; and the benzoic acid enters into the Edinburgh *Tinctura Opii Ammoniata*, and in some other compounds of foreign dispensaries.

The fragrance of this resin has caused it to be used in fumigations of various kinds. Where the object is merely to produce a penetrating agreeable scent, it may be of considerable use; but as a *corrective* of foul or contagious air, its powers are very small, by no means comparable to those of the mineral acid vapours, while the irritation which it gives to the lungs is more intolerable. Scheele's Essays. Fourcroy, *Hermstadt in J. Phys.* tom. 34, &c.

BEOLIPA GULF, in *Geography*, lies on the east side of the strait of Dardanelles, near the opening into the sea of Marmora.

BEORI ANIMAL (*Laët. Amer.*), in *Zoology*, the *Tapir Americanus* of Gmelin, &c.

BEOSTER ISLAND, in *Geography*, one of the Shetland islands, between which and Green island, at the north end of Brassa, or Brassy sound, is a good channel, that runs out into the sea.

BEOTIA, CAPE, lies within the island of Negropont, to the north of Corinth, on the north side of the peninsula, stretching south-east from Corinth.

BEQUIA, a small island of the West Indies, dependent on the government of St. Vincent, and containing 3,700 acres. It is chiefly valuable from the commodiousness of its fine harbour, called "Admiralty bay."

BER, a district of Switzerland, in the government of Aëlen and canton of Beru, comprehending two parochial villages.

BER. See BERBICE.

BERA. See BOELE-COMBA.

BERABZAN, a long lake in New North Wales, lying N. and S. and running gradually from its north end, till it mixes with the waters of Schecharas lake, at the south end, and where these waters form Seal river, which empties into Hudson's bay, at Churchill fort. The north end of Berabzan lies in about 60° 30' N. lat. and 93° 50' W. long.

BERÆA, in *Ancient Geography*. See BERØFA.

BERAMS, in *Commerce*, a coarse cloth, made altogether of cotton thread, which is brought from the East Indies, and particularly from Surat.

BERAMUN, in *Geography*, a town of Egypt, on the Nile; 3 miles north-east of Mansora.

BERAR, a soubah, or kingdom of Hindoostan, bounded on the north by Allahabad and Matwa; on the west by Candeish and Amednagar; on the south by Tellengana and Golconda; and on the east by Oriss. It contains 13 circars, divided into 42 pergunnahs. The western parts of this province were reduced by Acbar; and its revenue under Aurungzebe, as stated by Mr. Fraser, in his "Life of Nadir Shah," amounted to 153½ lacks of rupees. The principal part of this province is possessed by the Berar or Nagpour rajah; and the remainder is held by the Nizam, or soubah of the Decan, who pays to the rajah a "chout," or fourth part of its clear revenues. The interior parts of Berar are less known than most other countries in Hindoostan; but it is thought to be neither populous nor rich. Its present capital is Nagpour, about midway between Bengal and Bombay. This province produces wheat, rice, poppies, and many sorts of legumes. In the southern part is found the deer, which yields the Bezoar stone; and the sheep of this province differ from the common species, their neck being lengthened, their tail very short, their ears long, and their wool not curled.

BERARDI, ANGELO, in *Biography*, an Italian writer on music, who published at Bologna a considerable number of musical tracts, between the years 1681 and 1693, which, with a large portion of pedantry and common-place information, contain much curious and useful knowledge. Their titles are: "Ragionamenti Musicali, Musical Dissertations;" "Documenti Armonici, Harmonical Documents;" "Miscellanea Musicale, a Musical Miscellany;" "Arcani Musicali, Dialogo, Musical Arcana, a Dialogue;" and the "Perche Musicale, Musical Definitions." If the whole had been compressed, methodised, and digested into a single treatise, and all the musical information dispersed through these several tracts arranged in a regular and gradual order, a more useful and practical didactic work might have been produced, than Italy seems to have furnished during the 17th century.

BERASTEGUE, in *Geography*, a mountain of Spain, in the province of Guipuscoa, 3 leagues from Tolosa.

BERAULT, NICHOLAS, in Latin *Beraldus*, in *Biography*, one of the learned men of the sixteenth century, was either a native of Orleans, or for a long time resident in this place, where he was professor of the civil law. He was tutor to admiral de Coligni; and well acquainted with Erasmus, who, in his "Ciceronians," speaks with commendation of his easy and flowing elocution, and who, in 1522, dedicated to him his treatise, "De Conserbendis Epitolis." Among the Latin works of Berault, were "A Græco-Latin Dictionary," Paris, 1521; an "Oration on the Peace of Cambray," Paris, 1528; another "On ancient and modern jurisprudence," Lyons, 1533; and "A Dialogue on the faculty of speaking extempore," Lyons, 1534. He also wrote paraphrases on the Politics and Economics of Aristotle, and notes on the Rusticus of Politian. His comments on the Natural History of Pliny, though not mentioned by Hardouin, are much commended by Erasmus. He was esteemed for his integrity, and greatly regarded by Poncher, archbishop of Sens, a prelate distinguished in France by his patronage of literature.

BERAUN, in *Geography*, a royal borough of Bohemia, in a circle of the same name. The chief produce of the circle is wood and corn, and in some parts are found mines of iron.

iron. The town is seated on the river Mies or Miza: 14 miles S.W. of Prague. N. lat. 50° 2'. E. long. 14° 25'.

BERBECZ, a river of European Turkey, which runs into the Borlet, near Tecuczi, in the province of Moldavia.

BERBEGAL, a town of Spain, in Aragon 3 leagues from Balbastro.

BERBERES. See BREBES.

BERBERINA, in *Entomology*, a species of TIPULA, with forty, incumbent wings, having the base and marginal spot white. Schrank. This insect has the thorax and abdomen red; its seeds on the berries, and forms small trunks as excrescences on the branches.

BERBERINA, in *Natural History*, a species of VORTICELLA, of a simple oval form, with a branched rigid stem, and white granulations. Gmelin. This is Vorticella compita, fluitans ovalibus muticis, filipe ramosa of Linn. Syst. Nat. edit. 12. It is also Bactenus berberiformis of Pallas; and Pludopolypus berberiformis of Rœsel. Found in fresh water in Europe; usually in clusters.

BERBERIS, *Barberry*, or *Pipperidge Rub.* in *Botany*. Linn. gen. n. 442. Schreb 565. Rech 4, 6. Juss. 256. Gœrt. t. 242. Tournef. 385. Smith 181. Class and Order. *Hexandria Monogynia*. Gen. Char. Cal. perianth six-leaved, patulous; teeth ovate, with a narrower base, concave, alternately smaller, coloured, deciduous. Cor. petals six, roundish, concave, erect-expanding, scarcely larger than the calyx; nectary two, small, roundish, coloured bodies, fastened to the base of each petal. Stam. filaments six, erect, compressed, obtuse; anthers two, fastened on each side to the top of the filaments. Pist. germ cylindrical, the length of the stamens; style none; stigma orbiculate, broader than the germ, surrounded with a sharp edge. Per. berry cylindrical, obtuse, umbilicated with a point, one celled. Seeds two, oblong, cylindrical, obtuse. *B. cretica* has three seeds. Reich.

Ess. Char. Cal. six-leaved; pet. six, with two glands at the claws; style none; berry two-seeded.

Species. 1. *B. vulgaris*, common barberry; *B. dumetorum*. Ray, Sin. 465. Spina acida or oxycantha. Ger-Em. 1325. 2. *B. vulgata*, purple-fruited barberry. 3. *B. canadensis*, Canada barberry. "Petioles racemed, spines triple." A shrub rising to the height of 8 or 10 feet; with stems upright and branched, smooth, and slightly grooved, brittle, with a large white pith, and covered with a whitish or ash-coloured bark, yellow on the inside; stems and branches are armed with sharp thorns, commonly growing by threes; first leaves obovate, serrate ciliate, not jointed; stem-leaves alternate; secondary leaves in pairs, oblong, and serrate, with smaller leaves concealed between the lowermost leaves and the thorns; flowers toward the ends of the branches in pendulous racemes, with a bract to each pedicel; corolla yellow; petals frequently serrate about the edge, and at the base of each are two orange-coloured dots, which are probably the nectaries; anthers roundish, yellow; stigma greenish; berries at first green, and, when ripe, changing to a fine red colour; seeds two, rarely three, fastened at bottom to a minute tubercle, oblong, smooth, of a pale yellowish colour, and hard; the seed-cases of an elliptic form. A native of the eastern countries, and now of most parts of Europe in woods, coppices, and hedges; in England, especially in a country soil, as particularly about Suffern Wood in Essex. The flowers appear in May and June, and the fruit ripens in September. Miller mentions three varieties of this shrub, viz. *B. sine nucleis*; Bauh. pin. 457, 2, or without stone, occasioned by the age of the plant; *B. with white fruit*, having leaves of a lighter green colour, and the bark whiter than the common sort; and *B. orientalis procerior fructu nigro suavisimo*,

Tournef. cor. diffinendo only in the colour and flavour of the fruit. He makes the Canadian barberry a distinct species, and says that the leaves are much broader and shorter than those of the common sort, and that the fruit is black when ripe. It has been long observed by Linnaeus, that when bees in search of honey touch the filaments of this shrub, the anthers approximate to the stigma, and explode the pollen. This irritability is so remarkable, that if the filaments are touched near the base with the point of a pin, a sudden contraction is produced, and this may be repeated several times. Dr. Smith, who has made this property the subject of particular examination, observes (see Phil. Trans. vol. lxxviii. p. 158.) that neither the outside of the filament, nor the anther has any irritability; and that the spring of the filaments is owing to an high degree of irritability in the side of the filament next the germ, by which, when touched, it contracts, that side becoming shorter than the other, and consequently the filament being bent towards the germ. After irritation, the filaments will return to their original place, and on being again touched, they will contract as easily as before. The purpose which this curious contrivance of nature is designed to answer is evident. When the stamens stand in their original position, their anthers are effectually sheltered from rain by the concavity of the petals. Thus they probably remain till some insect, in order to extract honey from the base of the flower, thrusts itself between their filaments, and almost unavoidably touches them in the most irritable part; in this way the impregnation of the germ is performed; and as it is chiefly in fine sunny weather that insects are on the wing, the pollen is also in such weather most fit for the purpose of impregnation. Another peculiarity ascribed to this shrub is, that ears of corn growing near it constantly prove abortive, and that it extends this sterile influence over them to the distance of 3 or 400 yards across a field. Dabamel long since looked upon the milderew power of barberry as totally void of foundation, and M. Broussonet assured Dr. Smith, from his own observations, that the opinion, though very prevalent, was altogether groundless. Young's Annals, vol. vii. p. 183. Eng. Bot. p. 49. Withering's Bot. Arrang. vol. ii. p. 351.

The leaves of barberry are gratefully acid; the flowers are offensive to the smell when near; but at a proper distance their odour is extremely agreeable. The berries are so acid that birds will not eat them. The barberry however is cultivated for the sake of the seed, which are pickled and used for garnishing dishes; and being boiled with sugar, they form an agreeable rob or jelly; they are used also as a dry sweet-meat, and in sugar-plumbs or comfits. They are moderately refrigerant, and are said to be of great use in bilious fluxes, and in all cases where leucorrhœa, acrimony, and putridity of the humours prevail. On the authority of Prosper Alpinus (Med. Egypt. l. iv. c. 1.) we are informed, that the Egyptians employ the berries in peevishness, fevers, and fluxes with great success; and Simon Paulli relates, that he was cured of a malignant fever, accompanied with a bilious diarrhoea, by using these berries according to the Egyptian practice; that is, macerating the fruit for a day and a night in twelve times its quantity of water, with the addition of a little fennel seed; and then straining and sweetening the liquor, and using it as a common drink. Dr. Woodville observes, (Med. Bot. vol. iv. p. 62.) that these berries are well calculated to allay heat and thirst, and to correct a peevish tenderness in the fluids; but that in this respect they seem to possess no peculiar advantage over most of the other acid fruits; hence the colleges of London and Edinburgh have excluded this fruit from the Materia Medica, and retained only that of the currant. The bark is said to be purgative, and Ray experienced its good effects taken

taken as a decoction in the jaundice. The roots boiled in lye dye wood yellow. In Poland they dye leather of a most beautiful yellow with the bark of the root: and the inner bark of the stem dyes linen of a fine yellow, with the assistance of alum. Withering, *ubi supra*. Kine, sheep, and goats, are said to eat this shrub, and horses and swine to refuse it.

2. *B. cretica*, Cretan, or box-leaved barberry; *Lycium Creticum*, Alp. Exot. 21. t. 20. Pon. Ital. 137. "Peduncles sub-umbelled, spines triple." A shrub that never rises more than 3 or 4 feet high in England, where the flowers are not succeeded by fruit. A native of the island of Candia, or Crete, and also of Japan. Cultivated in 1759, by Mr. Miller: flowering in April and May. 3. *B. ilicifolia*, holm-leaved barberry. Lin. Syst. 343. Suppl. 210. "Leaves obovate, ferrate-spinous, pedicels elongated cymose, spines digitate." Found in the Terra del Fuego by Sparman, where the inhabitants used the wood for bows, on account of its great elasticity. 4. *B. sibirica*, Siberian barberry. Linn. Syst. 343. Murr. in com. got. 1784. 37. t. 6. Pall. It. 2. 737. t. P. f. 2. "Peduncles one-flowered, solitary, nodding; spines palmate." A small shrub, scarcely a span in height. A native of Siberia, where it was observed by Pallas.

Propagation and Culture. The common sort is generally propagated by suckers; but as the plants thus propagated send out suckers in greater abundance than those which are propagated by layers, the latter method should be preferred. The best time for laying down the branches is autumn, and the young shoots of the same year are the best; which will be well rooted by the next autumn, when they may be taken off and planted where they are to remain. When this plant is cultivated for its fruit, it should be planted single, and not in hedges; and the suckers taken away every autumn, and all the gross shoots pruned out; by this method the fruit will be fairer and more abundant. A few of these shrubs will make an agreeable variety in wildernesses or plantations of shrubs; and the fruit will be food for birds; but they should not be planted in too great quantities, or near walks that are much frequented, because their flowers emit a very strong disagreeable odour. The Canada fort may be propagated in the same way as the common sort, and is equally hardy. The box-leaved sort, which is now very rare in England, may be propagated by laying down the branches in the same manner as the first; but the young plants should be set in pots, or sheltered under a frame in the winter; and when they have acquired strength, they may be turned out of the pots, and planted in a warm situation. Martyn's Millar's Bot.

BERBI, in *Geography*, a town of Africa, on the Ivory coast, N. E. of cape Palmas. N. lat. 4° 30'. W. long. 5° 34'.

BERBICE, the seat of a colony of Guiana in South America, formerly belonging to the Dutch, on a river of the same name, about 25 leagues N. W. by W. $\frac{1}{2}$ N. distant from Surinam, which runs from N. to S. and discharges itself into the Atlantic ocean. The coast on each side of the river forms a bay at its entrance, nearly a mile broad, in the middle of which is a small island, called "Crab island." Opposite to this island, on the eastern shore, is a fort, with several pieces of artillery, and some soldiers; but the channel on the other side, which is navigable for ships of any burden, is undefended, and covered by the island from the guns on the opposite shore. Without the entrance of the river is a bar, which, at high tide, has seldom more than 16 feet of water; but within the water is of sufficient depth, and the river is navigable for ships of burden 200 miles from its mouth.

The plantations are situated on each side of the river, and extend nearly 300 miles from its entrance at fort Nassau, which was formerly the seat of government, and contiguous to which were the public offices and houses of the civil and military officers, about 100 miles from the mouth of the river. But the seat of government is now fixed at a point of land on the eastern shore of Berbice, about a mile from its entrance, which is formed between Berbice and the river Conya, which there discharges itself into the former. This is a narrow, but deep river, running from south to north, but diverging somewhat easterly from Berbice. On the sides of this river are several plantations, which form a part of the colony of Berbice. The produce of these plantations consists chiefly of sugar, coffee, cotton, and cocoa, and other articles, such as are furnished by Surinam. Bancroft's Nat. Hist. of Guiana, p. 350, &c. The colony of Berbice surrendered to the British arms in September 1803. The river Berbice discharges itself into the Atlantic in N. lat. 6° 30', and W. long. 57° 20'.

BERBUDA. See BARBUDA.

BERBURG, a town of the Netherlands, in the duchy of Luxemburg; 12 miles N. E. of Luxemburg.

BERCAD, a town of Poland, in the palatinate of Braclaw, near the Bog; 52 miles S. S. E. of Braclaw.

BERCARIA, BERQUERIA, or BERKERIA, in *Middle Age Writers*, denotes a sheep-fold, sheep-cote, sheep-pen, or other inclosure, for the safe keeping of a flock of sheep.

The word is abbreviated from *berbicaria*; of *berbex*, deformed from *vervex*. Hence also a shepherd was denominated *berbicarius*, and *berquarius*.

BERCHEM, or BERGHEM, NICHOLAS, in *Biography*, an eminent painter of landscapes and cattle, was born at Haerlem in 1624; and formed for the practice of his art under some of the best masters of his time. In his manner of painting he was easy and expeditious, and though he selected a very great variety and beauty of sites for his landscapes, he executed them with a surprising degree of neatness and truth. He possessed a clear and strong judgment, and a facility in expressing his ideas; and, therefore, in the lower kind of subjects to which he directed his attention, his choice of nature was judicious, and he gave to every subject as much beauty and elegance as it would admit. The leafing of his tree is exquisitely and freely touched; his skies are clear; and his clouds float lightly, as if supported by air. The distinguishing characters of the pictures of Berchem are the breadth and just distribution of the lights; the grandeur of his masses of light and shadow; the natural ease and simplicity in the attitudes of his figures; the just degradation of his distances; the brilliancy and harmony, as well as transparency, of his colouring; the correctness and true perspective of his design; and the elegance of his composition. He painted every part of his subject so well, as to render it difficult to determine in which he excelled most; his trees, buildings, water, rocks, hills, cattle, and figures, being all equally admirable. One of the most capital pictures of this master was painted for the principal magistrate of Dort, in whose family it is preserved; it exhibits the prospect of a mountainous country, enriched with a great variety of sheep, oxen, goats, and figures, excellently pencilled, and most beautifully coloured. Berchem was indefatigable, partly from his love of labour, and partly to gratify the avaricious disposition of his wife, who never allowed him to relax; and he painted, in the summer months, from four in the morning till day light failed: in consequence of this close application, his pictures are very numerous; and yet at this day they are rarely to be purchased, and always afford a very

very high price. Berchem died in 1683. We have several etchings by this master, that are executed in a fine, bold, mallery style; and from these John Wither seems to have formed that admirable style in which he engraved the copies from Berchem's pictures. Pilkington and Strutt.

BERCHEM, in *Geography*, a town of Brabant: 4 miles S. W. of Ravestein.

BERCHEM, or *Pergen*, a town of Germany, in the circle of Westphalia, and duchy of Juliers; 9 miles east of Juliers.

BERCHEROIT, or **BERKCOITS**, in *Commerce*, a weight used at Archangel, and in all the Russian dominions. It is equal to about 164 pounds English avoirdupois.

BERCHET, **PETER**, in *Biography*, an historical painter, was born in France, in 1650, and placed, at the age of 15, under the care of La Fosse, so that in 3 years he was qualified to be employed in the royal palaces. In 1681, he came over to England, and worked under Rambour, a French painter of architecture. Berchet painted the ceiling in the chapel of Trinity college, Oxford, the staircase at the duke of Schomberg's house in London, and the summer-house at Ranelagh. His drawings in the Academy were much approved. Towards the close of life he only painted small historical pieces, the subjects of which were taken from fabulous history; and his last performance was a Bacchanalian picture, to which he affixed his name the day before he died, in the year 1721. He occasionally amused himself with the point. Pilkington and Strutt.

BERCHING, in *Geography*, a small town of Germany, in the bishopric of Eichstett, or Aichstadt, seated on the river Sulz.

BERCHORIUS, **BERCHEUR**, **PETER**, in *Biography*, a learned divine and voluminous writer of the 14th century, was born at the village of St. Pierre du Chemin, 3 leagues from Poitiers in France, and was constituted grammatical preceptor to the novices of the Benedictine monastery at Clugni, in the year 1340. He died prior of the Benedict convent of St. Eloi at Paris, probably at an advanced age, in the year 1362, as we learn from his epitaph in that monastery. Berchorius was one of those writers who affected to interpret allegorically, not only texts of Scripture, but also poetical fables and profane histories, which they arbitrarily applied to the explication or confirmation of the mysteries of Christianity. His three grand printed works are, "Reductorium Morale super totam Bibliam," in 26 books, first printed Argentorat. 1473, fol. and containing all the incidents and stories in the Bible, reduced into allegories, "Repertorium, or Reductorium, Morale," in 14 books, which is a dictionary of things, persons, and places, all which are supposed to be mystical, and are therefore explained in their moral and practical sense; and "Dictionarium Morale," in two parts, and seeming to be principally designed as a moral repertory for students in theology. These pieces were all printed at a very early period; and a folio edition of them was printed, in 3 volumes, at Venice, in 1583. Berchorius was also the author of a comment on a profody, called "Doctrinae Metricae," which was used as a school-book in France. Glassius, in his "Philologia Sacra," written about the year 1623, and of which a third edition was printed at Francof. and Hamb. in 1657, ascribes to this author the famous work entitled "Gesta Romanorum;" the writer of which has for a long time remained unknown to the most diligent inquiries into Gothic literature. The learned Mr. Thomas Warton concurs in this opinion, and thinks it amply confirmed by the general coincidence of the plan, manner, method, and execution between the "Gesta Romanorum," and the three works of Berchorius above-mentioned. He supposes it was written about the year 1340,

with a view of rendering the exercises of his scholars, in the monastery at Clugni, in Latinity, more agreeable and easy, by means of an entertaining Latin story-book, capable of being readily applied to lessons of religion. This piece operated powerfully on the general body of our old poetry, and afforded a variety of inventions, not only to Chaucer, Gower, and Lydgate, but to their distant successors. It was first printed in the Gothic letter without date, and as it is supposed, before or about the year 1473, in folio; and contains 152 chapters. The second edition was printed in the same or following year at Louvain, in 4to, and contains 185 chapters. Another edition was printed in folio, in 1488. At the commencement of typography in England, a translation of it in English was printed by Wynkin de Worde, and it was afterwards frequently reprinted. This work is compiled from the obsolete Latin chronicles of the later Roman, or rather German story, heightened by romantic inventions, from legends of the saints, oriental apologies, and many of the shorter fictitious narratives, which came into Europe with the Arabian literature, and were familiar in the ages of ignorance and imagination. The classics are sometimes cited for authorities; but these are of the lower order, such as Valerius Maximus, Macrobius, Aulus Gellius, Seneca, Pliny, and Boethius. To every title is subjoined a moralisation, reducing it into a Christian or moral lesson. Warton's Hist. Eng. Poetry, vol. iii.

BERCHTOLDSDORF, or **PETERSDORF**, in *Geography*, a town of Germany, in the archduchy of Austria, 6 miles south-west of Vienna.

BERCHTOLSGADEN, or **BERGTOLSGADEN**, a proventuship and principality of Germany, in the circle of Bavaria, environed by the archbishopric of Salzburg, but exempt from the jurisdiction of that see. It is wholly mountainous, and contains two towns and a few villages, and also several lakes. At Bergtolsgraden, as well as at Hallein, in the principality of Salzburg, salt is found in its fossil state. In order to obtain it, large cavities, or chambers, are dug in the mines, and filled with fresh water. Some of these are so large that the water must stand in them during two years before it is sufficiently impregnated with salt; in others, this process does not require more than a few weeks. When the water is saturated, it is carried through the mount in by pipes into a reservoir, whence it is conveyed to the cauldrons. Of these there are four at Hallein, and two at Bergtolsgraden, which are not above four leagues distant from each other. The salt annually made at the former of these places, amounts to 400,000 quintals, and at the latter to 160,000. Count Razenmowlski supposes (Hist. et Mem. de la Societe des Sciences Physiques de Lausanne, vol. iii. for 1787 and 1788), that the mines at Hallein, and those at Bergtolsgraden, are parts of the same bank of salt, which, in his opinion, is a continuation of that of Grund in Austria, about 8 leagues from Hallein; and the irregularity of the strata seems to indicate that the connexion between the two mines must have been broken by some violent convulsion.

BERCKEL, a town of Holland, 5 miles east of Delft. — Also, a river of Germany, which rises in the bishopric of Munster, and runs into the Rhel at Zutphen.

BERCKSENBROECK, a town of Holland, 6 miles north of Rotterdam.

BERD, a river of Siberia, which runs into the Oby, near Beiskoi.

BERDA, in *Ichthyology*, a species of *SPARUS*, that inhabits the Red sea. It is of a whitish grey; lateral scales marked in the middle with a single transverse brown band dorsal spines recumbent. Forsk. F. n. Arab. The body of this fish is oval; back gibbous, with pale bands; beneath white; scales

feales broad, rounded, entire. The crown is naked, convex, flosing; iris white; nostrils large, linear, with a conic cirrus; four long, conic, subulate, incisive teeth; grinders numerous, hemispherical, those behind largest; upper lip long, protractile; gill-covers entire; lateral line nearest the back; fins brown, pectoral ones transparent and lanceolate; tail two-lobed. Gmelin.

BERDA, *Cape*, or BERDINSKAYA, in *Geography*, the east point of a large bay of the sea of Azoph; cape Wisarionova, or Besarionova, being the west point. Several rivers empty themselves into this bay. N. lat. $46^{\circ} 42'$. E. long. $56^{\circ} 24'$.

BERDAA, a town of Asia, in Armenia, 160 miles east of Erivan.

BERDANIEH, a town of Asiatic Turkey, in the province of Caramania; 32 miles north of Alameh.

BERDASCHIR. See BARSIR.

BERDASH, in *Antiquity*, was a name formerly used in England for a certain kind of neck-dress; and hence a person who made or sold such neckcloths was called a *berdasher*, from which is derived our word *haberdasher*.

BERDICZOW, in *Geography*, a decayed town of Poland, in the palatinate of Volhynia, 148 miles E.S.E. of Lucko, and 324 S.W. of Warsaw.

BERDIN, or BERLIN, in *Conchology*, the name by which the *limpet*, or paper-shells, *patella* of Linn., is known on the coast of Normandy. It is also called in some places *beracle*, or *hernicle*.

BERDOA, in *Geography*, a province of Africa, in the eastern division of the great desert or Sahara, constituting one of the Oases or fertile islands, which forms a part of that extensive desert that separates Egypt from Fezzan, and contains the wandering tribe of Lebeta or Levata. It is situated to the north-east of Agadez, and has Kuar or Kawar to the south and east, to the north Augela, and the desert of Barca, and to the west Fezzan. It extends northward from N. lat. 25° , and lies between 20° and 25° E. long.; but its exact boundaries are not ascertained. Berdoa, its capital, lies north of the mountains of Tibelli; and, according to Rennell's map, is placed in N. lat. $26^{\circ} 32'$. E. long. $21^{\circ} 35'$.

BERE-ALSTON, though only a small inconsiderable hamlet, in the parish of Bero-Ferris, Devonshire, has the privilege of returning two members to the English parliament. The right of election is vested in those persons who possess land in the borough, and pay three-pence acknowledgment to the lord of the manor, who varies the number of electors at pleasure, by granting burgage tenures to his own partizans only. The first return of members for this borough was in the 27th of Elizabeth. In the vicinity of this place are several lead mines; but none of them produce much ore, though in the time of Edward I. they were not only very rich in this metal, but yielded a great quantity of silver. It is said that 1600 weight of the latter was obtained in the course of three years.

BERECYNTHUS, in *Entomology*, a species of PAPILO, with entire wings, black above, with a yellow marginal band; six ocellar spots on the underside of the posterior pair. Fabricius. This is *papilio berecynthia* of Cramer, is of a large size, and inhabits Surinam.

BERECYNTIA, in *Ancient Geography*, a town of Asia Minor, in Phrygia. Steph. Byz.

BERECYNTIA *Regio*, a country of Asia, towards the river Sangar. Steph. Byz.

BERECYNTIUS TRACTUS, a canton of Asia Minor, in Caria. Pliny.

BERECYNTUS, a mountain of Asia Minor, in Phrygia, consecrated to the mother of the gods.

BERECZINA, in *Geography*, a river of Lithuania, which rises in the palatinate of Vilna, and runs into the Niemen, 16 miles north-east of Novogrodek.

BEREFIORD, a trading place and port of the island of Iceland.

BEREGRA, or BERETRA, in *Ancient Geography*, a town of Italy, in Picenum, at a small distance north from Interamna.

BEREGSZAZ, in *Geography*, a town of Hungary, 24 miles north of Zatmar. It gives name to a county, and derives its appellation from a Saxon colony established there; but its present inhabitants are Hungarians.

BEREIA, a town of Africa, north of Sierra Leone, at a small distance from the coast. N. lat. $8^{\circ} 58'$. W. long. $12^{\circ} 28'$.

BEREILLY, or BARELLY, a city of Hindoostan; is the capital of Rohileund, which was added to the dominions of Oude in 1774. It lies about half way between Lucknow and Delhi. N. lat. $28^{\circ} 27'$. E. long. $79^{\circ} 45'$. See BARELLY.

BERELOS, a lake of Egypt, between Damietta and Rosetta; about 32 miles long and ten broad in the middle, but gradually contracting towards each end. It has within it several islands.—Also, a town of Egypt, 30 miles west of Damietta.

BEREN, an island of Asia, 40 leagues west from Congo island in the gulf of Bassora.

BEREN, or BIERON, a town of Silesia, in the province of Ratibor; 34 miles east of Ratibor.

BERENBORG, called also Joan Main island, an island in the north seas, near the coast of East or Old Greenland. N. lat. $71^{\circ} 10'$. W. long. $6^{\circ} 19'$.

BERENGARIANS, in *Ecclesiastical History*, a religious sect, adhering to the opinions of Berengarius, who, in the latter part of the eleventh century, a considerable time before Luther, opposed the doctrine of transubstantiation, and the real presence, strenuously maintained by Lanfranc and Anselm. See BERENGER.

He is farther charged by the Romanists with decrying marriage, and maintaining the common use of all sorts of women, and asserting baptism of no effect.

His followers were divided on the head of the eucharist: though they all agreed, that the bread and wine were not essentially changed, yet some allowed, that the body and blood of Christ were contained in them, though concealed under an impanation: others denied any change at all, and resolved the whole into figure: others again allowed a change in part; and others an entire change, with this restriction, that to those who presented themselves unworthily it was changed back again.

Mabillon has an express dissertation on the manifold condemnations of Berengarius, his retractions, relapses, and repentance.

BERENGER, JAMES, in *Biography*, a native of Carpi, in Modena, from whence he took his name, being much more known by the name of Carpus, than by that of his family, Berengarius; one of the restorers and improvers of anatomy, was born about the end of the fifteenth century. He was initiated into the knowledge of surgery by his father, who practised that art, and had for his instructor in languages and philosophy, the celebrated Albertus Minutius. At a proper age he went to Bologna, and afterwards to Padua, where he filled for some time the office of professor of anatomy. Returning in 1518 to Bologna, he was there raised to the same office, which he continued to fill until about the year 1525. While teaching here, he is said to have dissected upwards of an hundred human bodies: a prodigious

prodigious number for the time, when the prejudice against handling or disturbing the dead was so strong. To that circumstance, aided by his known antipathy to the Spaniards, perhaps may be attributed the story of his having dissected two of the natives of that country alive, with the view of feeling the motion of the bowels, and of his being on that account obliged to fly his country. A similar story had been told of Herophilus, and was afterwards told of Vesalius. That this, however, had been done by some anatomists, or that he was accused of it, seems probable by his speaking of such a practice in his commentary on the works of Mundinus, with disgust and horror. He is with more reason said to have offended the ministers of religion by the levity and indecency of his conversation on the subject of his dissections, and by the profligacy of his life; and on that account to have been obliged to quit Bononia.

By his numerous dissections, he was enabled to correct many erroneous opinions as to the structure of the interior parts of the body, which prevailed to his time, and thence to pave the way for the further improvements made by Vesalius, his immediate successor. If he was not the inventor, as Douglas calls him, he was one of the first who used mercurial frictions in curing the venereal disease, by which he is said to have acquired a large fortune, which he left, at his death, to the duke of Ferrara, to whose territory he retired, and where he died, about the year 1527. His works are, "Commentaria, cum amplissimis additionibus, supra anatomiam Mundini, cum textu ejus in pristinum nitorem restituta," Bononia, 1521, 4to., containing, besides numerous corrections of Mundinus, a prodigious number of anatomical facts, which bear abundant testimony to his diligence and ingenuity. "Ea omnia enarrare, quæ recte videt (Haller says, inimitabile foret;)" and further on, "Invenio apud hunc virum, testimonium irrefragabile pro antiquo more, quo cardinales testes pontificis, nuper electi, contraerant." There are several rude engravings of the muscles of the abdomen, and of other parts, in this volume. "Hæcogæ breves, periculis et uberrimæ in anatomiam humani corporis ad fidem Galenicorum præces in lucem editæ," Bonon. 1522, 4to. also with plates. Both these works have passed through numerous editions. In 1664, it was published in London, with the title, "A Description of the Body of Man, being a practical Anatomy." He also published, in 1518, 4to. Venet. "De Cruri Fractura." Douglas. Bib. Anat. Haller. Biblioth. Chirurg.

BERENGER, BERENGARIUS, an eminent logician and controversialist, was a native of Tours in the eleventh century, and having studied under Fulbert at Chartres, he returned to Tours, where he was made principal of the school of St. Martin, and treasurer of the church. From Tours he removed to Angers, and became archdeacon of the city. Distinguished by his acute and subtil genius, by his extensive learning, and by his peculiar talents for controversy, as well as by the exemplary tenor of his life and manners, he was held in very high estimation. At length, however, he found reason to deviate from the doctrines of the church concerning the eucharist; and in 1045, he began to maintain publicly the doctrine of Scotus, in opposition to the opinion of Radbert; and he persisted in teaching that the bread and wine were not changed into the body and blood of Christ in the eucharist, but preserved their natural and essential qualities, and were merely figures and external symbols of the body and blood of our Saviour. Although the church of Rome had not, in this century, adopted any settled and decided opinion concerning the nature and manner of Christ's presence in the eucharist, the doctrine of Berenger was not only opposed by several doctors in France and Ger-

many, but attacked with peculiar vehemence and fury by the Roman pontiff Leo IX. who, in 1050, convened two councils, one at Rome, and the other at Verceili, in which it was solemnly condemned; and the book of Scotus, from which it was deduced, was committed to the flames. The council of Paris, summoned in the same year by Henry I., concurred in its condemnation, and menaced Berenger, and his numerous adherents, with all sorts of evils, both spiritual and temporal. The heresiarch was deprived by Henry of all his revenues; but he continued for some time afterwards firm and resolute in his adherence to the doctrine he had embraced, and enjoyed unmolested tranquillity. The prevalence of his doctrine, notwithstanding the opposition with which it encountered from the writings of its antagonists, and particularly from those of Anselm and Lanfranc, archbishops of Canterbury, alarmed the church; and two councils were summoned by Victor II. at Tours, in 1054, to examine anew this dangerous doctrine. In one of these councils, Hildebrand, afterwards pope Gregory VII. appeared as the pope's legate, and took the lead in opposing this new heresy. Berenger, who was present, was at length overpowered by threats, and not only abandoned his opinions, but solemnly abjured them, and made his peace with the church. This abjuration, however, was only an act of timidity and dissimulation; for he soon after taught the opinions he had formerly professed, though the dread of danger rendered him more circumspect and cautious. As soon as Berenger's perfidy was announced to Nicholas II., the exasperated pontiff summoned him to Rome in 1058, and in a council held there the following year, he was so terrified, that he declared his readiness to embrace and adhere to the doctrines which that venerable assembly should think proper to enjoin. Accordingly, Humbert was employed by the pope and council to draw up a confession of faith, which Berenger publicly signed, and to which, by a solemn oath, he avowed his adherence. As soon as Berenger returned to France, and found himself countenanced and protected by his ancient patrons, he expressed his detestation of the doctrines which he had been obliged to profess at Rome, abjured them solemnly both in his discourses and writings, and zealously inculcated his former opinion. Pope Alexander II. attempted by soothing and friendly expostulations to regain the apostate; but his remonstrances were ineffectual; the controversy was prolonged for many years, and the followers of Berenger continually increased. As soon as Hildebrand was advanced to the papal chair, he undertook to terminate the controversy; and with this view required Berenger, in 1078, to repair to Rome. Towards the conclusion of this year, a council was held in this city, and Berenger was permitted to draw up a new confession of his faith, and to renounce that which had been composed by Humbert, and approved by Nicholas II. and a Roman council. On this occasion the persecuted prelate made a declaration, confirmed by an oath, that he would for the future adhere to the following proposition: viz. "that the bread laid on the altar becomes, after consecration, the true body of Christ, which was born of the Virgin, suffered on the cross, and now sits at the right hand of the father; and that the wine placed upon the altar becomes, after consecration, the true blood which flowed from the side of Christ." This declaration satisfied the pontiff, but was thought by the enemies of Berenger to be too vague and equivocal. Gregory yielded to their clamours; and at a council held at Rome, in 1079, a new confession of faith was drawn up, to which Berenger, after reading and subscribing it, declared his assent by a solemn oath. This confession expressed his belief, "that the bread and wine were, by the mysterious influence of the holy

prayer, and the words of our redeemer, substantially changed into the true, proper, and vivifying body and blood of Jesus Christ;" and this was followed by a solemn declaration, "that the bread and wine, after consecration, were converted into the real body and blood of Christ, not only in quality of external signs and sacramental representations, but in their essential properties, and in substantial reality." Gregory dismissed him with the most honourable testimonies of his friendship and liberality, and he returned to his own country. But Berenger, not conceiving himself bound by this declaration, publicly retracted the sentiments which he had solemnly avowed at Rome, and even composed an elaborate refutation of the doctrine to which he had been compelled to profess his assent. Gregory, who seems not to have approved the last confession imposed upon Berenger, when appealed to, declined interfering, and took no measures for molesting him. From this time, Berenger observed a profound silence amidst the clamours of his incensed adversaries, and made no reply to their bitter and repeated invectives. At length, decaying with age, overpowered by the opposition with which he had incessantly struggled, and probably depressed with the reproaches of his own mind for the pusillanimous and dishonest part he had acted, he abandoned all his worldly concerns, and retired to the isle of St. Cosme, in the neighbourhood of Tours, where, in a course of penitential and pious exercises, he passed the short remainder of his life; and in 1088, he was released by death. On the minds of the people, he left behind him a deep impression of his extraordinary sanctity; and an annual service is still performed for him in the church of St. Martin at Tours. His unsteady conduct was unquestionably very disgraceful to him; and there is reason to believe that it embittered the reflections of his retirement and closing scene. It is therefore a question of little importance, whether he abandoned his original opinion before his death, as the Roman catholic writers maintain, or whether he adhered to it in the last period of his life, as the protestants, with greater probability, have asserted. All his works, which were numerous, have been lost; except two letters, his three professions of faith, and part of his treatise against one of them. Cave's Hist. Lit. tom. ii. p. 130. Mosheim's Eccl. Hist. vol. ii. p. 559, &c.

BERENICE, or BERNICE, a Jewish queen, the daughter of Agrippa the elder, and sister of Agrippa the younger, kings of Judæa. She was born about the year of Christ 28, and at the age of 16 married her uncle Herod, king of Chalcis. After her husband's death, A. D. 48, she was suspected of having criminal intercourse with her brother Agrippa; and in order to remove suspicions, and to silence rumours of this kind, she consented to marry Polemon, king of Pontus and part of Cilicia, on condition of his embracing Judaism. She lived with him, however, but a little while, and returned to her brother, with whom she lived on terms of intimacy, which subjected her to reproach. Juvenal refers to this incestuous connection (sat. vi. v. 155):

— "Deinde Adamas notissimus, et Berenices
In digito factus pretiosior; huic dedit olim
Barbarus: incestæ dedit hunc Agrippa forori."

When Agrippa heard the discourse of St. Paul before Festus at Cæsarea of Palestine, Berenice was present with him. After the commencement of the Jewish war in 67, when Agrippa was driven from Jerusalem by the seditious people, she remained for some time after him, and interceded for the Jews with the Roman governor Florus, by whom she was treated with great disrespect. She afterwards accompanied Agrippa to the army of Vespasian in Syria; and contrived, by costly presents, to engage the good will of that avaricious emperor as long as he lived. Her beauty and ad-

dress had also captivated Titus; and on the death of Vespasian she followed him to Rome. The emperor was much attached to her, and disposed to make her his queen; but in deference to the sentiments of the Roman people, who disliked the idea of a foreign queen, and who well knew that her character was not irreproachable, he dismissed her, and sent her away to her own country. What became of her afterwards history does not inform us. Jos. Antiq. l. xix. xx. De Bell. Jud. l. ii. Tacit. Hist. l. ii. Crevier. Gen. Dict.

BERENICE was likewise the name of several Egyptian and eastern queens. One of them, the wife of Ptolemy Evergetes, king of Egypt, under an apprehension of the danger to which he would be exposed in his expedition to Syria, made a vow to consecrate her hair, which was her chief ornament, in case of his safe return. When the prince returned, not only in safety, but crowned with glory and success, she immediately cut off her hair, and dedicated it to the gods in the temple which Ptolemy Philadelphus had built in honour of his beloved Arsinoë, under the name of the Zephyrian Venus, on the promontory of Zephyria in Cyprus; but this hair being lost by the negligence of the priests, Ptolemy was enraged, and threatened to punish them. Upon which Conon of Samos, a flattering courtier, as well as skilful mathematician, with a view to appease the king's anger, and to conciliate his favour, affirmed, that the queen's locks had been conveyed to heaven, and pointed out seven stars near the tail of the lion, which till that time had not belonged to any constellation, declaring that they were the queen's hair. Several other astronomers confirmed the asseveration of Conon; and hence "Coma Berenices," or Berenice's hair, became one of the constellations.

Callimachus, who lived at that time, and had been a great favourite of Philadelphus, wrote a hymn on the hair of Berenice, which was afterwards translated by Catullus, whose version is extant among his other performances. Berenice, according to Plutarch (in Quest. Græc.) and Stephanus Byzantinus (verb. Βερενικη), was formed from Φερενικη, a bearer of victory, by the Macedonians, who exchanged Ph into B.

BERENICE, in *Entomology*, the name under which Cramer figures *papilio crispus* of Fabricius and Gmelin.

BERENICE, in *Ancient Geography*, the name of several cities, of which Ortelius reckons nine. The principal are as follow: viz. a town of Thrace:—another of Asia Minor in Cilicia:—another of Asia, called Pella in Cælo-Syria; all three mentioned by Stephanus Byzantinus:—another of Africa in Cyrenaica, near the mouth of the river Lathon, or Lethon, where it discharges itself into the bay of Syrtis, anciently called Hesperis, and Hesperides, now Berenice: near this town was situated the garden of Hesperides, and a wood still marks its position, in a country destitute of trees:—another, a maritime town of Arabia Petraea, situated at the extremity of the Arabian gulf, or Red sea, the promontory of Heroopolis, and that of Strobilus, according to Pomponius Mela; it is mentioned by Josephus, in his account of Solomon's fleet, who says, it was not far from the city of Ælana, and that it was formerly called Assingaber, or Eziongaber, in which position it M. d'Anville acquiesces:—another, a famous town of Egypt, so named from the mother of Ptolemy Philadelphus, who founded it on the western side of the Red sea, and nearly under the tropic, about 450 miles below Suez, in order to avoid the slow and dangerous navigation of the upper part of the Red sea; this city soon became the staple of the trade with India. From Berenice the goods were transported by land to Coptos, a city three miles distant from the Nile, but which had a communication with that river by a navigable canal, of which there are still some remains, and thence carried down the stream of the Nile,

and its canals, to Alexandria. The distance between Berenice and Coptos, according to Pliny (Nat. Hist. l. vi. c. 29.) confirmed by the Itinerary of Antonine, and approved by M. P. A. Villi, was 258 Roman miles; and the road lay through the desert of Thebais, almost entirely destitute of water. But the attention of a powerful monarch made provision for supplying this want, by searching for springs, and wherever these were found he built inns, or more probably, in the eastern style, caravanseras, for the accommodation of merchants. See Strabo, Geog. l. xvii. p. 1157. D. 1169. In this channel the intercourse between the east and west continued to be carried on during 250 years, as long as Egypt remained an independent kingdom. Berenice continued to be the port of outlet for the Roman East India trade in the time of Pliny (A. D. 79.) who details, in his 6th book, the account of the navigation to India, and who informs us, that it cost 5 millions of sesterces, or about 440,000*l.* every year. From Berenice it was reckoned 30 days' navigation down the Red sea to Ocelis (Galla) just within the strait of Babelmandel. From Ocelis to Muziris, the first port of merchandize in India, was 40 days' sail: so that as they left Berenice about Midsummer, they might arrive in India in the latter end of August, when the violence of the S. W. monsoon was abated, and the sailing navigation safe and easy. These voyages were first made by coasting along the Arabian shore, to the promontory byægrius (now cape Rafalgate,) and thence along the coast of Persia, either directly to Pattala (now Tatta,) at the head of the lower Delta of the Indus, or to some other emporium on the west coast of India. Afterwards, a shorter and safer course was discovered; and from cape Rafalgate vessels sailed in a direct course to Ziveris, which, according to major Rennell, was a port on the northern part of the Malabar coast. In a subsequent period, a direct course was pursued from the outlet of the Red sea to Muziris. It has not been accurately ascertained what were the other ports in India which the merchants from Berenice frequented, when that trade was first opened; but it is probable, that as their vessels were of small burden, and kept near the coast, their voyages were circumscribed within very narrow limits, and that under the Ptolemies, no considerable progress was made in the discovery of India. Rennell's Mem. Intrad. p. 35—37. Robertson's Hist. Disq. concerning India, p. 46, &c.—Another Berenice was a town of Africa, on the Red sea, situate more to the south than the preceding, in the country of the Troglodytes, at the entrance of the Red sea, near the strait of Babel Mandel, known by the epithet of "Epidiria"—another, denominated by Pliny (l. vi. c. 29.) "Panchrybia," from the gold dug in its vicinity; and by Strabo, *περὶ τῆς Ἰνδίας, juxta Sabas*, on the same coast; translated by Hardouin to Arabia Felix, but mentioned by Strabo and Pliny in connection with the country of the Troglodytes.

BERENICE'S HAIR, in *Astronomy*. See *BERENICE* *αἰχμή*, and *COMA Berenice*.

BERENTHA, in *Ancient Geography*, a small town of Peloponnesus in Arcadia, mentioned by Strabo, Byz. and Pausanias.

BERENTHATE, a small river of Peloponnesus in Arcadia, that discharged itself into the Achæan. Pausanias.

BERENTZ, in *Geography*, a town and a part of Hungary; 20 miles N. N. E. of Pestburg.

BERES, in *Ancient Geography*, a town of Thrace. Steph. Byz.

BERESKY, in *Geography*, a town of Poland, in the palatinate of Braclaw; 45 miles S. E. of Pracław.

BERESNA, or **BERESIN**, a district and town of Tchernigof in Russia, situated on the Desna, 24 miles E. N. E. of Tchernigof.

BERESOF or **BERESOW**, a district of the province of Tobolsk in Russia, in the country of the Samoyedes, situated on the river Soffva, which falls into the Oby; and bounded to the north by the straits of Waygats; on the east by the Ural mountains; on the south by the river Konda, and a large bay of the Frozen ocean, which runs into the land toward the south, and separates near the 66th degree of north latitude, into two parts, one of which is called the Obskaia Guba, or bay of Oby, and the other Tazowkaia Guba, or the bay of Tazow. Into the former the river Oby empties itself, and into the latter the Taz; and from these two rivers the bays derive their names. This district was added to the Russian empire by the czar Gabriel, in 1530, long before the other parts of Siberia were conquered. The town of Beresof is situated on the west side of the river Oby, 372 miles N. N. W. of Tobolsk. N. lat. 64. E. long. 65. 14'. This district is famous for its gold mines, in the mineral mountains of Ural, opened in 1754, and affording annually 3, 4, 5, or 6, and in later years 7 or 8 pood of gold. From the commencement of the work, in 1754, till the year 1788, during an interval of 34 years, the quantity of about 120 pood has been generally gained, which, estimated in value, amounts to about 1,198,000 rubles, and after deducting the costs, to above 480,000 net profit. Taking the gold and silver here obtained, according to its standard in coinage, and balancing it with the expenses paid in copper money, according to its true value, a profit accrues of nearly 800,000 rubles. Took's View of Russia, vol. iii. p. 296.

BERESOF is also a town of Russia, in the government of Olonetz. N. lat. 64. 15'. E. long. 30. 34'.

BERETILSKO, a town of Poland, in the palatinate of Volhynia; 24 miles S. S. W. of Lucko.

BERETHALOM, or **BIRTHELEN**, a spacious town of Transylvania, in the district of Weibland, which is the residence of the Protestant bishop. The church is seated on a high rock, and its vicinity produces good wine.

BERETZHAUSEN, a town of Germany, seated on the Laaber, in the circle of Bavaria, and principality of Neuburg; 12 miles W. N. W. of Ratisbon.

BEREWICHA, or **BEREWICA**, in our *Old Writers*, denotes a village or hamlet belonging to some town or manor, situate at a distance from it.

The word frequently occurs in Doomsday-book: *Ipse sunt berewiche ipsidem maneri.*

BEREZA, in *Geography*, a town of Poland, in the palatinate of Kiow; 30 miles W. of Belzetziew.—Also, a town of Lithuania, in the palatinate of Poliss, and territory of Brzsk; 56 miles E. N. E. of Brzsk. In this place the Catholics have a convent.

BEREZEC, a town of Little or Red Russia, in the palatinate of Cheln; 22 miles east of Cheln.

BEREZEN, a river which runs into the Black sea; 20 miles west of Oczakow.

BERLZENE, a town of Poland, in the palatinate of Volhynia. N. lat. 51. 45'. E. long. 25. 30'.

BEREZEUKA, a town of Russia, in the government of Smolensk, on the west side of the Volga; 124 miles S. of Smolensk.

BEREZINA, or **BEREZYNA**, a river of Lithuania, which rises in the palatinate of Poliss, and runs into the Dniester, in N. lat. 52. 10'. E. long. 30. 55'. This river has been erroneously laid down, by some modern geographers, as forming a town which is not mentioned in any of our Authors.

BEREZISA, a town of Lithuania, in the palatinate of Poliss, near the source of the river of the same name; 44 miles N. E. of Minsk. N. lat. 54. 20'. E. long. 25. 35'.

BEREZINSKOI, a town of Siberia, on the north side of the Irtysh; 40 miles E. of Tobolsk.

BEREZNA, a town of Russia, in the district of Kargapol, seated on the river Onega. N. lat. $62^{\circ} 18'$. E. long. $38^{\circ} 5'$.

BEREZNE, a town of Poland, in the palatinate of Vóhlynia, near the river Sluez. N. lat. $51^{\circ} 10'$. E. long. $26^{\circ} 52'$.

BEREZNIKI, a town of Lithuania, in the palatinate of Troki; 40 miles N. N. W. of Troki.

BEREZOF. See **BERESOF**.

BEREZOVOI, a fortress of Asiatic Russia, in the government of Orenburg, on the Uvelka, 240 miles east of Ufa, and 68 S. E. of Tcheliabinsk.

BEREZOVSKOI, a fortress of Asiatic Russia, in the government of Orenburg, on the Ural, 140 miles E. N. E. of Orenburg.

BER-FISCH, in *Ichthyology*, a name given by the Germans to the *common perch*.

BERG, **MATTHYS VANDEN**, in *Biography*, a painter of portrait and history, was born at Ypres in 1615, and, as one of the disciples of Rubens, he obtained some distinction. In his drawing he was correct, and being assiduous in designing after the life, and after the best models, pictures of his own invention are uncommon; although excellent copies after the finished pictures of his master are numerous. He died in 1687. Pilkington.

BERG, in *Geography*, a duchy of Germany, in the circle of Westphalia, called in Latin "Ducatus Montensis," *berg* and *mons* being synonymous, and denoting mountain or hill, is bounded on the west and south by the archbishopric of Cologne, from which it is separated by the Rhine; on the north by the duchy of Cleves; and on the east by Nassau-Siegen, the duchy of Westphalia, and the county of Mark. It is about 72 miles long, and from 10 to 26 in breadth. The country, which upon the whole is mountainous, is, nevertheless, along the Rhine flat, very fertile, and produces corn in abundance; on the hills the inhabitants cultivate vines, and the higher tracts are covered with extensive forests; and the vallies afford excellent pasture. In this duchy there are mines of lead, iron, and coal; its principal manufactures are swords, knives, and other articles of iron and steel; and also those of cloth, ribbands, and handkerchiefs. The principal rivers are the Rhine, which flows to the east of this country, the Wipper, the Sieg, and Ruhr. Its capital is Dusseldorf; and its other principal towns are Elberfeld, Gemark, Lennep, Rattingen, and Solingen. Hoeek computes the number of inhabitants to be 261,504. Rander (Tour, vol. ii. p. 294.) says, that this duchy contains 9 cities, 8 market towns, 35,942 hearths, 202 churches, 44,646 Calvinists, 36,807 Lutherans, and 1,300 Jews: and he adds, that this duchy, and that of Juliers, contain a number of manufacturers, who are computed to be about 150,000. The duchy of Berg belonged to the elector palatine; but in the year 1795, it was entirely over-run by the French. See **JULIERS**.

BERG. See **BERGUES**.

BERG Reichstein, or *Kaschperski Hory*, a royal town of Bohemia, in the circle of Prachalitz, seated on a mountain, in which are mines of silver, 20 miles W. of Prachalitz.

BERGA, a town of Norway, 60 miles E. N. E. of Christiana. N. lat. $59^{\circ} 50'$. E. long. $9^{\circ} 38'$.—Also, a small town of Spain, in Catalonia, seated on the river Llobregat.—Also, a town of Germany, in the circle of Neustadt, and prefecturate of Weyda, seated on the Elster, 5 miles W. of Weyda.

BERGAMASCO, or **BERGAMO**, a country of Italy, being part of Lombardy, and belonging to the states of Venice, is bounded on the north by the Valteline, on the

east by the Bresciano, on the south by the Cremasco, and on the west by the Milanese. It extends about 36 leagues from north to south, and 30 from east to west. Towards the north it is mountainous and uncultivated, but the vicinity of Bergamo, its capital, is fertile. Some of its vallies produce wine and oil; others are barren. In the mountains are mines of iron, and quarries of marble and of stones. The inhabitants are inclined to corpulency, and are subject to the goitre; nevertheless, they are indolent, and intelligent in commerce, and carry on a considerable traffic in iron, wool, carpets, and tapestry, which they manufacture; cattle, marble, and mill-stones. Their language is a very corrupt Italian. Bergamasco now belongs to the Cisalpine republic.

BERGAMO, **JAMES PHILIP DE**, in *Biography*, an Augustin monk, was born at Bergamo in 1434, and wrote a "Chronicle" in Latin, from the creation of the world, to the year 1503, and "Treatise of Illustrious Women." He died at the place of his nativity in 1518. Gen. Dict.

BERGAMO, anciently *Bergomum*, in *Geography*, a fortified city of Italy, and capital of Bergamasco, is seated on several hills, at the bottom of which are some handsome suburbs. Between the city and the strong castle on the mountain, is a subterraneous communication. Bergamo is the see of a bishop, suffragan of Milan, and contains 13 parish churches, 12 convents for men, 10 for women, and about 30,000 inhabitants. The old church, of mingled Gothic and Grecian architecture, contains several valuable pictures, and deserves notice. It is a place of considerable trade, and has a large fair on St. Bartholomew's day, which is resorted to by a great number of merchants from other parts of Italy, Germany, and Switzerland. The principal articles of commerce are wool and silk; and the ferges and tapestry of this place have been celebrated. Their silks equal those of Turin. The inhabitants are diligent and active, and by their industry render fertile the sandy environs of the town. Bergamo is 25 miles N. E. of Milan, and 26 N. W. of Brescia. N. lat. $45^{\circ} 42'$. E. long. $9^{\circ} 38'$.

BERGAMO, a name given by the Turks to the ancient **PERGAMUS**.

BERGAMOT, in *Botany*, *cedrat* or *bergamot citron-tree*, the *CITRUS mella-rosa* of Lamarek, and a variety of the *CITRUS medica* of Linnæus. It is distinguished from the common citron-tree by its leaf, which has the odour of the rose, by its fruit, which is red, and by the pistil of its flower, which is short. The fruit has a fine taste and smell; and its essential oil is in high esteem as a perfume.

BERGAMOT, *Oil*, or *Essence of*, is a fragrant essential oil procured from the outer rind of the bergamot orange, and prepared in a very large quantity for the table and perfumery in the south of France, and especially in Italy and Sicily. There are several other species of oranges used for this purpose, but the bergamot is esteemed the most fragrant.

As the oil exists pure and ready formed in the orange peel, being simply deposited in small cells, the extraction is very easy. There are two methods of procuring it, either by distillation, as with all other essential oils, (for which, see the article *OIL Essential*) or by expression. The latter is in some respect the best, as the oil is not liable to be altered by heat. Sestini relates, that in Sicily, a vast quantity of the oil is procured simply by squeezing the peel in the hand, and holding a small piece of sponge to the surface, which imbibes the oil as fast as it flows out: when the sponge is full, its contents are pressed out into a vessel in which the oil is collected. It is not easy to imagine a more indolent and inartificial method: but in Italy, and the south of France, the orange peels are first torn to pieces on a small machine stuck over with nails, with the points projecting,

like

like a carding mill, whereby they are entirely torn to pieces, from which much of their oil flows out on the small mill, and is conducted away by a channel cut for the purpose, leading to a large bottle, where it is collected. After this, the peel, now in a pulpy state, is strongly compressed between two plates of glass, and the remainder of the oil is forced out. This last being mixed with the other parts of the pulp, is at first turbid, but gets clear by repose.

Their expressed essential oils, or as they have sometimes been distinguished by the term *essences*, are more fragrant than the oils prepared by distillation, but being mixed with a little mucilage, they are somewhat thicker, and do not keep quite so long as the distilled. The Sicilian method of preparing the essence by hand, though attended with great waste of materials, certainly affords a purer oil, than where a mill and press are used.

If the pulp, remaining after pressure, is mixed with spirit of wine and distilled, an addition of water to the distilled spirit separates an additional quantity of the oil, and leaves the liquor highly flavoured with its exquisite scent.

Beaume obtained two ounces of the oil by distillation, from two pounds of the peel of lemons, and probably the bergamot is yielded in somewhat similar proportion. Beaumé. Murray.—*Éncycl. Arts. & Met.* tom. vii.

There is likewise a kind of snuff of the same name, which is only clean tobacco, with a little of the essence rubbed into it.

BERGAMOT, in *Commerce*, is also the denomination of a coarse tapestry, manufactured with flecks of silks, wool, cotton, hemp, ox, cow, or goats' hair, and supposed to be invented by the people of Bergamo in Italy.

BERGANDER, in *Ornithology*, a name by which some have called the *shieldrake* or *burrough duck*, a very beautiful species of duck, common on the Lancashire, and some other coasts of England; but not in much esteem for eating. This is *anas tarda* of Linnæus, which see.

BERGARA, in *Geography*. See VERGURA.

BERGASE, a town of Romania, in European Turkey, seated on the Larissa. N. lat. 41° 22'. E. long. 27° 24'.

BERGBIETHEIM, a large market town of France, in the department of the Lower Rhine, and district of Dachteln.

BERGEN, DIRK VANDEN, in *Biography*, was born at Haarlem, and was reckoned one of the best disciples of Adrian Vandervelde. His colouring is more glowing than that of his master; but his cattle, and other objects, are less correctly drawn. He spent some time in England; but not succeeding, returned to his own country, and for want of economy, died poor in 1689. Pilkington.

BERGEN, CHARLES AUGUSTUS DE, son of George Bergen, professor of medicine in the university of Frankfort on the Oder, was born Aug. 11, 1714. After being initiated by his father into the knowledge of anatomy and medicine, he was sent to Leyden, where he studied under Boerhaave and Albinus, and thence, to complete his education, to Paris and to Strasburg. In 1734, being thought qualified to assist his father, he recalled him to Frankfort, where he was made doctor, and the year following, professor in medicine. On the death of his father in 1738, he was promoted to the chairs of professor of anatomy and botany. With what zeal and ability he filled those offices, his numerous, learned, and ingenious dissertations on those subjects evince. In 1744, he was appointed to succeed Goehelers as reader in therapeutics and pathology, which post he filled to the time of his death, October 7, 1760.

His works, consisting chiefly of academical dissertations, were collected by Haller, and published with his "Theses Anatomica." The titles of a few of them follow. For the remainder, see Bib. Anat. et. Botan. Haller. "De nervo

intercostali," 1731: "Icon nova ventriculorum Cerebri," 1734: "Methodus Cranii Ossis differendi, et machine hunc in finem constructæ per figuras, ligno incisâ, delineatio," 1741; "Flora Francofurtina, facili modo elaborata, &c." 1750.

BERGEN, or *Berghen*, in Latin *Berga*, in *Geography*, the capital of Norway, and of the province of Bergenhuys, was founded in the year 1069 or 1070. It is a sea-port town, seated in the middle of a valley, and forming a kind of semicircle round a small gulf of the sea, called by the inhabitants Waag. On the land side it is defended by high mountains, constantly overhung with clouds, which descend upon the town in frequent rains; and towards the sea by several fortifications. All the churches and public edifices, as well as many of the dwelling-houses, are built of stone. The most remarkable buildings are the castle, and the cathedral school, founded in 1554. This city carries on a large trade in all kinds of fish, fish-oil, tallow, tar, hides, and timber, which are brought from the northern parts of the kingdom, and exported from hence. The returns consist chiefly in corn and foreign commodities. Bergen was formerly connected with the Hans-towns, and enjoyed the privilege of coining till the year 1575. The origin of its commerce was owing to the merchants of the Hanseatic league; fifty-eight store-houses are still to be seen on the quays, which were established by those merchants for the convenience of their exportation of fish. They had also a particular court here, the decisions of which tended to exclude the native inhabitants from all share in the trade; but they were at length entirely expelled, chiefly by the vigour of a bailiff, Walkendorf. This city, being chiefly constructed of wood, has been subject to frequent conflagrations, as in 1428, when eleven parish churches were entirely consumed, and also in 1472, 1623, 1640, 1702, 1756, and 1771, on which last occasion, the flames, it is said, were visible in the isles of Shetland, or at least, the red reflection in the sky. It has now only four parish churches, three Danish, and one German, together with some private chapels. The population is computed at 19 or 20,000. The harbour is reckoned one of the best in Europe. Bergen possesses a very laudable institution for the encouragement of the useful arts. N. lat. 60° 23'. E. long. 5° 33'.

BERGEN, BERGHEN, or BERGENHUYS, the most westerly province of Norway, situate between Aggerhuus and the northern ocean. It is about sixty leagues long, and 7 wide. Its capital is Bergen. This province, or diocese, is very populous, and is remarkable for having 7 marble quarries. It includes 7 vogteys or districts, and the same number of provostships. The vogteys are Hhardanger, Sundhard-Lehn, Nord-hord Lehn, Sogn, or Sygna-Filke, Suardiord, Nordfiord, and Sundmor.

BERGEN, a county of America, in New Jersey, on Hudson river, lies opposite to New York on the east, and was first planted by the Dutch from New York. It is a mountainous country, and its extent is about 30 miles long and 25 broad; forming part of the eastern and northern extremities of the state, and at its north-western extremity meeting the north-eastern part of Sussex county. Bergen contains 6 townships, the chief of which are Bergen and Hackensack, and 12,601 inhabitants, including 2301 slaves. Here are 7 Dutch Calvinist churches, and 2 of Dutch Lutherans.

BERGEN is the shire town of the above county, and lies surrounded by water, except on the north. It is separated by the Hudson river, from New York, at the distance of 3 miles; on the south, a narrow channel lies between it and Staten island; and on the west, it has Hackinsack river. The inhabitants are chiefly descendants of the Dutch settlers.

BERGEN Nech, is the southern extremity of the above township.

BERGEN, a town of Germany, in the circle of the Upper Rhine, and principality of Hanau Munzenberg. The environs produce excellent wine.—Also, a town of Germany, in the circle of Upper Saxony, and capital of the isle of Rugen; its ancient name was *Gora*. It is situated in the centre of the island, where are held the tribunals of Swedish Pomerania. N. lat. $54^{\circ} 28'$. E. long. $13^{\circ} 40'$.

BERGEN *the Dumme*, a town of Germany, in Lower Saxony, and principality of Zell, 12 miles S. W. of Danneberg.

BERGENHUYS. See **BERGEN**, *supra*.

BERGEN-OP-ZOOM, a sea-port town of Dutch Brabant, seated on an eminence, in the middle of a morass, near the eastern shore of Zoom, at its junction with the Scheldt. It was first surrounded by a wall in 1287, by the first lord of the town, and erected into a marquisate by the emperor Charles V. in 1533. The church, which is a beautiful structure, was made collegiate in 1442. The houses are well built, and the market places and squares handsome and spacious. It has a good tract of land under its jurisdiction, with several villages, and some islands in the Scheldt. This place, naturally strong on account of the morasses that secure it, was regularly fortified in 1629, and esteemed nearly impregnable. The fortifications are reckoned the master-piece of that great engineer Coehorn. It was unsuccessfully besieged by the prince of Parma in 1588, and also by the marquis of Spinola in 1622. In 1746, the marechal Saxe deputed count Lowendahl to lay siege to it with 36,000 men; and after persevering attacks, and a vigorous, obstinate defence, in which many lives were lost, it was surrendered to the French, who became masters of the whole navigation of the Scheldt. At the peace of Aix-la-Chapelle, it was restored to the Dutch. It is distant 18 miles N. N. W. from Antwerp. N. lat. $51^{\circ} 30'$. E. long. $4^{\circ} 15'$.

BERGENTE, in *Ornithology*, one of the names of *anas marila*. (Scaup. Duck.) *Bloch, besch derlerl naturf. 3. c.*

BERGERA, so called from Christ. Joh. Berger, professor at Kiel, in *Botany*, Auth. D. Konig. Lin. gen. Schreb. n. 718. Clafs and order, *decandria monogynia*. Gen. Char. *Cal.* perianth, five-parted, very small, acute, spreading, permanent. *Cor.* petals five, oblong, bluntish, spreading. *Stam.* filaments ten, five alternately shorter; anthers round. *Pist.* germ roundish, superior; style filiform, club-shaped; stigma turbinate, shining, with transverse grooves. *Per.* berry subglobular, one-celled. *Seeds* two.

Ess. Char. *Cal.* five-parted. *Pet.* five; *berry* subglobular, one-celled, with two seeds.

Species, 1. *B. Koenigii*. Lin. Mantiss. 563. A leafy tree, with the bark of alder. A native of the East Indies. Martyn.

BERGERAC, in *Geography*, a town of France, and principal place of a district, in the department of the Dordogne; beautifully situate in an extensive plain on the Dordogne, which divides it into two towns, called "St. Martin," and "St. Magdelaine." It is a rich, commercial, and populous town, containing about 8540 inhabitants. In the canton are 14,140. The territorial extent comprehends 175 kilometres, and the number of the communes is 12. Before the revocation of the edict of Nantes, it is said there were 40,000 Protestants in this town and neighbourhood. N. lat. $44^{\circ} 51'$. E. long. $0^{\circ} 37'$.

BERGFINK, in *Ornithology*, the name of *fringilla montifringilla*, in the Hist. Birds. *Frisch, sinder naturf. 3. c.*

BERGGANS, (Kolbe) the mountain goose, *anas montana*. Gmelin.

BERGGIEFZHUBEL, or **BERGGIESHUBEL**, in *Geography*, a town of Germany, in the circle of Upper Saxony,

and margraviate of Meissen, near which are warm medicinal springs, 6 miles south of Pirma.

BERGH, or **BERGLAND**, an island in the Indian sea, north of Nassau island, and south-west of the island of Sumatra. S. lat. $2^{\circ} 50'$. E. long. 100° .

BERGHEIM, a town of Germany, in the circle of the Upper Rhine, and county of Waldeck, and by the new French distribution, the chief place of a canton, in the department of Roer, and district of Cologne, containing 469 inhabitants, and the population of the canton is estimated at 10,365, distributed in 44 communes; 4 miles S. E. of Waldeck.

BERGHEM, in *Biography*. See **BERCHEM**.

BERGHIRI, in *Geography*, a town of Asia, in the province of Kurdistan, 70 miles S. E. of Betlis.

BERGHMOT, or **BERGMOTE**, vulgarly barmote, formed from the Saxon *berg, mons*; and *mote, conventus, assembly*, or *meeting*. See **BARGMOTE**.

BERGLAX, in *Ichthyology*, one of the synonymous names of *corphybena rupestris*. Ström. Söndm.

BERGIA, so called from P. J. Bergius, M. D. professor of natural history at Stockholm, in *Botany*. Lin. gen. Reich. p. 631. Schreb. 791. Juss. 301. Clafs and order, *decandria pentagynia*. Nat. Ord. *Succuente. Caryophyllea*, Juss. Gen. Char. *Cal.* perianth, five-parted, spreading; leaflets lanceolate, permanent. *Cor.* petals five, oblong, spreading, the length of the calyx. *Stam.* filaments ten, brittle-shaped, of middling length; anthers roundish. *Pist.* germ roundish, superior; styles five, very short, approximating; stigmas simple, permanent. *Per.* capsule simple, subglobular, mucronate, with five little swellings, five-celled, five-valved; valves ovate, flat, opening along the furrows, permanent, spreading very widely. *Seeds* numerous, minute.

Ess. Char. *Cal.* five-parted; *Pet.* five; *Capf.* one, globular, with swellings, five-celled, five-valved; valves resembling petals; *Seeds* very many.

Species, 1. *B. caperfsis*. Lin. Syst. 431. Reich. 2. 386. Suppl. 243. Mant. 241. Pola-tsjira, Rheed. Mal. 9. 153. t. 78. "Leaves lanceolate, or elliptic, flowers in whorls." This has the stature of Ammonia. A native of Tranquebar, in the East Indies, and therefore misnamed *Caperfsis*. The valves of the capsule, continuing after it is ripe, form a kind of five-petalled wheel-shaped flower. 2. *B. glomerata*, Lin. Syst. 431. Suppl. 243. "Leaves obovate, crenulate, flowers glomerate." Found at the Cape of Good Hope by Bergius. Martyn.

BERGIER, **NICHOLAS**, in *Biography*, was born at Rheims in 1557, and became professor of the university in his native city, where he was educated for the law, and became syndic. Under this character he visited Paris, and there formed an intimate friendship with Peiresc, and du Puy, by whom he was induced to execute a work which he had projected on the high roads of the empire. M. de Bellievre took him to his house, and procured for him a pension, with the brevet of historiographer. He died in 1623. The principal of his works are his "Histoire des grand chemins de l'Empire Romain," first printed in 1622, 4to. and reprinted, with notes, at Brussels, in 2 vols. 4to. in 1729. This valuable work was translated into Latin by Henninius, and is included in the 10th volume of Grævius's Roman Antiquities. Bergier also wrote in French "A sketch of the History and Antiquities of Rheims, with curious remarks concerning the establishment of the people, and the foundation of the towns of France," 4to. 1635.

BERGIMUS, in *Ancient Mythology*, a deity peculiar to the inhabitants of Breecia, in Italy, where he had a temple, and an order of priests. Gruter, Muratori, and Spon, have recorded many inscriptions relating to this deity. It is thought that he was the god of the mountains, because *berg*, in Celtic, signifies a mountain.

BERGMANN.

BERGMANN, TORBERN, in *Biography*, professor of chemistry at Upsal, was born at Catherineberg, in West Gothland, March 20th 1735; and after having finished the first course of his education, entered at the university of Upsal. His application, particularly to the study of mathematics and natural philosophy, was so intense, that his health was endangered; and as these sciences afford no peculiar prospect of emolument, a relation, who had the charge of him, discouraged his prosecution of them, and rendered it necessary for him to conceal the books which assisted him in his favourite studies. At the close of a year his health was so much impaired, that the restoration of it required an intermission of his application, and a course of exercise, which obliged him to return to his family. His hours of relaxation were, however, occupied in the study of botany and entomology, and his discoveries in the last of these sciences were communicated to Linnæus. As soon as his health was re-established, he returned to the university, with ample permission to pursue those studies which were most agreeable to his inclination. Besides mathematics and natural philosophy, he directed his attention to natural history, under the patronage of Linnæus; and began with a memoir on the nature of the substance found in certain waters, and called coccus aquaticus, which he found to be the egg of a leech, including 10 or 12 young. This was followed by other memoirs on the history of insects which attack fruit-trees, and the means of preventing their ravages; and he proposed a method of classing these insects from the form of the larva, in which state the destruction of noxious insects is most essential. About this time, the famous Swedish naturalist testified his esteem of Bergmann's character and talents, by giving his name to a new species of insects. In 1761, Bergmann was appointed professor of mathematics and natural philosophy in the university of Upsal; and both before and after this time he enriched the volumes of the Swedish act with several papers on philosophical subjects. His paper, containing "A Review of the several explanations which Natural Philosophers have given of the Rainbow," was published in 1759; and in 1760, he published some thoughts "On the origin of those meteors, which are not accompanied by any sensible sound or explosion," and also "On the opinions held by Philosophers relating to the Twilight," to which is prefixed an account of Mairan's "Anti-repusculum," or that of the horizon opposite to the sun. In 1761, and in 1762, professor Bergmann wrote on the subject of electricity, in consequence of a correspondence with Mr. Wilson; and particularly on the electrical quality of Iceland spar, and double refracting spar. His remarks on the tentredo, or saw-fly, showing how to distinguish between the caterpillars of this insect and those of the butterfly and moth, and discovering the feet in the latter to be never more than 16, a discovery that at the day was exceeding that number, were published in 1753; and the same year produced the satisfactory result of some electrical experiments, made with silk of various colours. In 1764, the professor wrote a paper to describe, from a number of observations, the height in the atmosphere at which the aurora borealis exists (see *AURORA BOREALIS*); and in 1765 and 1766, he wrote again on electrical subjects; and principally on the property and laws of electricity in the terrestrial, which had been referred to his examination by the Royal Academy of Sciences at Stockholm. At this time it does not appear that the subject of chemistry had employed much of Mr. Bergmann's attention; however, in 1767, on the resignation of Wollnerus, he was chosen to succeed him as professor of chemistry and metallurgy. This appointment was much opposed by the party of the former professor, united with others who envied Bergmann's rising merit; and their opposition was supported by some severe criticisms on two papers, which the professor

published at this time, relating to the depuration of alum, in which he recommends the use of argillaceous earth, and proposes tobacco-pipe clay, instead of alkali, to free it from the vitriol. But the prince royal of Sweden, who afterwards succeeded to the throne, and who was then chancellor of the university of Upsal, determined the dispute, and fixed him in the professor's chair. With enlarged views of the practical importance and utility of chemistry, of what had already been performed in this department of science by preceding authors, and of what yet remained to be done, Bergmann prosecuted his chemical researches, and by a combination of experimental analysis with mathematical reasoning, he extended and improved this science by a variety of valuable discoveries and observations. In order to pursue his experiments and inquiries with the greater facility, and to communicate the result with advantage to his pupils, he formed, near his laboratory, a cabinet, in which all the mineral substances were ranged in order, together with the products of those experiments which had ascertained their composition. Another collection exhibited all the minerals of Sweden, arranged according to the places where they are found. In a third, were exhibited models of the various machines and apparatus by means of which these substances were converted into useful articles, which articles were placed near the materials from which they were formed. From this systematical arrangement Bergmann derived peculiar advantage in his profession as a teacher. While he excelled as a professor of chemistry and mineralogy, and devoted much of his time to this occupation, he was actively and incessantly employed in making discoveries which have placed him in the first rank of philosophical chemists. He examined the carbonic acid, discovered by Black, and denominated fixed air, in its several properties and habitudes. Nickel, manganese, the magnesian earth, and barytes, which were newly-discovered substances, were particularly investigated by Bergmann, and afforded materials for regular and perspicuous treatises. The acid obtained from fugar, and many other vegetables, by the abstraction of the nitric acid, and those acids which are obtained from arsenic, molybdena, fluor spar, and tungsten, were discovered either by himself or some of his disciples; and to him we are indebted for leading the way in the investigation of their properties, and for ascertaining many interesting phenomena attending their combinations. From him we learn, that iron contains a number of foreign admixtures, chiefly of a metallic nature, and that the three states of crude iron, and malleable iron, and steel, principally depend upon the greater or less abundance of carbon. In his analysis of waters, he added, to the re-agents before used, other substances more effectual, and whilst he evinced the imperfection of this method, he rendered it much more accurate. He also ascertained the quantities of products, without separating them from all their combinations; and in this way he infers the quantity of metal from the weight of precipitate it affords, by the addition of an alkali, or some other known substance, from tables founded on former experiments. He likewise analysed the precious stones, known by the name of gems, and devised peculiar methods for separating them into the known earths in determinable proportions. Professor Bergmann evinced the necessity and utility of performing domestic operations in the humid way, or by analysis, in which liquid solvents are used; and he also exhibited the advantages of the process by fire, applied to materials in minute portions, by means of the blow-pipe, either upon a piece of charcoal, or in a spoon of pure silver. This mode of examining mineral substances, united with that of the habitudes which they exhibit, with a few simple re-agents, facilitated the classification of them, according to their chemical properties; a method adopted by this ingenious chemist, with-

out the exclusion or disparagement of that method of investigation which regards the external character. This appears from his short essay on the forms of crystals. The subject of elective attractions engaged the particular attention of professor Bergmann; and he engaged in the laborious undertaking of improving and extending the tables of Geoffroy, for which he perceived that, according to his views, no less than 30,000 experiments would be necessary. He therefore, under an apprehension that his life would not allow the completion of his plan, contented himself with publishing what appeared to him to be an imperfect work, though it was otherwise regarded by the scientific world. His table of simple affinities is the first, that exhibits the laws of affinities as they are observed in the dry way; and in his scheme it is seen at once whether the operation takes place in the humid or dry way; what are the substances presented to each other; their component parts and proportions; the numerical expressions of their attractions; what new compounds take place; and whether they fall down, or sublime, or remain in solution, and which of them are thus respectively affected. (See AFFINITY.) In this work, as well as in his work on metallic precipitates, Bergmann, not apprised of those effects of oxygen, which have been developed in later times, considers the existence of phlogiston, or a common principle of inflammability, as an acknowledged truth. He also admits of the matter of heat as a self-existent independent principle, and seems not to have apprehended that it may be a distinct modification. Accordingly, these two principles enter into many of his explanations of facts; but in all those explanations, the matter is arranged with such order and perspicuity, that it is extremely easy to substitute the absorption of oxygen instead of the extrication of phlogiston, and the contrary effect wherever the latter imaginary principle, as it is now thought to be, is absorbed. The life of professor Bergmann, like that of other studious and scientific men, admits of little variety. Attentive to the duties of his profession, he resided constantly at Upsal, and had the honour to be elected rector of the university, which in his time was divided into two parties, of theologians and civilians on one side, and of natural philosophers on the other, between whom Bergmann maintained peace and equality. The king of Prussia wished to engage the professor of Upsal to become a member of his academy, and to remove to Berlin; but attached to his office, though exhausted by it, and in a declining state of health, which might have been relieved by a warmer climate, and under obligations of gratitude to Gustavus, king of Sweden, who had been his benefactor, and who had honoured him with the order of Vasa, he declined the proposal, and remained at Upsal. The disciples of his school, of whom the celebrated Scheele sustained a very distinguished rank and character, reflected honour on their master, who never failed to encourage their researches, and to mention their discoveries in terms of approbation and respect. How much fir Torbern Bergmann was esteemed whilst he lived, in every part of Europe, it is needless to say; and of his works it is sufficient to observe, that, notwithstanding the rapid improvements which have taken place since his time in chemical science, they will long remain repositories of facts and reasoning, to which every philosopher must recur. When it is considered that he began this pursuit rather at a late period of life, and that he made his various discoveries in the course of 17 years, and that he died before he attained his 50th year, his death will be regretted as a premature event, by which society sustained a very considerable loss. He died on the 8th of July 1784, at the baths of Medwi in Sweden. His works were very numerous; the principal of them are as follows: viz. "Opuscula physica et chemica, pleraque scorsim antea edita jam ab auctore col-

lecta, revisa et aucta;" published in Latin in 3 vols. 8vo. in 1779, 1780, 1783, and translated by Dr. Cullen of Dublin, in 2 vols. 8vo. with illustrations and notes by the translator. "Meditationes de systemate fossilium naturalium;" printed in the 4th volume of the Transactions at Upsal for 1784, and translated into English in 1788, in 8vo.; "Physick Beskrifning oefver Jordklotet," or physical description of the earth, in 2 vols. in which he has given lucubrations on the structure and form of the earth; "Essay on the usefulness of Chemistry," published in Swedish in 1779, and translated into English in 1783, 8vo.; two academical dissertations on the origin and progress of chemistry, intitled "De Primordiis Chemiæ," in 1777, and "Chemiæ Progressus a medio Sæc. vii. ad medium Sæc. xvii." in 1782; and "Sciagraphia Mineralis," or outlines of Mineralogy, first printed in 1782, at Leipzig and Dessau, and translated into French by M. Mengez, and into English by Dr. Withering in 1783, 8vo. Eloge of Bergmann, inserted in the Acts of the Academy of Sciences at Paris for 1784. Coxe's Travels in Sweden, &c. vol. iv. p. 228, &c. Gen. Biog.

BERGMANNIA, in *Entomology*, a species of PHALÆNA (*Tortrix*), with pale yellow wings, spotted with bright yellow; fasciæ whitish, and the third bifid; found in the gardens of Germany and northerly parts of Europe.

BERGOO, in *Geography*, a district of Abyssinia, situate north of Darfur, and south of Bornou, between 15° and 19° of N. lat. and between about 24° and 27° 31' E. long. Its capital is Wara, in N. lat. 15° 30'. E. long. 25° 30'. Bergoo is said to be 15 days or (allowing 12½ geographical miles per day) 187½ geographical miles in extent, from E. to W. and from N. to S. 20 days, or 250 miles. Within about a day's journey of Wara, are said to be eight large mountains, the inhabitants of each of which use a distinct language. They are Mahometans, zealously attached to the faith; and read the Koran daily. They are said to be brave, and furnish the armies of the sultan of Bergoo with recruits as often as they are required. They make war by sudden incursions, traversing and laying waste a large space in a short time. On these occasions they leave their women behind, and are therefore better adapted to military operations than the people of Darfur, who never march without a host of female attendants. The people of Bergoo seldom make "selatea," i. e. an expedition to procure slaves by force. Some of the idolatrous nations, dependent upon Bergoo, are represented as conducting their wars in a very formidable manner. The combatants never retreat; and the women behind light a fire, in which they heat the heads of the spears, and exchange them for such as are cooled in the combat. They also use poisoned weapons. Mr. Browne informs us, that in a remote part of the pagan country, from which slaves are brought, the inhabitants eat the flesh of prisoners taken in war. They are also habituated to strip off the skin of the hands and faces of their slaughtered foes, which, after undergoing some preparation, is worn as an emblem of triumph. Their arms, which are a spear and a javelin, are formed of iron, wrought by themselves. These they make red-hot, and flick the point in a tree, where they leave them till the juice is dried; and in this manner, according to report, they acquire a most deadly poison. Browne's Travels in Africa, p. 310. 468.

BERGSNYLTRA, in *Ichthyology*, the name under which Linnæus mentions *Labrus fuillus* of Fn. Suec. in Jt. Wgoth. 179.

BERGSPERLING, in *Ornithology*, the name of *Fringilla montana* in Frisch. birds.

BERGSTADT, in *Geography*, a town of Moravia, in the circle of Olmutz, 18 miles north of Olmutz.

BERGSTRASS, a long tract or tongue of land, on the side of the Rhine, between Heidelberg and Darmstadt. It contains

contains a few small places as Bershheim, Oppenheim, and Weinheim. It has in it a highway, commanding prospects of wide extent. The best part of this continued chain of hills is from Heidelberg to Bershheim, where it is about 8 leagues long and four broad. On the right hand it is covered with woods near the top, and nearer the plain with vineyards. The level road is planted with rows of walnut trees, and on each side are fields and meadows that are very fertile. A considerable profit to the country by the wood and the fruit; and the wine produced there is an inexhaustible source of supply to the inhabitants. In one year they have exported 40,000 rough made walnut tree market stools, from these parts to Saxony. From the nuts they make an excellent oil, which serves the common people instead of butter, and the inferior sort is used for lamps. The almond trade, of which great quantities grow along the Bergstrass, is very considerable. The warmth of the climate, and goodness of the soil in the Bergstrass, are such, that after rye-harvest the land may be sown a second time with spelt, buck-wheat, or oats, which are always reaped the same year.

BERGUES, or **BERG**, or **BERGUES St. Vinox**, a town of France, and principal place of a district, in the department of the North; so called from St. Vinox, a Flemish lord, who lived here. It is seated on the river Colme, at the union of several canals, which pass to Dunkirk, Gravelines, St. Omer, Furnes, &c., and contains two parishes. Berg was the last town of West Flanders which held out for the Dutch in the 16th century. It was taken by the French in 1678, and confirmed to them by the peace of the Pyrenées in the following year. Since that time it has been fortified by new works, and the country round it may be laid under water by means of sluices; $\frac{1}{2}$ league south of Dunkirk. It contains 7085 inhabitants, and in the canton are 14,026. The territorial extent comprehends 130 kilometres, and 13 communes. N. lat. $50^{\circ} 57'$ E. long. $2^{\circ} 37'$.

BERGUN, a small town of Switzerland, in the country of the Grisons, near a river which flows from a lake of the same name, and discharges itself into the Albula. It lies between the Albula and the Inn, about 6 miles from the latter, and 12 miles from the former. N. lat. $47^{\circ} 31'$ E. long. $3^{\circ} 55'$.

BERGWERBEN, a town of Germany, in the circle of Upper Saxony, two miles north of Wessenthal.

BERGWERK, a town of Hungary, 13 miles west of Steinam.

BERG-ZABERN, a town of Germany, in the circle of the Upper Rhine, and duchy of Deux-Ponts, seated on the Erlbach, 30 miles south east of Deux-Ponts. By the new arrangement of the French, it is the chief place of a canton in the department of the Lower Rhine, and district of Wissembourg, containing 1947 inhabitants. The canton has 9077; its extent is 130 kilometres, and the communes are 17. N. lat. $49^{\circ} 7'$ E. long. $7^{\circ} 52'$.

BERIA, **BERIE**, **BERRY**, in *Middle Age Writers*, denotes a large open field; and the cities and towns of England, which end with that word, are built in plain and open places, and do not derive their names from borough, as Sir Henry Spelman imagines. That the word "berie," which has been confounded with "bury," and "borough," is a flat wide campaign, is proved from sufficient authorities, by the learned Du Fresne, who observes, that "Beria Sti Edmundi," mentioned by Matt. Par. sub. ann. 1174, is not to be taken for the town, but for the adjoining plain. Besides, many flat wide meads, and other open grounds, are called by the names of "beries," and "berry fields;" thus the spacious meadow between Oxford and Illey was in the reign of king Athelstan called "Bery;" and the largest pasture ground in Quarendon in the county of Buckingham is known by the

name of "Beryfield." And though these meads have been interpreted demesne, or manor meadows, yet they were in reality any flat or open meadows, that lay adjoining to any vill or farm. (Cowel.) Hence also "berras affartare" signifies to dry or plough up heaths and downs; and hence our warrens are called "coney-berries."

BERIBERIA, or **BERIBERI**, in *Medicine*, a barbarous *Beri* Indian. It is called by some British authors, who have written on the diseases of hot climates, *the berrius*. According to Bontius, it comes on with great weariness, trembling, numbness, and peculiar tingling sensation of the limbs, so that the patient is rendered incapable of walking, or otherwise using them. The upper as well as lower limbs are often affected. Sometimes it is accompanied with a halting speech. Its attack is generally sudden. Those whom it afflicts are chiefly the lower class of people, who imprudently get chilled after being heated, by drinking cold water; but more especially by sleeping in the night air, after great fatigue or intoxication. The remedies against this obstinate complaint are strong frictions, aromatic fomentations, warm-bathing, and sudorific decoctions. According to Bontius, the most efficacious topical application is a species of naphtha, or petroleum, from Sumatra, used as a liniment. The natives of India (says Dr. Lind) have a method of putting the patient into a hole dug into the ground, and covering him with sand up to his neck; this is done in the middle of the day, and he remains there as long as he can bear the heat of the sand, which is considerable. Camphire, and a decoction of guaic wood, have sometimes produced a good effect; also the expressed bitter oil of the mergoose, an Indian plant. But notwithstanding the use of the most powerful nervous medicines, the patient generally continues paralytic for some months, unless he is removed into another air.

On the Malabar coast (continues the last mentioned author) this disease is most violent and frequent, and attacks both natives and strangers, especially in the months of December, January, February, and March. During these months, the land winds blow every morning about sun-rise, from the neighbouring mountains, with remarkable coolness; and such as, being tempted by the serenity of the season, sleep exposed to these winds, are often suddenly seized with a very painful sensation in the periosteum of the arms and legs. In persons of a good constitution, this pain abates as the day advances, and as the air becomes warmer; but in others it continues for a considerable time, attended with a weakness of the knees, and uneasy sensations in the calves of the legs and soles of the feet, especially on any attempt to walk. This is scarcely ever cured by medicine, till after the shifting of the monsoon, unless the patients can be removed to the coast of Coromandel, or to any place to the eastward of the Balagat mountains, where, by the change of air, they quickly recover. See Bontius de Med. Indorum; and Lind on Diseases incidental to Europeans in Hot Climates.

BERICARIA. See **BERCARIA**.

BERIEZFN, in *Geography*. See **BIRIESINA**.

BERIGAN, a town of Africa, in the kingdom of Algiers, and capital of the country of Beni-Mezzab. N. lat. $32^{\circ} 15'$ E. long. $2^{\circ} 57'$.

BERINDAL, a town of Egypt, on the west branch of the Nile, 7 miles S. E. of Rosetta.

BERING, in *Biography* and *Geography*. See **BIERING**.

BERINGEN, in *Geography*, a town of Germany, in the circle of Westphalia, and bishopric of Liege, 18 miles N. W. of Maastricht.

BERINGOU. See **BERING's Island**.

BERINSCHUL, a rocky island in the Mediterranean, near the coast of Algiers.

BERKELEY.

committed to the flames several letters that had passed in correspondence between her and the dean, not, as he declares, because there was any thing criminal in them, but because he observed a warmth in the lady's style, which delicacy required him to conceal from the public.

On the 18th of May 1724, Dr. Berkeley resigned his fellowship, and was promoted by his patron to the deanery of Derry, worth 1100*l.* *per annum*. Having for some time conceived the benevolent project of converting the savage Americans to Christianity, by means of a college to be erected in the Summer islands, otherwise called the isles of Bermuda, he published a proposal for this purpose at London, in 1725, and offered to resign his own opulent preferment, and to dedicate the remainder of his life to the instruction of youth in America, on the moderate subsistence of 100*l.* a year. Such was the influence of his distinguished example, that three junior fellows of Trinity college, Dublin, concurred with him in his design, and proposed to exchange, for a settlement in the Atlantic ocean, at 400*l.* *per annum*, all their flattering prospects in their own country. The proposal was enforced on the attention of the ministry, not merely by considerations of national honour and a regard to the cause of Christianity, but by the immediate advantage likely to accrue from it to the government. Having, by diligent research, estimated the value of the lands in the island of St. Christopher's, ceded to Great Britain by France at the treaty of Utrecht, he proposed to dispose of them for the public use, and thus to raise a sum of money, part of which was to be applied to the establishment of his college. The scheme was communicated by the intervention of the abbé Gualtieri, or Altieri, to king George I. and by the royal command introduced into the house of commons by sir Robert Walpole. A charter was granted by his majesty for erecting a college, by the name of St. Paul's college in Bermuda, which was to consist of a president and nine fellows, who were obliged to maintain and educate Indian children at the rate of 100*l.* *per annum* for each. The first president, Dr. George Berkeley, and the first three fellows named in the charter, those junior fellows of Dublin college abovementioned, were licensed to hold their preferments in these kingdoms till the expiration of one year and a half after their arrival at Bermuda. The commons, in 1726, voted an address to his majesty, praying a grant of such a sum to effect the above purpose out of the lands of St. Christopher's already mentioned, as his majesty might think proper. The sum of 1000*l.* was furnished by the minister, and several private subscriptions were immediately raised for promoting so pious an undertaking. The dean having, in 1728, married the eldest daughter of the right honorable John Forster, esq. speaker of the Irish house of commons, prepared to set sail for Rhode island, in the execution of his scheme, and took with him a pretty large sum of money of his own property, and a collection of books for the use of his intended library. Upon his arrival at Newport in Rhode island, he contracted for the purchase of lands on the adjoining continent, and fully expected that the purchase money would, according to grant, be immediately paid. His expectations, however, were disappointed; and after various excuses he was at length informed by bishop Gibson, at that time bishop of London, in whose diocese the whole West Indies is included, that on application to sir Robert Walpole, he received the following honest answer:—"If you put this question to me," says sir Robert, "as a minister, I must, and can assure you, that the money will not be paid; but if you ask me as a friend, whether I can contribute to your scheme in America, expecting the present of 1000*l.* I will oblige you, by admitting you to return home to Europe, and to give up his present expectation."

ingly, the dean, after having expended a great part of his private fortune, and more than seven years of his life in the prosecution of a laudable scheme, returned to Europe. Before he left Rhode island, he distributed the books he had brought with him among the clergy of that province, and upon his arrival in London, immediately returned all the private subscriptions that had been advanced for the support of his undertaking. In 1732, he published the "Minute Philosopher," a work consisting of a series of dialogues, on the model of Plato, in which he pursues the free-thinker through the various characters of atheist, libertine, enthusiast, scorner, critic, metaphysician, fatalist, and fanatic, and employs several new arguments from his own system. Of the company, which at this time attended the philosophical conversations that were carried on in the presence of queen Caroline, according to a practice which had commenced when she was princess of Wales, some of the principal persons were doctors Clarke, Hoadly, Berkeley, and Sherlock. The debates that occurred were chiefly conducted by Clarke and Berkeley; and Hoadly adhered to the former, as Sherlock did to the latter. Hoadly affected to consider the philosophy of Berkeley, and his Bermuda project, as the reveries of a visionary. Sherlock, on the other hand, espoused his cause; and on the publication of the "Minute Philosopher," presented a copy of it to the queen, and left it to her majesty to determine, whether such a work could have been the production of a disordered understanding. The queen honoured Berkeley with admitting him to frequent visits, and took pleasure in his conversation on subjects relating to America; and upon a vacancy in the rich deanery of Down in Ireland, procured it for him. But as lord Burlington had neglected to give proper notice of the royal intention to the duke of Dorset, then lord-lieutenant of Ireland, and to obtain his concurrence, the duke was offended, and the appointment was not urged any farther. Upon this, her majesty declared, that since they would not suffer Dr. Berkeley to be a "dean," in Ireland, he should be a "bishop;" and accordingly, upon a vacancy in the see of Cloyne, in 1733, he was promoted by letters patent to that bishopric. In consequence of this appointment, he resided continually at Cloyne, and devoted his time and attention to the faithful discharge of all episcopal duties. He revived in his diocese the useful office of rural dean, visited often parochially, and confirmed in several parts of his see. In the prosecution of his studies, however, his diligence was unabated; and about this time he engaged in a controversy with the mathematicians of Great Britain and Ireland on the subject of Fluxions. He was led to it by the following occurrences: Mr. Addison having visited Dr. Gauth in his last illness, addressed him seriously on the necessity of preparing for his approaching dissolution; but the doctor replied, "Surely, Addison, I have good reason not to believe those trifles, since my friend Dr. Halley, who has dealt so much in demonstration, has assured me, that the doctrines of Christianity are incomprehensible, and the religion itself an imposture." This conversation being reported by Addison to the bishop, he took up arms against this redoubtable dealer in demonstration, and addressed to him "the Analyst," with a view of showing that mysteries in faith were unjustly objected to by mathematicians, who admitted much greater mysteries, and even fallhoods in science, of which he endeavoured to prove that the doctrine of Fluxions furnished an eminent example. See FLUXION. In the course of the controversy on this subject, the bishop, in 1735, published a reply to Pinaltheus, supposed to be by Dr. Johnson, entitled "A Defence of Free-thinking in Mathematics." From this controversy, he diverted his thoughts to subjects of more important utility; and printed, in 1735, his "Queries," for the good of Ireland; in 1736, his "Diss-

ecurse addressed to Magistrates;" and in 1750, his "Maxims concerning Patriotism;" all of which evince his knowledge of mankind, and his zeal for the service of true religion, and of his country. In 1745, during the Scots' rebellion, he addressed a "Letter to the Roman Catholics" of his diocese; and in 1749, another to the clergy of that persuasion in Ireland, under the title of "a Word to the Wise," which was so well received by them, that they returned him their public thanks, with expressions of marked esteem and respect, which describe him as "the good man, the polite gentleman, and the true patriot." That he discovered this character in a very eminent degree, was very generally acknowledged, and particularly by lord Chesterfield, who as soon as he was advanced to the government of Ireland, in 1745, offered him the see of Clogher, then vacant, and the value of which was double that of Cloyne. This offer the bishop, moderate in his views, disinterested in his support of government, and particularly attached to his customary place of residence at Cloyne, and to the connections and duties attending it, respectfully declined. Towards the close of his life, he laboured under a nervous colic, the effect of his sedentary course of living, in which he found considerable relief from the use of tar-water; and he therefore communicated his thoughts on this celebrated medicine to the public, in a treatise entitled "Siris, a Chain of Philosophical Reflections and Enquiries concerning the Virtues of Tar-water," printed a second time in 1747, and followed in 1752, by "Farther Thoughts on Tar-water," which was his last performance.

In 1752, he removed, with his lady and family, to Oxford, for the purpose of superintending the education of one of his sons, who was admitted a student at Christchurch college, in that university: but sensible in a high degree of the impropriety of non-residence, he endeavoured first to procure an exchange of his high preferment for some canonry or headship at Oxford; and failing of success, he afterwards, by a letter to the secretary of state, requested permission to resign his bishopric, worth at that time not less than 1400*l. per annum*. When the petition for this purpose was presented to his majesty, he declared he should die a bishop in spite of himself, and gave him full liberty to reside wherever he pleased. Before he left Cloyne, he signed a lease of the demesne lands in that neighbourhood, renewable yearly at the rate of 200*l.* and directed this sum to be annually distributed, until his return, among poor house-keepers of Cloyne, Youghall, and Aghadda. At Oxford he was highly respected by the members of the university; but his residence among them was of no long duration. On Sunday evening, January 14, 1753, whilst he was surrounded by his family, and his lady was reading to him one of Dr. Sherlock's sermons, and also the lesson in the burial service, taken from 1 Cor. xv. whilst he was commenting upon it, he was suddenly seized with a disorder, called the palsy of the heart, and instantly expired. His remains were interred at Christchurch Oxford, and a marble monument was erected to his memory by his widow, with a Latin inscription, drawn up by Dr. Markham, head master of Westminster school, and now archbishop of York. In this inscription he is said to have been born in 1679, and his age to be 73; whereas his brother, who furnished the particulars of his life, states the year of his birth to have been 1684, and of course he died at the age of 69.

The person of bishop Berkeley was handsome, his countenance expressive and benign, and his constitution robust, till it was impaired by his sedentary life. At Cloyne he constantly rose between three and four in the morning; and often spent the greater part of the day in study; his favourite author, from whom many of his notions were borrowed, was

Plato. The enthusiasm of his private character, which was singularly excellent and amiable, entered into his literary one: and it was manifested in his public works, as well as in his life and conversation. Few persons were ever held, by those who knew his worth, in higher estimation than bishop Berkeley. When bishop Atterbury was introduced to him, he lifted up his hands in astonishment, and exclaimed, "So much understanding, so much knowledge, so much innocence, and such humility, I did not think had been the portion of any but angels, till I saw this gentleman." This testimony serves to remove the air of hyperbole from the well-known line of his friend Mr. Pope:—

"To Berkeley every virtue under heaven."

In matters of speculation, his natural ardour might, possibly, have led him to imbibe some notions that are more fanciful than just. It has been said, that towards the close of his life, he began to doubt the solidity of metaphysical speculations, and that he therefore turned his thoughts to the more beneficial studies of politics and medicine. He has been charged by some considerable persons, and particularly by bishop Hoadly, with corrupting the native simplicity of religion, by blending with it the subtlety and obscurity of metaphysics; and Mr. Hume asserts, that his writings form the best lessons of scepticism which are to be found either among the ancient or modern philosophers, Bayle not excepted; that "all his arguments," against Sceptics, as well as against Atheists and Free thinkers, says Hume, "though otherwise intended, are, in reality, merely sceptical, appear from this, *that they admit of no answer, and produce no conviction.*" That his knowledge extended to the minutest objects, and included the arts and business of common life, is testified by Dr. Blackwell, in his "Court of Augustus." The industry of his research, and the acuteness of his observations, comprehend not only the mechanic arts, but the various departments of trade, agriculture, and navigation; and that he possessed poetical talents in a considerable degree, is evident from the animated letters that are found in the collection of Pope's Works, and also from several compositions in verse, particularly the beautiful stanzas written on the prospect of realizing his noble scheme relating to Bermuda. The classical romance, entitled "The Adventures of Signior Gaudenzio di Lucca," has generally but not truly been attributed to him.

Besides the writings already mentioned, bishop Berkeley published at Dublin, in 1735, a small pamphlet relating to the doctrine of Fluxions, entitled "Reasons for not replying to Mr. Walton's full Answer," &c. His smaller pieces were collected and printed under his inspection at Dublin in 1752, under the title of "Miscellanies." "The works of George Berkeley, D. D. late Bishop of Cloyne; to which is added an account of his life, and several letters, &c." were published in 2 vols. 4to. in 1784. Biog. Brit.

BERKENHOUT, JOHN, son of a respectable merchant of Leeds in Yorkshire, but originally from Holland, was born about the year 1730. Being intended by his father for merchandize, after receiving a school education at Leeds, he was sent to Germany, to acquire a knowledge of that language. Paying a visit to the baron de Bielfeldt, a relation of his father, residing at Berlin, he was, through the influence of that nobleman, first made a cadet, and, in progression, an ensign, and afterwards a captain in the Prussian army; but on the breaking out of a war between England and France, he obtained his dismissal from the Prussian service, and was preferred to the command of a company here. On the return of peace, in 1762, he went to Edinburgh, where he commenced student in medicine, and after a short residence there, he removed to Leyden, and in the year 1765, took his degree

degree of doctor in that faculty. The thesis he wrote on this occasion is intitled, "Dissertatio medica inauguralis de podagra," and is dedicated to his relation the baron de Bielfeldt. On his return to England, he settled at Isleworth, near the Thames; and soon after published his "Pharmacopœia medica," which has been so much approved, as to pass through several editions. But he seems to have been of too active a disposition to remain long in the practice of medicine, in which he never made much progress. In 1778, he was appointed by government one of the commissioners who were sent to America with a view of settling the differences between that country and England, and was the only one of them that was permitted to go to Philadelphia, where the congress was sitting. Here he remained some time, but suspected at length by the congress, and perhaps not without reason, of carrying on a secret correspondence with some of the Americans, who disapproved of their proceedings, he was first sent to prison, but was soon released, and then sent to his brother commissioners at New York. On his return to England, he received a pension from government for the services he had endeavoured to render his country; on which, and his own fortune, he lived as a private gentleman to the time of his death, which happened on the 3d of April 1771.

Dr. Berkenhout was author of various works, besides those mentioned above. In 1772, he published "Outlines of the Natural History of Great Britain and Ireland;" a useful manual for students in that line. In 1788, "First lines of the theory and practice of philosophical chemistry;" which he dedicated to Mr. Eden (lord Auckland), who had been one of the commissioners with him to America. He also wrote "An Essay on the bite of a mad dog;" "An Answer to Dr. Cadogan's Essay on the Gout;" "A Preface to the translation of Pomme's treatise on hyetie diseases." He was also the author of "Lucubrations of ways and means," from which the idea of several of our present taxes is said to be taken; and of "A Translation of count Tessin's letters to the late king of Sweden." New Bog. Dict

BERKER'S CREEK, *Arian*, in *Geography*, a sand which shoots off from the land towards the sea, to the south of Breenk, or the south sand hill, on the coast of Holland. It is situated on the south of the Land Deep channel into the Texel, the coast trending nearly N. and S. from the Maast to the Texel.

BERKHAMPSTEAD, a market town of Hertfordshire, England, is situated in a fertile country, on the southern bank of the small river Bulborne, at the distance of 26 miles N. W. of London. This town and its vicinity have been the seat of war, and noted by historians as the property and residence of some of the Saxon kings, and of the distinguished characters of that nation. After the Norman conquest it was possessed by some princes of the blood, and dukes of Cornwall. On the north side of the town are the embankments, and other remains, of a considerable castle, which Camden supposed was built by Robert Mortimer earl of Cornwall, who was brother to the conqueror, and enjoyed the manor, &c. from him. At this place the conqueror had an interview with the English nobility, after his successful battle against Harold. The castle raised by earl Moreton, was demolished in his son's time, who was accused of rebellion, and the town and manor presented to the crown. Henry II. granted the inhabitants many privileges, among which was the liberty of selling their goods free of tolls and duties, either in that country or in Brittany, Aquitain, or Anjou. In Domestick war he had fifty-two burghesses named in this town, whose merchandise was chiefly wool, which was manufactured into

cloth on the continent. Henry II. kept his court here, as appears from a grant dated at this place, conferring the church of Havering in Essex on the monks of St. Bernard de Monte Jovis, to provide firing for the poor. King John, in the 7th year of his reign, granted this castle and honour to Geoffrey Fitzpeers earl of Essex; but two years after his death, these places were again in the king's hands. The dauphin of France, in concert with the barons, besieged this fortress, which was bravely defended. The besieged made two successful sallies, and held out until the king sent them orders to surrender. Previously to the second year of Henry III. the markets were held here on a Sunday, but in that year they were changed for Monday, which is still the market day. This castle and lordship continued for a long period in the possession of the earls and dukes of Cornwall, and were repeatedly the scene of rendezvous and baronial contentions. The castle was surrounded by a foss and vallum, including about four acres of ground, and the keep, or citadel, was placed on the north side of it: upon the dilapidation of its walls, a large house was constructed with the materials, which was possessed in the rebellion by colonel Axtel.

The town is much reduced from its former consequence, and consists of one long street, having St. Leonard's hospital at one end, and St. James's at the other. The church, dedicated to St. Peter, is a large handsome pile of building, and has several small chapels, or oratories, included within its walls; also some curious old monuments. Here is an alms house for six poor widows, who are jointly allowed 50l. a year towards their maintenance. The town has also a charity-school and a free grammar school; the latter of which was endowed by king Edward VI. for 144 boys, and provided with a master and usher. Besides these charitable foundations, here is another alms-house, which was endowed by John Layer and his wife, with a legacy of 1300l. Berkhampt ad gives the title of marquis to the duke of Cumberland. The chief trade of the place consists in the turning of bowls, of shovels, spoons, and other articles, made of beech wood. Here are three annual fairs, and a statute fair for the hiring of servants, &c. The houses in the parish are 338, and the inhabitants amount to 1650. This town is called Berkhamptead St. Peter's, in contradistinction to another parish a little to the north of it, which was formerly separated from this, and called Northchurch, or Berkhamptead St. Mary's. Salmon's History of Hertfordshire, &c.

BERKI, a town of Asiatic Turkey, in the province of Natolia, near the river Caucis; 35 miles E. of Smyrna. N. lat. 38° 2'. E. long. 25° 15'.

BERKLEY, a county of Virginia in North America, lies west of the Blue ridge, north of Frederick county, and separated from the state of Maryland, on the north and east by Potowmack river. This fertile county, about 40 miles long and 20 broad, has 16,781 free inhabitants, and 2932 slaves. Its chief town is Martinsburg.

BERKLEY, the name of a county and town in Charleston district, South Carolina, lying near Ashley and Cooper rivers. In the census of 1791, it was called St. John's parish, in Berkley county, and contained 75 free persons, and 517 slaves.

BERKLEY, a township of Bristol county in Massachusetts, containing 3500 inhabitants; 50 miles S. of Boston.

BERKLEY, or BERKELLY, an ancient town of Gloucestershire, England, and distinguished in the annals of this country for its small but good castle, and the popular events that have occurred within its walls. The town is scarcely ever noticed in the page of history, whilst the castle is repeatedly mentioned, and referred to from the Norman conquest to the disastrous warfare in the seventeenth century. In some old records

this place is called Berchelai, and is distinguished by the appellation of borough, though it does not appear ever to have sent members to parliament. Formerly the great public road from Bristol to Gloucester, and from the western to the northern counties, passed through the town, and consequently gave it some advantages; but this road is now conducted through Newport, and some other places, to the east of the town. This circumstance, with the powerful attractions of Gloucester and Bristol, have conspired to reduce the size and consequence of this place, which at present consists of one street only. The river Avon skirts the southern side of the castle gardens, and extends a short distance above them. This part of the county is distinguished by its fine pasture land, the rich cheese made in its dairies, and the golden and London-pippin cyder, obtained from its orchards. The cheese mostly made here is distinguished by the double name of Gloucester, the best of which is bought up by the London factors, at high prices. (See CHEESE.) The town is one of the five ancient boroughs of this county, which subsisted in the time of Edward I. and though deprived of most of its ancient privileges, yet a mayor is annually elected.

The manor of Berkley is one of the largest in England, and was taxed in the Domesday book at 160 hides, and 294 plough-tillages and a half. It was possessed, immediately after the Norman conquest, by Roger de Berkeley, who came into England with the conqueror, and was rewarded by him with this manor. It has continued in this noble family without interruption to the present time, and is now enjoyed by Frederick Augustus, the fifth earl of Berkeley, who is the twenty-first in descent from Harding the Dane.

The castle of Berkeley is one of the most perfect of the English baronial edifices, and has suffered less by the scourge of war and injudicious alteration, than any other English castle belonging to a subject. Some parts of the original structure are still perfect, and are interesting examples of the first Norman architecture, which was employed in constructing the baronial castles. The site of this building occupies an area of ground whose outline is nearly circular. It rises from a valley on the south and east, and its other sides are guarded by embattled walls, towers, and fortified gates. The great entrance gate opens into a base court, having the keep on the left, and the domestic apartments on the right, and in front. The keep, whose walls are lofty and massive, resembles the form of a Roman D, and is flanked by three semicircular towers, besides that in which the great stone stairs are contained. This is square, and has a small dark room near the top, where Edward II. was secretly murdered by the machinations of the bishop of Hereford, who invented and directed the execrable deed.

The elegant and energetic poet, Gray, notices this event in the following expressive terms:—

“Mark the year, and mark the night,
When Severn shall re-echo with affright,
The shrieks of death through Berkeley's roof to ring,
Shrieks of an agoazing king.”

The hall, chapel, and most of the apartments, are fitted up and preserved nearly in their ancient style, and in some of them are several curious relics of antiquity. Among them are many fine old historical portraits, and the sofa, chairs, and bedstead, which belonged to the cabin of the circumnavigator sir Francis Drake. The hall, which is 43 feet by 33, was built in the reign of Edward III. and has a fine old raftered roof, with a gallery at one end for the accommodation of minstrels, in “days of yore.” Leland mentions several parks and chaces, as connected with this castle at the time he

visited it; but all, except two, have been converted to the more useful purpose of farming. One of these, called Whitley park, which is inclosed with a wall seven miles in circumference, still remains, and contains much fine forest-timber.

At Purton near this castle, the present earl of Berkeley has made a decoy pool, which is the only one in this county, and where a great number of wild ducks are annually netted. The celebrated Dr. Jenner, the great promoter of the vaccine inoculation, was born in this parish.

To the north of the castle is the parish church, which is a large handsome structure, and contains several handsome and ancient monuments of the Berkeley family. The tower is a modern building, and constructed at a small distance from the church.

In this township are 99 houses, and 658 inhabitants. In the hundred of Berkeley there appear to be, by the late population act, 3,450 inhabited houses, 9,148 males, 10,074 females, 3968 persons employed chiefly in agriculture, 6151 employed in trade, manufactures, and handicraft, and the whole number of persons amounts to 19,222. Rudge's History of Gloucestershire. Rudder's History of ditto.

BERKLEY'S *Point*, lies on the north side of lord Egmont's island, or New Guernsey, the principal of the groupe called Queen Charlotte's islands, in S. lat. 10° 40'. E. long. about 164° 10'.

BERKLEY *Sound*, so called from captain Berkley, who visited it in 1787; an inlet, or bay, on the N. W. coast of North America, being the entrance into the supposed strait of Juan de Fuca, terminated on the south by cape Flattery, and on the north by the southern part of Quadra, or Vancouver's island; about 1° 51' south-east of Nootka sound, N. lat. 48° 30'. E. long. 235° 35'.

BERKS, a county of Pennsylvania in North America, has Northampton county on the N. E. Northumberland on the N. W. part of Luzern on the N. Dauphin and Lancaster on the S. W. and Chester and Montgomery on the S. E. It is watered by Schuylkill river, and is 53 miles long, and near 29 broad, and contains 1,030,400 acres. Iron and coal, which are plentiful, supply several iron works. The northern parts are rough and hilly. Berks contains 30,179 inhabitants, of whom 65 are slaves. It has 29 townships, of which Reading is the chief.

BERKSHIRE, a county of the state of Massachusetts, is bounded on the N. by the state of Vermont, on the S. by that of Connecticut; on the E. by Hampshire county, and on the W. by the state of New York. It runs through the whole extent of the state from N. to S. and contains 26 townships; and the number of inhabitants is 30,291. White and coloured marble is found in several towns, in the rough and hilly parts of this county.

BERKSHIRE, a newly settled township of Franklin county in the state of Vermont.

BERKSHIRE, an inland county of England. Previous to, and at the period of the Roman invasion of Britain, this part of the island was inhabited by three British tribes, respectively termed Attebrates, Bibroces, or Rhemi, and Segontiaci. The first occupied the western part of the county, from the river Loden on the south-east, to the Thames on the north-west; whilst the second possessed the south eastern part of the county; and the Segontiaci inhabited the remaining part on the southern side. When Constantine divided this country into Roman provinces (in 310,) Berkshire was included in the first division, called Britannia Prima. During the Saxon Heptarchy, it constituted part of the kingdom of the west Saxons, which commenced about A. D. 519, and continued till A. D. 828, when Wessex became the only sovereignty,

sovereignty, and its monarch, Egbert, gave the whole country the name of England. Alfred, grandson to Egbert, and a native of Wantage in this county, proceeding on the plan of his grandfather, more firmly cemented the kingdoms which Egbert had united, divided the whole into hundreds, tithings, parishes, &c. and gave this division the name of Berrocshire, which was afterwards contracted and softened into Berkshire.

This county is bounded by the shires of Oxford and Buckingham on the north, having the river Thames running the whole course; on the east by Surry; on the south by Hampshire, and on the west by Wiltshire. In the estimation of its size authors are at variance, but the most accurate statement gives its length from E. to N.W. at 48 miles, and its breadth, in the widest part, at 25 miles; though a narrow part near the centre is little more than 6 miles across. It contains about 530,000 acres of land, and is locally divided into twenty hundreds, containing 12 market towns, 140 parishes, 62 vicarages, about 670 villages and hamlets, 21,195 houses, and 109,515 inhabitants. A range of chalk hills entering this county from Oxfordshire, crosses it in a westerly direction, and forms the southern boundary of the vale of White Horse. Independent of this range of hills, the county is characterized by gentle eminences and valleys; having much rich fertile land, and abounding with picturesque and beautiful scenery. Though almost every kind of grain is cultivated in the county, yet that of barley is raised in greater quantities than either of the other species, and when made into malt, is chiefly sent to London. Many large dairy farms are found in the White Horse vale. Berkshire is well stocked with timber, particularly oak and beech in the western part, and also with numerous deciduous and exotic trees in Windsor forest and park, and in the various ornamental plantations scattered through the county. The open commons and uncultivated fields of Berkshire are supposed to constitute nearly half the county. Of these, Windsor-forest, Maidenhead-thicket, Tyehurst-heath, Wickham-heath, and the numerous commons and marshes, that are found in almost every parish, contain above 40,000 acres. The county derives but little advantage from manufactures, there being only a few clothiers established in the western part of it, and some pin-makers, &c. at Reading. On the banks of the river Kennet, in the vicinity of Newbury, are some large beds of peat, which furnishes the poor with fuel, and the farmer with ashes to meliorate his land.

The principal rivers of Berkshire are the Thames, the Kennet, the Lamborn, the Ock, and the Loddon. The first, though it serves to irrigate and fertilize a great part of this county, does not strictly belong to it, being the natural boundary line between this and the counties of Oxford and Buckingham. It enters Berkshire almost one mile south of Lechlade, and in its progress eastward waters the several towns of Abingdon, Wallingford, Henley, Maidenhead, Windsor, &c. and having received the tributary waters of various streams, leaves the county near Runnymede.

The Kennet enters the county on its western side at Hungerford, and passes through a narrow boggy valley to Newbury. Flowing eastward, in nearly a direct line, it runs through the county town of Reading, and soon afterwards unites with the Thames.

The Lamborn, a tributary stream to the former river, rises near a town of its own name, and after a course of about 11 miles, falls into the Kennet at Newbury. This river has been denoted as a phenomenon, by many topographical writers, some of whom have asserted that its current is more powerful and copious in summer than in winter. To account for this singular occurrence, they have had recourse to various hypotheses, but had they visited the place, and

there made inquiries, they would have found, that the river has no remarkable characteristic different from others, whose course is through a short tract of flat country.

The Ock rises in the vale of White Horse, near Kingston-Lisle, and flowing eastward, receives several other streams before it reaches the town of Abingdon, near which it unites with the Thames.

The Loddon enters the southern side of the county near Swallowfield, and running directly north, forms the western boundary to Windsor forest, and falls into the Thames near Wargrave.

Berkshire is in the diocese of Salisbury, and included in the Oxford circuit. It sends nine members to parliament; two of whom are returned for the county, and two for each of the towns of Reading, Wallingford, and New Windsor. The other member is elected for the borough of Abingdon. The Lent assizes, and the Epiphany county sessions, are constantly held at Reading; the Easter sessions at Newbury; the Summer assizes at Abingdon; and the Michaelmas sessions alternately at the latter town, and at Reading.

Among the objects of antiquity in this county, is the celebrated White Horse; which the most learned antiquaries refer to Saxon origin; and Mr. Wise, who has published two quarto pamphlets on the subject, endeavours to prove that it was designed by Alfred, to commemorate a victory obtained by the Saxons over the Danes. It was formed on the side of a chalk-hill, by the simple process of cutting off all the green turf within a certain line, which resembled the shape of a horse. This trophy is now nearly obliterated by the grass growing on its surface. Near the White Horse is a very large encampment, called Uffington-castle, and about one mile westward of the latter is a Druidical monument, named Wayland-Smith. It is a large cromlech on a barrow, with several smaller stones, which were formerly placed in a circle round it. Another Druidical relic is to be found at Park-place in this county. This was brought from the isle of Jersey, and all its stones were placed here in the exact position, and relative situation in which they were originally found. See HENLEY.

Besides several ancient encampments of different sizes and shapes, this county had two Roman stations, which are named in Antoninus's Itinerary "Spmis," and "Calleva," and are found in the thirteenth Iter of that work. In the seventh Iter is another station, named Pontibus, or Pontis, which antiquaries agree in fixing near the eastern border of the county. The Roman Walling-street passed across the northern corner of Berkshire, entering it near Wallingford, and leaving it on the north-western side. Reading is the county town of Berkshire, and the castle of Windsor its great ornament. Camden's Britannia. Coates's History of Reading. Horley's Britannia Romana. Beauties of England and Wales.

BERKUSSA, a town of Croatia, on the river Kulpa, 11 miles west of Petrenta.

BERLAI, a town of Croatia, on the river Korana, 8 miles south of Sluin.

BERLAMONT, a town of France, in the department of the North, and chief place of a canton, in the district of Avesnes, $2\frac{1}{2}$ leagues E.S.E. of le Quesnoy. It contains 1579 inhabitants, and those of the canton amount to 5,794. The territory includes 15 kilometres, and 14 communes.

BERLASREUT, a town of Germany, in the circle of Bavaria, 12 miles N. of Passau.

BERLEBURG, a town of Germany, in the circle of the Upper Rhine, 56 miles E. of Cologne.

BERLEUX, a town of France, in the department of the Somme, and chief place of a canton, in the district of Peronne, 3 miles S.W. of Peronne.

BERLIN, a city of Germany, in the circle of Upper Saxony.

BERLIN.

Saxony, a capital of the electorate of Brandenburg, and of the whole Prussian dominions, is situated on the banks of the river Spree, and has been reckoned one of the most beautiful cities in Europe, as it is one of the largest and most populous in Germany. Its extent is about $4\frac{1}{2}$ miles in length, from the Muhlenthor on the south-east, to the Oranien-burgerthor on the north-west; and about 3 miles broad from the Berraverthor, on the north-east, to the Potsdamerthor on the south-west: but within this extensive inclosure there are many gardens and corn fields. The streets are disposed with great regularity, and are of a convenient breadth. In the new town they are perfectly straight. Frederick street is reckoned $2\frac{1}{2}$ English miles in length; and others, which intersect this at right angles, are a mile, or a mile and a half long. Some have asserted that it covers as much ground as Paris; but though this be not true, and it be allowed to occupy more than half the extent of the capital of France, its number of inhabitants is much smaller in proportion. The number of houses has been variously estimated. Reisbeck computes them at 6000; count Hertzberg states the number of buildings, public and private, as amounting, in 1790, to 6725; and according to Hoeck, the number of houses is 6950. The number of inhabitants, according to the lowest statement, is 140,000; Hoeck computes them at 142,099; and Hertzberg at 150,803, being, at an average, more than 22 inhabitants to each house. There are a few very magnificent buildings in this town; and the rest are neat houses, built according to a plan prescribed by the late and present king, who have directed their particular attention to the external decorations of the city, either of a fine white free-stone, or of bricks covered with a thin coating of plaster, painted with a light colour, and generally one, or at most two stories high. The situation of the city, in a barren sandy plain, exposes it very much to dust, which, in dry windy weather, is not only inconvenient to the eyes and lungs of the inhabitants, and injurious to their health, but detrimental to the beauty of the buildings, which exhibit a soiled and shabby appearance. The finishing of the houses within by no means corresponds with their external elegance; the rooms are in a ruinous condition, the furniture covered with dust and dirt, and the variety of persons of the meanest condition who inhabit them, altogether incongruous to their outward magnificence and decoration. In these handsome houses, soldiers are quartered even on the ground floor, in rooms looking out to the street; and the lowest mechanics occupy the different stories. The principal edifices are the king's royal palace, and that of the prince-royal. The former is a magnificent structure of free-stone, begun by Frederick I. in 1699; but as it has been constructed at different periods, and by several architects, its fronts are not exactly regular. It consists of four stories, with large apartments, fine ceilings, and superb furniture. The state chambers are decorated with capital paintings and rich tapestry, and furnished with tables, stands, lustres, chandeliers, looking-glass frames, screens, couches, &c. of solid silver. The library, though a mean apartment, is well furnished with books; among which is a collection of 500 Bibles in different languages and editions, particularly the Bible used by our Charles I. when he was beheaded, presented as a kind of relic by Dr. Juxon to the elector of Brandenburg, and also the first Bible printed in America, and one of 1450, the first printed in the German language; and also a koran, in a character so small, and on a paper so thin, as to form only $\frac{1}{2}$ inch in bulk. The arsenal is a noble structure, forming a spacious quadrangle, and containing arms, ranged in excellent order, for 200,000 men. Over the principal gate is a portrait of the elector, William

the Great, in a large model of gilt brass; and the four cardinal virtues, of a gigantic size, are placed on pedestals on each side of the portico, and seem to look towards the picture. The soldiers of the garrison amount to about 30,000. The royal stables are very magnificent, adjoining to which are grand apartments for the master of the horse, and his inferior officers; and in the rooms over the stables, may be seen the rich accoutrements of the horse on which Frederick I. rode, when he made his public entry; all the ornaments of the bridles, the breast-leather and crupper, as well as the bits and stirrups, being of gold, adorned with brilliants. The opera-house is a beautiful structure, and on the front bears this inscription, "Fredericus rex, Apollini et Musis." The king allows the free exercise of religion: and, accordingly, in Berlin are 25 churches, 14 of which are Lutheran, 10 Calvinist, and one Roman Catholic, which is the most elegant in the city. The churches are decorated with Mercuries, Apollos, Minervas, and Cupids, "which might lead a stranger to suspect," says Dr. Moore, "that the Christian religion was exploded from the Prussian dominions, and old Jupiter and his family restored to their ancient honours." Instead of saints and crucifixes, says the same writer, Frederick III. proposed to adorn the church of Berlin with the portraits of men who have been useful to the state; those of the marshals Schwerin, Keith, Winterfield, and some others, were actually placed in the great Lutheran church before his death. We may also reckon among the public buildings and establishments of Berlin, the academy of sciences, (See ACADEMY), another of arts and painting, an anatomical college, 5 gymnasia, 2 public libraries, and many excellent and important fabrics and manufactures of silk, woollen stuffs, and stockings, cotton, linen, lace, porcelain, &c. which supply it with a very considerable and advantageous trade, to the prosperity of which, the unlimited toleration granted to Roman Catholics, Lutherans, Calvinists, and Jews, has very much contributed. In Berlin, there are several large squares, in one of which is an equestrian statue of marshal Schwerin, holding the ensign with which he advanced at the famous battle of Prague, and which he seized from one of his officers when his troops were giving way, exclaiming, "Let all, but cowards, follow me." On the new bridge over the Spree, stands also an equestrian statue of William the Great, which is highly esteemed as a piece of fine workmanship: the man and horse in one piece, cast at the same time, and the statue weighs 3,000 quintals. The suburbs are adorned with the magnificent garden of count Reuffen, the beautiful house and garden called Mombjon, the house and garden of Belvidere, and the stately hospital of invalids, for the maintenance of about a thousand officers and soldiers. In the new Calvinist church of Old Coln, is the burying place of the royal family. At Berlin there are many public walks and gardens. The principal walk is that in the park, on the south side of the Spree, which is upwards of three miles in circuit, and resorted to by the inhabitants of the city in great crowds on a Sunday; and here they are provided with every kind of refreshment, and indulged with any sort of amusement. The most fashionable walk in the city, is that which lies in the middle of one of the streets. Before the houses at Berlin, on each side, is a cause-way, and between these two cause-ways, are fine gravel walks planted with lime-trees. Under these are pitched tents, in which are sold ice, lemonade, and other refreshments. In the summer, the bands of music belonging to the regiments practise in this walk. In all the private houses a very rigid economy is observed; the chief article of expence is that which pertains to the dress of the ladies, who deny themselves common indulgences, for the sake of powder and millinery. The ladies

adies of the court have much of the air of French women. There are some kinds of irregularities that prevail to a great degree in this city. Public courtezans are more numerous here than in any town of Europe, in proportion to the number of its inhabitants. They appear openly at the windows, beckon to passengers as they walk in the streets, and ply for employment in any way they please, without disturbance from the magistrate. Citizens and manufacturers of the better kind live altogether among those of their own rank; and without affecting the manners of the courtiers, or stooping to the mean debauchery of the commonalty, maintain the decency, plainness, and honesty of the German character. Jealousy is held in equal contempt and detestation by the inhabitants of Berlin, and scandal is very little known. The environs of this city are remarkably pleasant, being interspersed with villages, vineyards, canals, pleasure houses, and gardens. Among the palaces in the neighbourhood belonging to the royal family, Schonhausen and Charlottenburg are the most worthy of notice. The former is situated about two miles from Berlin, on the Pankow, which supplies the pond in the sumptuous garden of this palace with water. Charlottenburg also, one of the royal or electoral palaces, seated on the river Spree, was only a small village, till the electress, consort to Frederick I. being pleased with its situation, began to build in it, and after her death the works were carried on by the elector, who gave it its name in commemoration of his wife Sophia Charlotte. This palace is one of the most considerable structures in Germany, and is adorned with a most beautiful garden.

Berlin is divided into five wards, called Berlin proper, Coln on the Spree, Frederick's Werder, Dorotheenstadt, and Frederickstadt. The proper Berlin was founded in the 12th century, by some colonists invited thither from the Netherlands, and the vicinity of the Rhine, under the margrave Albert, the Bear. The suburbs of this town are frequently called Konigstadt, and by others divided into three vicetels, or quarters. Berlin proper is separated by a principal arm of the Spree from Coln, over which are four bridges, three of timber, and one of stone, called the Pontneuf. Coln was probably built about the same time as Berlin; and it is formed into a kind of island by two branches of the Spree, which environ it. New Coln is now a considerable part of the old town of Coln, from which it is separated by the Spree. The suburbs of Coln were inclosed in 1756, within the outer wall. The Frederickswerder was built by the elector Frederick William, on a swampy werder, or island. This ward is separated by a rampart and ditch from the Dorotheenstadt, or Neustadt, founded by the elector Frederick William, and named after his consort, Dorothy. This new town is the most beautiful part of Berlin, and it is chiefly inhabited by the French. In a street of this town is the walk above mentioned. Frederickstadt, founded by the elector Frederick III. immediately on his accession to the government, communicates with the new town and the Werder, and is the pleasantest ward in the whole city; the streets being spacious, straight, and planted with lime-trees. Behind this is erected a new ward, which ranges to the end of the new town, where many of the nobility have built palaces. In the suburbs, the houses are generally of timber, but so well plastered, that they seem to be of stone, and the streets are broad and straight. From this town there is a free communication, by means of canal, between the Spree and the Oder, and the Spree and the Elbe. Berlin lies in N. lat. 52° 32' 30". E. long 13° 26' 15". The annual average of temperature of Berlin for fifteen years, from 1769, to 1782, was, according to Mr. Beguelin's observations, 49°, nor could he find that the temperature de-

creases. The Baltic, within 120 miles N. of it, tempers the north winds, says Kirwan (see his Estimate of the temperature of different latitudes, p. 71.) and to this is owing the moderate temperature which it enjoys. The influence of the vicinity of the Baltic must be allowed, when it is considered that the temperature of Berlin is higher than that of Dresden, Altenburgh, or Gotha, whose latitude is one degree lower, but more distant from the Baltic. Reissbeck's Travels, vol. iii. Moore's Travels through France, &c. vol. ii.

BERLIN, a neat and flourishing town of America, in York county, and state of Pennsylvania, containing about 100 houses. It is regularly laid out, on the S. W. side of Conewago Creek, 13 miles westerly of York town, and 101 west of Philadelphia. N. lat. 39° 56'.—Also, a township in Orange county, Vermont, on Dog river, a branch of Onion river from the south, which last separates Berlin from Montpelier on the N. N. W. Berlin contains 134 inhabitants, and is about 94 miles north-easterly from Bennington.—Also, a township in Hartford county, Connecticut, 12 miles S. S. W. from Hartford, 42 N. W. from New London, and 26 N. N. E. from New Haven.—Also, a township in Worcester county, Massachusetts, containing 512 inhabitants, 34 miles W. from Bolton, and 15 N. E. from Worcester. Hops have been cultivated here, and promise to be a valuable article of husbandry.—Also, a township of Somerset county, formerly in that of Bedford, Pennsylvania, which lies on a branch of Stoney creek, a south water of Conemaugh river on the west side of the Alleghany mountain; 25 miles W. from Bedford; 23 N. W. from Fort Cumberland, in Virginia, and 200 W. from Philadelphia. Stone creek, the chief source of Kiskeminitas river, rises N. N. E. of Berlin. N. lat. 39° 54'.

BERLIN, a sort of vehicle, of the chariot kind; taking its name from the city of Berlin, in Germany: though some attribute the invention of it to the Italians, and derive the word from *berlina*, the name given by them to a sort of stage, whereon persons are exposed to public shame. In proof of its having derived its origin, as well as its name, from Berlin, it is alleged, that Philip de Chiese, a native of Piedmont, and descended from the Italian family of Chiese, was a colonel and quarter-master in the service of Frederick William, elector of Brandenburg and that he was much esteemed by the elector on account of his skill in architecture. Being once sent to France on his master's business, he caused to be constructed, for the convenience of this journey, a carriage capable of containing two persons; which in France, and every where else, was much approved and called a berlin. This Philip de Chiese died at Berlin in 1673.—Beekman's Hist. of Inventions, vol. i. p. 130.

The berlin is a very convenient machine to travel in, being lighter, and less apt to be overturned, than a chariot. The body of it is hung high, on shafts, by leathern braces; there being a kind of stirrup or footstool, for the convenience of getting into it; instead of side windows, some have screens to let down in bad weather, and draw up in good weather.

BERLIN, in *Natural History*. See BERDIN.

BERLINCHEN, in *Geography*, a town of Germany, in the circle of Upper Saxony, and New Mark of Brandenburg, 80 miles E. N. E. from Berlin, and 39 N. N. E. from Kottin.

BERLINECZ, a town of Poland, in the palatinate of Bracław, 52 miles W. from Bracław.

BERLOCH, a town of Bohemia, in the circle of Czazlan, 9 miles N. E. from Czazlan.

BERME, in *Fortification*, a small space of ground, four or five feet wide, left without the rampart, between its foot

and the side of the moat, to receive the earth that rolls down from the rampart, and prevent its falling into, and filling up, the moat.

This is also called *lisiere, relais, retraite, pas de sources, foreland, &c.*

Sometimes for greater security, the berme is palisadoed.

BERMEJO, in *Geography*, the name of an island and port on the S.W. coast of South America, in about 2 degrees N. lat. a little W. from Lima. It is four leagues distant from Mengon on the north, and 6 from Guarmey port on the south. The island is a small white island, in the middle of which is a bay: the land from hence to Mengon is high, and abounds with hillocks, having large spots of white sand. It has a good harbour and fine fresh water at a small distance from the shore; and the harbour is known at sea by a large high hill with a cleft in it, which runs down southward to the sea-side; on the north it is very steep.

BERMEO, or **VERNEO**, a sea-port town of Spain, in the province of Biscay, near cape Machicaca, 5 leagues N.W. of Bilbao.

BERMUDA HUNDRED, or **CITY POINT**, is a port of entry and post town of America, in Chesterfield county, Virginia, seated on the point of the peninsula formed by the confluence of the Appamattox with James river, 56 miles west-erly from Williamsburg, 64 from Point Comfort, in Chesapeake bay, and 315 S.W. by S. from Philadelphia. City Point, from which it is named, lies on the southern bank of James river, 4 miles S.S.W. from this town. The town has about 40 houses, including some warehouses. It trades chiefly with the West Indies, and the different states. City Point, in James river, lies in N. lat. 37° 16'. W. long. 77° 31' 30".

BERMUDAS, or **SOMERS' ISLANDS**, vulgarly called *Summer Islands*, a cluster of small and rocky islands, forming the figure of a shepherd's crook, and amounting in number to about 400; situated in the Atlantic, and distant from the coast of Carolina about 200 leagues. N. lat. 32° 35'. W. long. 63° 28'.

They derived their first name from John Bermudas, a Spaniard, who discovered them in 1527; and their second appellation they owe to sir George Somers, who was shipwrecked on these rocks in his passage to Virginia in 1609, and lived there nine months. But he and his companions, having built a ship of cedar wood, sailed from thence to Virginia. Sir George Somers, it is said, was driven a second time on these islands, and died there. But his companions returning to England, made so favourable a report of their beauty and fertility, that the Virginia company, who, as the first discoverers, claimed the property, sold them to about 120 persons, to whom king James I. granted a charter. Accordingly, in 1612, they planted the largest of them, viz. St. George's isle, with 160 persons, and in 1619, sent thither 500 persons more; upon which they instituted an assembly, with a governor and council. It is said, that they are much incommoded by want of fresh water, and by the storms, thunder, &c. to which they are subject. Shakspeare has therefore justly described them as ever "vexed" with storms; but the poet Waller, who resided there for some time, on being condemned for a plot against the parliament in 1643, represents them as enjoying a perpetual spring. In 1725, the benevolent bishop Berkeley proposed to erect a college in these islands for the conversion of the savage Americans. See **BERKELEY**.

This group of islands is said to consist of about 400: but the greater number seem to be mere islets and rocks, not of sufficient importance to have received a name. From the chart by Lempriere in 1797, it should seem that the largest island, called "Ber-

muda," resembles a hook, the great found fronting the north. The length is about 35 geographical miles, and the breadth between one and two. The other islands which have received names are St. George's, St. David's, and Sommerfet. The island of St. George's lies eastward of the main land, and has a capital town of the same name, containing about 500 houses. Contiguous to this is St. David's, which supplies the town with provisions. The air is healthy, and a continual spring prevails; so that most of the productions of the West Indies might probably be cultivated in these islands. The houses are built of a soft stone, which is fawn like timber, and seemingly resembling that of Bath; and the stone is much used in the West Indies for filtrating water.

With regard to the supposed fertility and productiveness of these islands, it appears, from the answers of governor Brown to the inquiries of the privy council of England, that they contain from 12 to 13 thousand acres of very poor land, of which 9 parts in 10 are either uncultivated, or reserved in woods for a supply of timber towards building small ships, sloops, and shallops for sale, this being the principal occupation of the inhabitants; and the vessels which they furnish, being built of cedar, are light, buoyant, and unexpensive. Of the land in cultivation, no part was appropriated to any other purpose than that of raising Indian corn, and esculent roots and vegetables, of which a considerable supply is sent to the West Indies, until the year 1785, when the growth of cotton was attempted, but without much success; there not being at present more than 200 acres applied to this species of culture. The number of white people of all ages in Bermudas is 5462, and of black, 4919. The Bermudians are generally seafaring men, and the negroes are expert mariners. In the war between Great Britain and America, there were at one time between 15 and 20 privateers fitted out from hence, which were manned by negroe slaves, who behaved irreproachably; and such is the state of slavery in these islands, and so much are the negroes attached to their masters, that such as were captured always returned when it was in their power. Some part of the trade of the Bermudians consists in carrying the salt which they fetch from Turks island to America, where they sell it for provisions or for cash. These islands are frequented by whale-fishers. The government is conducted by a governor named by the British crown, a council, and a general assembly: the religion is that of the church of England. There are 9 churches under the care of 3 clergymen; and one Presbyterian church. The women of these islands are said to be handsome, and both sexes are fond of dress. Edwards's *Hist. of West. Ind.* vol. i. p. 470.

BERMUDAS Cedar, in *Botany*. See **JUNIPERUS**.

BERMUDIANA. See **SISYRINCHIUM**.

BERN, in *Geography*, was, before the French revolution, one of the thirteen cantons of Swisserland, bounded on the east by the cantons of Uri, Underwalden, Lucern, and the county of Baden; on the north by the Austrian forest-towns and the cantons of Basle and Soleure; on the west by the canton of Soleure, the county of Bienne, and a part of France; and on the south by the lake of Geneva, the Valais, and the duchy of Savoy. In the year 1352, Berne acceded to the Helvetic confederacy; and possessed such power, even at that early period, as to obtain the second rank among the Swiss cantons. Since the acquisition of the Pays de Vaud, the domains of this canton formed nearly the third part of Swisserland, and about the fourth of the actual population. It contained 3840 square miles; its population was estimated at 374,000 persons, and its contingents amounted to 2000. At the introduction of the reformation in 1528, government acquired a large increase of revenue by secularizing the ecclesiastical

ecclesiastical possessions. At the same period the whole canton followed the example of the capital; and the reformed religion was permanently established. This canton was divided into two great portions; the Pays de Vaud, and the German district. The Pays de Vaud having been conquered from the house of Savoy, and the German district from the States of the Empire, justice was administered, and taxes regulated in each by peculiar laws and customs. Each of these divisions had its treasurer and chamber of appeal resident in the capital; the chamber of appeal belonging to the Pays de Vaud judged in the last resort; but the inhabitants of the German district were allowed to appeal to the sovereign council.

The sovereign power of this canton resided in the great council of two hundred, which, when complete, consisted of 299 members chosen from the citizens, from whom they were considered as deriving their power, and as acting by deputation. The authority with which they were invested, was in some respects the most uncontrouled of any among the aristocratical states of Switzerland. The great council of Bern, since the year 1682, when it was declared the sovereign, was restrained by no constitutional check, like some of the others. As a general assembly of the citizens was never convened on any occasion, the executive powers of government were delegated by this sovereign council to the senate, chosen by themselves from their own body; the former ordinarily assembled three times a week, and extraordinarily upon particular occasions; the senate, every day, Sundays and festivals excepted. The senate, comprising the two avoyers, or chiefs of the republic, was composed of 27 members; and from this select body were taken the principal magistrates. On a vacancy in the senate, 26 balls, 3 of which were golden, were put into a box, and drawn by several members; and those who drew the three golden balls, nominated three electors out of their body. In the same manner, seven members were chosen from the great council, who also nominated seven electors out of their own body. These ten electors fixed on a certain number of candidates, not exceeding ten, nor less than six; and such among these candidates as had the fewest votes in the sovereign council, retired till their number was reduced to four; then four balls, two golden and two silver, were drawn by the four remaining candidates; the two who drew the former were put in nomination, and he who had the greatest number of suffrages in the sovereign council was chosen. But the candidate, in order to be eligible, must have been a member of the great council ten years, and must be either a married man or a widower. The greatest excellence of this mode of election consisted, as Mr. Planta observes, in making the chance of lots apply chiefly to the electors, and not to those who might pretend to the succession, by which the dangerous effects of *cahal* were in a great measure obviated, and yet a fair prospect of success was given to the meritorious, while those wholly unqualified could entertain little hopes of being preferred. The selected candidates drew lots only in one stage of the proceeding; and this when their number being reduced to only four, an even chance was given to those few to whom eminent qualifications had secured the marked approbation of their fellow-citizens; and when fortune proved unfavorable in one instance, repeated opportunities would occur, in which, unless they proved singularly unpropitious, the desired object would be ultimately obtained.

The great council was generally filled up every ten years; as within that period there was usually a deficiency of 50 members to complete the whole number of 299. When this deficiency occurred, and not before, a new election was

proposed; nor could it be deferred when there was a deficiency of 100. The time of election being determined by vote, each avoyer nominated two of the new members; each seizenier, and each member of the senate, one; and two or three other officers of state enjoyed the same privilege. Some few persons claimed, by virtue of their office, a right of being elected, which was generally allowed. These several nominations and pretensions generally amounted, on the whole, to about 50; the remaining vacancies were supplied by the suffrages of the senate, and the seizeniers. These seizeniers were sixteen members of the great council, drawn yearly from the abbayes or tribes; and the candidates were generally taken from those who had exercised the office of bailiffs, and were elected by lot. They were invested with an authority similar to that of the Roman censors; and in case of mal-administration, might remove any member from the great council or senate, though they have seldom exercised this power. The principal magistrates were two avoyers, two treasurers, and four bannerets; each chosen by a majority of voices in the sovereign council, and yearly confirmed in their respective offices. The avoyers held their posts for life; the treasurers, six years; and the bannerets, four. The two treasurers, one for the Pays de Vaud, and the other for the German district, formed, in conjunction with the four bannerets, an economical chamber or council of finance, which passed the accounts of the bailiffs, and received the revenues from those who were accountable to the government. The four bannerets, the ex-avoyer, who was the first senator in rank, and president of the secret council, the senior treasurer, and two members of the senate, composed a committee or secret council, in which all state affairs, requiring secrecy, were discussed.

Although the form of this constitution was aristocratical, and the senate possessed a very considerable influence, yet it did not enjoy (says Mr. Coxe) that almost exclusive authority which exists in many aristocratical governments. For, by several wise and well observed regulations, the sovereign council, although it delegated the most important concerns of government to the senate, yet assembled at stated times, and superintended the administration of public affairs. Mr. Burke asserts, that the republic of Berne was one of the happiest, most prosperous, and best governed countries on earth.

The canton of Bern, by its old constitution, was divided into a certain number of districts, called bailiages (see BAILLIAGE), over which bailiffs were chosen from the sovereign council. These were the most profitable posts in the disposal of government, and very eagerly pursued. They were formerly nominated by the bannerets, but the mode of election was altered in 1712, and they were chosen by lot. The bailiffs were representatives of the sovereign power in their respective districts; whose business it was to enforce the edicts of government, to collect the public revenues, to act as justices of the peace, and to be judges in civil and criminal causes, except where there was any local jurisdiction. In civil cases, beyond a certain value, an appeal lay to the courts of Bern: in criminal affairs, the process underwent a revision in the senate, and was referred to the criminal chamber, which inflicted punishments for small misdemeanours; but in capital cases, the sentence was to be confirmed by the senate, and by the sovereign council, if the delinquent was a citizen of Bern. The bailiff delivered his accounts to the economical chamber, to which court an appeal lay in case of exaction on his part, or on the part of his officers. The profits of the bailiff's office arose from the produce of the demesnes, of the tithes, certain duties paid to government in the respective bailiages, and from the fines imposed for

for criminal offences. In some parts of the German division, the bailiff became entitled, upon the death of every peasant, to a determinate part of the inheritance, which proved in some situations an oppressive tax upon the family. The bailiff, being governor and judge in his own district, and having a magnificent chateau for his accommodation, not only possessed great power, but in the course of his administration, which lasted six years, was able to live with proper magnificence, and, to lay up two or three thousand pounds without extortion or unbecoming parsimony.

In Bern, the militia was so well regulated, that government was able to assemble a very considerable body of men at a moment's warning. To this purpose every male at the age of 16 was enrolled, and about a third of the whole number was formed into particular regiments, composed of fusileers and electionaries; the former being bachelors, and the latter married men. Every person thus enrolled was obliged to provide, at his own expence, an uniform, a musquet, and a certain quantity of powder and ball; and no peasant was allowed to marry, unless he produced his uniform and arms. Every year a certain number of officers, called land-majors, were deputed by the council of war, to inspect the arms, to complete the regiments, and to exercise the militia. The regiments were, besides this annual review, occasionally exercised by veteran soldiers appointed for that purpose. Beside the arms in the arsenal of Bern, a certain quantity is also provided in the arsenal of each bailliage, sufficient for the militia of that district, and likewise a sum of money amounting to three months' pay, which is appropriated to the electionaries in case of actual service. The dragons were chosen from the substantial farmers, each of whom provided his horse and accoutrements. In time of peace the avoyer out of office was president of the council of war; but during war, a general in chief was nominated for the forces of the republic. A certain number of regiments being thus always ready, signals are fixed on the highest part of each bailliage, for assembling the militia at a particular place in each district, where they receive orders for marching. As the page of history does not exhibit a greater curiosity than what was called the "exterior state" at Bern, we shall here subjoin a brief account of it. It was a model of the sovereign council, and composed of those burghers who had not attained the age requisite for entering into that council. It had a great council, a senate, two avoyers, treasurers, bannerets, and seizeniers; all of whom were chosen in the usual manner, and with the accustomed ceremonies. The post of avoyer in this mimic legislative community was solicited with great assiduity, and sometimes obtained at a considerable expence, as the successful candidate was always admitted into the great council without any farther recommendation. This body possessed 66 bailliaiges, consisting of several ruined castles dispersed throughout the country, among which Hapsburg was the principal. It had also its common treasure, and its debts; differing in this latter respect from the actual government of Bern, which was not only free from debts, but possessed of a very considerable fund in reserve. Great honours were paid to this singular institution, as it was in fact a kind of political seminary for the youth of the canton, who were likely to arrive in some future period at the highest offices in the state. Its badge, or coat of arms, which was an ape sitting on a lobster, and viewing itself in a mirror, was no bad emblem of its mock consequence.

The revenues of Bern, out of which were paid the salaries of the principal magistrates, which were extremely moderate, the reigning avoyer being allowed 400l., each of the senators 150l., and the banneret 230l., and which were ap-

plied to the expences of the government, were derived principally from the public demesnes appropriated at the time of the reformation; the tithes, sequestered at the same period, and assigned to the maintenance of the clergy, public seminaries, and charitable institutions; quit-rents, and monopoly of salt and gun-powder; produce of the post-office; customs and tolls; duty on wine imported into the capital; and fines imposed for misdemeanors; also a tax on the alienation of landed property in the French district; the interest of money accumulated from a regular progression of savings, of which nearly 500,000l. were lodged in the English funds. The whole revenue has been stated by the best authorities as not exceeding 300,000 crowns, which were always more than sufficient to supply the expediture, and to construct and support the magnificent public works. A large treasure was always reserved in a vault of the capital for sudden emergencies, and the care of this vault entrusted to the principal magistrates, each of whom had a separate key, and without their concurrence, and a special order from the sovereign council, the door could not be opened. The amount of this treasure could not be accurately ascertained, but it must have been very considerable, as not less than 160,000l. sterling was deposited in the mountains of Hasli and Oberland. The pillage of this treasure was one of the principal objects of the French directory, to defray the expences of their armament against Egypt. In the plunder of Bern, it is said that the French did not acquire less than 400,000l. in specie.

When the directory of France determined to revolutionize Switzerland, it directed its whole force against the canton of Bern, on the conquest or submission of which the reduction of the country at large depended. Its hostilities were preceded, in 1797, by requiring Bern, and the other Helvetic cantons, to dismiss the British minister, who withdrew, and voluntarily announced the termination of his embassy in a dignified note addressed to the rulers of Bern. France, having accomplished the first part of its plan, which was that of dividing the confederate states, proceeded to the attainment of their second object, which was the subjection of Bern. With this view they secured the passes which facilitated the invasion of the Berne territory, by seizing the Erguel and the town of Bienne. The subsequent attempt to detach the Pays de Vaud from Berne, and to erect it into a republic, under the auspices of France, was equally successful, from the pusillanimity and infatuation of the Berne government. Bern, after some feeble and ineffectual remonstrances, relinquished its claims on the Pays de Vaud, and made overtures of conciliation to the French directory, and to Mengaud, their agent, in Switzerland. But these degrading measures served only to hasten the fall of the republic. At length, after some fruitless negotiations, they had recourse to arms; and the forces of Soleure and Friburgh ranged themselves under the standard of Bern; and the chief command was entrusted to general d'Erlach, a member of the sovereign council, who was a veteran distinguished for military skill and undaunted courage. The combined forces of Bern, Soleure, and Friburgh, amounted at this time to 25,000 men, and extended from the northern frontiers of the canton of Soleure beyond Friburgh; occupied the strong position of Vailly, between the lakes of Morat and Neuchâtel, and pushed their advanced corps as far as the valleys of Ormond, towards the south-eastern extremity of the lake of Geneva. By this position they covered the towns of Soleure, Bern, and Friburgh, and prevented all communication between the two French armies, in the Pays de Vaud, and the bishopric of Basle. Erlach, having arranged his plan of offensive operations in a masterly manner, was confident of success, and his troops were eager for the combat. In

this state of preparation, and whilst he was employed in distributing his instructions previously to an engagement, he received orders from Bern, which revoked the powers with which he had been intrusted, and commanded him to suspend hostilities, as a negotiation was opened with the commander in chief of the French forces, general Brune. He immediately repaired to Bern, and there found the fatal ascendancy of the French party. Dissatisfied with Brune's ultimatum, the magistrates issued their orders to general Erlach to renew his plan of attack. But still timid and wavering, they renewed their negotiations, which seemed merely to subject them to fresh insult. In the mean while a spirit of disaffection was spread among the troops, which Erlach, by his reasonable interposition, suppressed; and they again prepared for attacking the enemy. But no sooner was the order issued to this purpose, than it was again revoked, and a new conference was opened with the French general. These contradictory orders roused the indignation of the troops, ardent for an engagement; and they withdrew all confidence from their officers, whom they regarded as accomplices in the destruction of their country; and many of them indignantly quitted their standards. The army of Bern, thus dispirited by counter-orders, pretended negotiations, and the gradual advances of the enemy from one advantageous post to another, and reduced to the number of 14,000 men, determined, however, under the command of their valiant leader Erlach, to make a final effort for expiring liberty, and to encounter 40,000 veterans, flushed with conquest, and in a high state of discipline. After four desperate engagements, Erlach resisted a fifth assault under the walls of Bern, nor did he finally abandon the contest, till his little army, diminished to 7000 men, had lost 2000 of their number, and the troops of the two French generals, Brune and Schawembourg, were on the point of uniting, while the capital was unprepared for a siege. Bern surrendered to the first summons of general Brune, and a tree of liberty was planted in his presence. Erlach, having wonderfully escaped from the repeated assaults of the enemy, was hastening towards the mountains of Oberland, with hopes of collecting his scattered forces for another effort; but being recognized upon the high road between Bern and Thun by some straggling soldiers, he was seized, bound, and placed in a cart, in order to be conveyed to the capital; but another desperate band assaulted him, and, amidst reproaches and execrations, massacred him with their bayonets and hatchets. The subjugation of Bern speedily decided the fate of Switzerland. Upon the dissolution of the Helvetic confederacy, in 1798, Geneva, Mulhausen, Bienne, and the bishopric of Basle, were annexed to France; the remainder of the country, except the Grisons, was modelled into a republic, one and indivisible, divided into 18 departments, and governed by a senate, a great council, and five directors, who first assembled at Aarau, and were afterwards transferred to Lucern. By the constitution now established, Bern, including the central and western part of the ancient canton, with the district of Schwarzenburgh, was made one of the 18 departments, and Bern was its capital. According to this distribution, the canton of Bern is bounded on the north by that of Solothurn, on the east by that of Lucern, on the south by that of Oberland, and on the west by that of Sarine and Broie. During the campaign of 1799, part of Switzerland experienced a momentary deliverance; but from the unfortunate misunderstanding between the courts of Petersburg and Vienna, the directorial government was re-established. This was succeeded by a provisional government, which was first seated at Lucern, and on the progress of the Austrians in 1799, removed to Bern. When peace was established with the emperor by the treaty of Lunéville, the French ambassador

transmitted the plan of a new constitution; according to which, Switzerland, including the Gisons, was divided into 17 cantons. Accordingly, by this constitution of 1801, Bern, in its former extent, except the Pays de Vaud and Argovie, was the first of the 17 departments, or cantons, and the number of its representatives deputed to the diet was nine. The whole body consisted of 77 members, chosen by the representatives of each district, and assembled at Bern, to organize the new constitution. The legislative authority was vested in the senate, composed of two landammans and twenty-three counsellors. The executive power was lodged in a little council of four senators, in which each of the landammans presided in turn. The landamman in office was to receive a salary of 50,000 French livres, and the other landamman and four counsellors 10,000 each. The salaries of the senators were not to exceed 6000 livres. Each canton was governed by a prefect, nominated by the landamman, and was provided with its interior administration, which approved or rejected the projects of laws presented by the senate. By the conditions of eligibility, universal suffrage was abolished; and no person admitted to any public office, unless he was proprietor of land, or exercised an independent profession, and paid a contribution to the public burdens, the amount of which was regulated by each canton. A counter-revolution afterwards took place, by which the diet was dissolved, and the provisional government established as it existed before the 29th of May 1801. But the fate of Switzerland is not yet decided. For a further account of the alterations that have taken place from this period in the constitution and government of the Swiss cantons, see *HELVETIA*. Coxe's *Travels*, vol. i. & ii. Pianta's *Hist. of the Helvetic Confederacy*, vol. ii.

The canton of Bern is fertile and well cultivated; the plains produce corn and fruit; and the Alpine eminences afford excellent pasture, which supports herds of cattle and flocks of sheep, from whose milk they make butter and cheese. The inhabitants of the district of Sanenland in this canton, are principally herdsmen and shepherds, who hold a middle rank between that of cultivators and wandering Tartars or Arabians. Each family changes its habitation five or six times in a year; and every week it is customary to meet the father of his household, with his wife and children, and preceding them, herds, a cheese, kettle, and some wooden utensils, travelling, like an ancient patriarch, in search of a new residence. The country abounds with cots and houses, most of which are constructed of wood, and in such a manner as to be easily taken to pieces and removed for the convenience of their migration. In some of the valleys, the meadows are sometimes twice mowed, and thus fed. The mountain herbage for the cattle continues ten or twenty weeks, according to its height and situation. When their winter forage is finished, they remove to the lower parts of the mountains, and having contained their whole flock, proceed with their flocks towards the summits. Their progress is regular and majestic. The most beautiful cow of the herd, adorned with a magnificent collar and bell, takes the lead, accompanied by the master of the family. Then follow his attendants, with the rest of the flocks. Shepherds and cattle are all bedecked with garlands of flowers; and every part resounds with the jingling of bells, lowing of cows, and cheerful notes of the herdsmen. The smaller flocks bring up the rear, and the procession is closed with the wife and children. Towards the end of August they again descend toward the lower parts, pasture the last grass in the valleys, and at last retire to their warm retreats in the vale, to wait the return of spring and the same pleasing migration. In this part of the country no attention is paid to the culture of the meadow land; for though they

contrive to water their meadows without any fixed rules, and dung them in winter, they never drain those that are marshy, and water is left to stagnate on the sides of slopes and declivities. In the cold vallies, where in April the snow remains at the depth of some feet, they frequently strew mould on its surface, which soon melts it, and thus various gardens are cultivated in the midst of large tracts of snow. Potatoes have been lately planted, and are become a favourite food of the people, and in many cases have been substituted for bread instead of corn. The Alpine bean, ground into flour, serves the same purpose; whilst its leaves supply fodder for the sheep, and its stalk litter for the pens. Since the introduction of the commerce of cheese, the cultivation of corn has been annually decreasing. Some few spots of ground are, however, sown with wheat and barley, and others with hemp and flax, which are very thriving. The operations of the dairy render them negligent in the culture of fruit-trees; nevertheless, plum, cherry, pear, and apple-trees, are scattered here and there, but are nowhere collected into an orchard. In the German parts of Sanenland, they boil cherries with cloves and cinnamons into a kind of paste, which is preserved good for thirty years. Mixed with a few grains of mustard-seed, and other spices, they use it as a sweet mustard; and beaten together with spices and juniper berries, they allow it to ferment, and drink it as a red beer. For want of some regulation about their woods, whole forests are cut for palings to inclose their meadows, which soon become rotten, and useless even for fuel. Maddar grows in this district wild and high. The most beautiful and most fertile spots of the canton of Bern are on the sides of the lakes of Geneva and Neufchatel, where grow the most excellent fruits, and where are made the most valuable wines. In this canton are found a variety of coloured earths and clays, some of which are used for pottery, and stones of different sorts, plaster of Paris, crystal, salt springs, coal, sulphur, mines of iron, copper, lead, and silver, and medicinal baths. They count in this canton 39 towns, great and small, and 1300 villages. The rivers that water it, are the Aar, the Emmat, the Wigger, the Reusz, the Limmat, the Sanen, and the Kandel. The principal lake is that of Geneva; besides which there are those of Neufchatel, Biel, Murat, or Murten, Thun, Brientz, and Halwyl, all which abound in fish. The part of the chain of the Alps seen from Bern, is distinguished by the different names of Wetterhorn, Schreckhorn, Finster Aar-horn, Viecherhorn, Exterior and Interior Eger, Eungfrace horn, Gletcher horn, Ebenschuh, Mittaghorn, Briethorn, Lauterbrunen, Blumli Alp, and Neils; and it forms an amphitheatre, gradually rising from the environs of the city to elevated peaks, covered with eternal snow, and hitherto inaccessible. The Jungfrau, or Virgin, is one of the highest and most beautiful mountains in the canton of Bern.

The following table exhibits the height of the principal Alps in this canton.

	Eng. Feet.
Finsterarhorn, - - - -	14,116
Jungfrauhorn, - - - -	13,730
Mouch, - - - -	13,510
Schreckhorn, - - - -	13,397
Eiger, - - - -	13,086
Wetterhorn, - - - -	12,217
All Els, - - - -	12,194
Frau, - - - -	12,153
Doldachorn, - - - -	12,039
Ni sen, - - - -	7,829
Morgenberghorn, - - - -	7,456
Hohgant, - - - -	7,290
Stockhorn, - - - -	7,218

The prevailing language is the German; but the people of fashion speak either French or Italian; and the common people in the Pays de Vaud, and in those parts that border on France and Italy, use a corrupt French or Italian, or a jargon, founded on both. The established religion is Calvinism; and the ministers are divided into deaneries and classes, and hold yearly chapters or synods. They are more independent of the civil power than in the other cantons, and are forbidden to interfere in matters of state. The nobility of Bern are accused of an extraordinary degree of pride and stateliness, and affect to keep the citizens and persons of lower rank at a great distance. As the whole power of government, and all the honourable offices of state, are in their hands, they are not permitted to engage in trade; and without the places and pensions which they enjoy, they must be poor and wretched. The lucrative offices being thus in the hands of the nobility, it might be imagined that people of the middle and lower ranks are indigent and oppressed. This, however, is by no means the case; for the citizens, i. e. the merchants and trades people, seem in general to enjoy all the comforts and conveniences of life; and the peasantry is uncommonly wealthy throughout the whole canton of Bern. They possess the privilege of bearing arms, and form a very respectable body of military, that have been usually attached to the existing government, and particularly favoured by it. The manufacturer, in this respect, less docile than the peasant, is less regarded; and the government of Bern has been charged with discouraging, or at least not zealously promoting, manufacture and commerce. Mr. Coxe informs us, that, in his first visit to Swisserland, he found the people of Bern much less informed, and more indifferent about the encouragement of literature, than those of the other cantons; their academical studies being principally directed to those branches of knowledge that fitted them for the church; and the society for the encouragement of agriculture, which was almost the only establishment tending to promote the arts and sciences, obtained little countenance from government. However, in his second journey, after an interval of about ten years, viz. in 1786, he says, that the government, roused from its former lethargy, had begun to perceive that it is the interest of every wise state to esteem and protect the sciences; and that the magistrates had lately purchased and appropriated at Bern a large mansion for the public library, increased the collection of books, and procured from England an extensive apparatus for experimental philosophy. A literary society had also been instituted for the promotion of physics, and natural history in general, and that of Swisserland in particular. In January 1788, this society consisted of ten members resident at Bern, of whom several possessed, and others were forming, collections agreeable to the plan of the institution. A regular correspondence was also established in various parts of Europe; and the members have been disposed to satisfy the inquiries of foreign naturalists relating to the natural history of this country. The principal articles of exportation from this canton are horses, cheese, linen cloth, coarse cloth and canvas made of hemp, cloth of cotton, and woollen stuffs. It is said that 10,000 pieces of linen have been sent annually from this canton; the principal part of which has been conveyed to Lyons. At Bern they have manufactures of silk, chiefly stuffs, and coloured stockings. In the western part of the mountains, the principal employment is clock-making, and the polishing of false stones.

BERN, a city of Swisserland, and capital of the canton of that name above described, derives its name, as it has been said, from a "bear," which was found there when its foundations were laid; "bern" in German signifying bears; and

and accordingly, it bears this animal in its arms, and always maintains one. It was built by Berchtold the 5th. duke of Züringer, and was, from its foundation, an imperial city. Upon his death in 1218, the emperor Frederick II. conferred upon the inhabitants considerable privileges, and compiled a code which forms the basis of their present civil law. The liberty which this city enjoyed attracted many persons from the adjacent country, who found a sure asylum from the oppression of the nobles. Although Bern, from its foundation, was engaged in perpetual wars with its neighbours, and for some time with the house of Austria, yet it continued to aggrandise itself by degrees, and considerably enlarged its territory.

This is a regular well-built town, with some air of magnificence. The principal streets are broad and long, not straight, but gently curved; the houses are built of a greyish stone upon arcades, and are mostly uniform, and of the same height. On each side are piazzas, with a wall raised four feet above the level of the street, which are very commodious in wet weather. A stream of the Aar runs in a clear current, and along a stone channel, through the middle of the streets, which furnishes several fountains not less ornamental to the place than beneficial to the inhabitants. The river Aar almost surrounds the town; winding its course over a rocky bed much below the level of the streets, and forming by its steep and craggy banks a kind of natural rampart. The stream that passes through the town serves to keep the streets always clean; for which purpose criminals are also employed in removing rubbish, both from the streets and public walks. The more atrocious delinquents are chained to waggons, while those who are condemned for smaller crimes are employed in sweeping the light rubbish into the rivulet, and throwing the heavier into the carts or waggons, which their more culpable companions are obliged to push or draw along. These wretches have collars of iron round their necks, with a projecting handle in the form of a hook to each, by which, on the slightest offence or mutiny, they may be seized, and are entirely at the command of the guard, whose duty it is to see them perform their work. People of both sexes are condemned to this labour for months, years, or life, according to the nature of their crimes. The public buildings at Bern, as the hospital, the granary, the guard-house, the arsenal, and the churches, are magnificent, and announce the riches and grandeur of the republic. The cathedral is a noble pile of Gothic architecture, standing upon a platform raised from the bed of the river, and commanding a most extensive view. The arsenal contains arms for 60,000 men, and a considerable quantity of cannon, which is cast in the town. The Bernese value themselves on the trophies contained in it, as well as upon the quantity, good condition, and orderly arrangement of the arms. Here is exhibited the statue of William Tell, who, with an arrow, is said to have struck off the apple placed upon his son's head by the governor Grissler, and by that means saved his life, which occasioned the beginning of the Swiss republic. The granary always contains a large provision of corn, supplied in consequence of particular treaties by France and Holland. The charitable institutions in this town are numerous, and well regulated. The hospitals are in general large, clean, and airy; and in the alms-house for the reception of 50 poor citizens, is a curious establishment similar to one at Basle, which provides for the reception of distressed travellers, who are accommodated with a meal and lodging at night, and each receives expence on their departure; if sick or wounded, they are maintained till their recovery. The house of correction is

conducted partly on the plan of the benevolent Mr. Howard, and in consequence of his suggestion. The delinquents are separated and distributed in two houses: one called the house of correction for greater crimes, and the other the house of labour for misdemeanors. The prisoners are also discriminated by the appellations of "brown" and "blue," from the colour of their clothes; the former being appropriated to the house of correction, and the latter to the house of labour. The men and women occupy separate apartments; and both are constantly employed in cleaning the streets and other servile occupations, and at other times in learning to read and write, and in acquiring the knowledge of various trades, which may enable them to gain a maintenance when their time of confinement expires. By these means the expence of the establishment is nearly supported, and an honest livelihood assured to those who would otherwise prove useless or pernicious members of society. There are four tables, at which the respective seats are made of distinction appropriated to good behaviour, and a larger or lesser share is distributed to each in proportion to their industry. After earning their food, the prisoners in the house of labour receive 10 per cent., those in the house of correction 8 per cent., for their extra-work. The torture at Bern is now formally abolished, by a public act of government; and justice is wisely and impartially administered. The solemnity used in passing capital sentence on a criminal deserves to be mentioned. When the trial is finished, the prisoner is informed of his condemnation by the "grand sautier," or lieutenant of the police, and attended by two clergymen to prepare him for death. On the day appointed for execution, a large scaffold, covered with a black canopy, is constructed in the middle of the principal street. The avoyer, with a sceptre in his hand, is seated on an elevated kind of throne between two senators, and attended by the chancellor and lieutenant of the police, holding an iron stick, called "the rod of blood," all habited in their official robes. The criminal, being brought to the foot of the scaffold, without chains, receives the sentence of condemnation, which is read aloud by the chancellor, at the close of which the avoyer commands the executioner to approach, who instantly binds the arms of the culprit, and leads him away to the place of execution.

The public library is a small, but well-chosen collection, containing 20,000 volumes, to which additions have been made by purchase, and by the liberality of private contributors; to this belong also a few antiques, a cabinet of Swiss coins and medals, some curious manuscripts, particularly of the thirteenth century, consisting of several songs and romances of the Troubadours, written in that and the preceding ages, and some other curiosities. The small figure of the priest pouring wine between the horns of a bull, is merely valuable, because it illustrates a passage of Virgil, and has been mentioned by Addison.

To the account of the public buildings of Bern, we may add that of an elegant edifice, built by the voluntary subscription of the nobility, furnished with accommodations for many public amusements, such as balls, concerts, and theatrical entertainments, which latter are seldom permitted in this city. The walk by the great church was formerly the only public walk, and much admired on account of the view from it, and the peculiarity of its situation; being on one side on a level with the streets, and on the other some hundred feet of perpendicular height above them. Besides this, there is now another walk on a high bank on the side of the Aar, and at some distance from the town. This walk is singularly magnificent, commands a view of the river, the town of

Bern, the country about it, and the glaciers of Swisserland. The adjacent country is richly cultivated, and agreeably diversified with hills, lawns, wood, and water; the river flows rapidly below, and an abrupt chain of rugged and snow-capt Alps bounds the distant horizon.

The population of Bern is estimated at about 13,000; the society is extremely agreeable; and foreigners are received with great ease and politeness. The men do not meet in separate societies; and the women are the life and ornament of their daily assemblies, which begin about four or five in the afternoon, and continue till eight, when the parties usually retire to their respective houses. The inhabitants are particularly fond of dancing, which of course is a frequent amusement; and this diversion commences at the early hour of five in the afternoon, on account of a standing order of government, which prohibits their continuance after eleven. There is but little trade in the capital. Some few manufactures, chiefly of linen and silk, have been established; but they are carried on only by those who have no prospect of being admitted into the sovereign council, and who would think themselves degraded by commerce. But as offices of the state, those of the bailliages excepted, are neither numerous nor very profitable, many enter, as their sole resource, into foreign armies. As for the peasants, who have acquired opulence either by manufactures or commerce, they seldom quit their station, but retain the habits acquired in early life, and, however wealthy, never give their daughters in marriage to any but persons of their own description. Of the burghers of Bern, those only are qualified for the magistracy and government of the city, who are the descendants of such as were made burghers before the year 1635; and, besides, they must not be under 30 years of age, and must be enrolled in one of the twelve companies. The British envoy to the Swiss cantons usually resides at Bern. N. lat. $46^{\circ} 55'$. E. long. $7^{\circ} 20'$. Coxe's Travels, vol. ii. Moore's View of Society, &c. in France, Switzerland, &c.

BERN-Machine, in *Agriculture*, the name of an engine for rooting up trees, invented by Peter Sommer, a native of Bern in Swisserland. This machine, of which there is a model in the machine-room of the Society for the encouragement of Arts, is represented in *Plate III. Agriculture*; and consists of three parts, the beam, the ram, and the lever. The beam ABC (N^o 1.) of which only one side is seen in the figure, is composed of two stout planks of oak, three inches thick at least, and separated by two transverse pieces of the same wood, at A and C, about three inches thick. These planks are bored through with corresponding holes, as represented in the figure, to receive iron pins, upon which the lever acts between the two sides of the beam, and which is shifted higher and higher as the tree is raised, or rather pushed out of its place. The sides are well secured at the top and bottom by strong iron hoops. The iron pins on which the lever rests should be an inch and a quarter, and the holes through which they pass, an inch and a half in diameter. The position of these holes is sufficiently indicated by the figure. The foot of the beam, when the machine is in action, is secured by stakes represented at G, driven into the earth. The ram D, which is made of oak, elm, or some other strong wood, is capped with three strong iron spikes, represented at *f*, which take fast hold of the tree. This ram is six or eight inches square; and a slit is cut lengthwise through the middle of it, from its lower end at K to the first serif *a* in order to allow room for the chain *gh* to play round the pulley K, which should be four inches thick, and nine inches in diameter. This ram is raised by means of the chain *gh*, which should be about ten feet long, with links four inches and three quarters in length, and an inch thick. One end of this chain is fastened to the

top of the beam at C, while the other, after passing through the lower part of the ram, and over the pulley K, terminates in a ring or link, represented N^o 3, the two ears *mn* of which serve to keep it in a true position between the two planks of the beam. In this ring the hook P is inserted. The hook is represented in profile N^o 2, where F is the part that takes hold of the ring. But it must be observed, that the parts of this machine, represented in N^o 2, 3, are drawn on a scale twice as large as the whole engine. The hook F, N^o 2, should be made of very tough iron, as well as the handle D, and the arch Ec. This handle should be two inches thick at *z*, where it joins to the hook, and the thickness gradually lessens by degrees up to the arch, which need not be more than half an inch thick. On each side of the pin *z*, is a semicircular notch, *x*, *y*, which rests alternately on the pins when the machine is worked. The hole D, and the arch Ec, serve to fix a long lever of wood EF, N^o 1, by means of two iron pins; and by this contrivance the lever is either raised or depressed at pleasure, in order to render the working of the machine easy in whatever part of the beam the lever may be placed; for without this contrivance the extremity of the lever EF, would, when the handle is near the top of the beam, be much higher than men standing upon the ground could reach. It must however be remembered, that the lever is often shortened by this contrivance, and consequently its power lessened.

The machine is worked in the following manner: It is placed against a tree, in the manner represented in the figure, so that the iron spikes at *f* may have hold of the tree, and the end of the beam A be supported by stakes represented at G. The iron handle N^o 2, is placed in the opening between the two planks of the beam, and the wooden lever fixed to it, by means of the iron pins already mentioned. The hook F takes hold of the chain, and one of the iron pins is thrust into the outer row of holes, by which means the outer notch *x* will rest on the pin, which will be now the centre of motion; and the end of the lever E, N^o 1, being pressed downwards, the other notch *y*, N^o 2, will be raised, and at the same time the chain, and consequently the ram. The other iron pin is now to be thrust into the hole in the inner row, next above that which was before the centre of motion, and the end of the lever E elevated or pushed upwards, the latter pin on which the notch *y* rests now becoming the centre of motion. By this alternate motion of the lever, and shifting the pins, the chain is drawn upwards over the pulley K, and consequently the whole force of the engine exerted against the tree. There is a small wheel at L, in order to lessen the friction of that part of the machine.

From this account the reader will very easily perceive that the machine is nothing more than a single pulley compounded with a lever of the first and second order. It must, however, be remembered, that as the push of the engine is given in an oblique direction, it will exert a greater or lesser force against the horizontal roots of the tree in proportion to the angle formed by the machine with the plane of the horizon; and that the angle of 45° is the maximum, or that when the machine will exert its greatest force against the horizontal roots of the tree.

BERNABEI, ERCOLE, in *Musical Biography*, the scholar and successor of Benevoli at St. Peter's, and instructor of the abate Steffani, may be ranked among the greatest masters of harmony, in the ancient ecclesiastical style, or the 17th century. This composer being invited by the elector of Bavaria to Munich, about the year 1650, entered into the service of that court, where he continued the rest of his life. His son, Giuseppe Ant. Barnabei, after following his father's steps in the study of ecclesiastical harmony, surpassed him considerably

considerably in melody and modulation, as he lived long enough to see a great relaxation in the rigour of ancient rules. There is a canon by this composer in the first volume of Paolucci, page 158, and an excellent Agnus Dei, in P. Martini Saggi. di Contrap. II. 127, extracted from his mass, for four voices, intitled, "Laudate eum letitia, qui fuitis in tristitia." After succeeding his father as maestro di capella to the elector of Bavaria, by whom he was honoured with the title of counsellor antique, and publishing several compositions for the church, replete with musical science of the first class, he lived till the year 1732, extending his existence to the great age of eighty-nine.

Their successors, with many other good harmonists, in the style of the 17th century, supplied the churches of Italy with innumerable compositions, in which the chief merit consisted in pure harmony, and the contrivance of canon, figure, and imitation on simple and often insipid subjects; but to these excellencies the best moderns have added melody, a more varied modulation, and not only an attention to long and short syllables, but to the expression of words. In the 15th century almost every mass was composed upon the subject of some well-known song or ballad; but these airs being psalmodic, and a little more lively or varied than canto fermo, admitted of no greater variety of modulation than the ancient chants of the church, upon fragments of which, during the 16th and part of the 17th centuries, it was thought necessary to construct the chief part of choral music. Though the present students in counterpoint at Naples, and other parts of Italy, still exercise themselves in harmonizing canto fermo, the writing masses or motets on the subjects of these chants is seldom done but in pure pedantry, and to give an air of antiquity to dry and fanciless compositions.

The church style of composition was, however, much altered during the 17th century, not only by the imitation of dramatic music, and the introduction of instruments, but by writing in transposed keys, and supplying the deficiencies in the scales, which too strict an adherence to the species of octave, and modes of the church, had occasioned. Indeed, before this time, there was no decision of keys, either in sacred or secular music, according to our present rules of beginning and ending upon the chord major or minor, of the key note, or of some determinate note in the scale. The prohibitions were so numerous in the writings of the old theorists, that if the most regular modern compositions were tried by such rules as substituted at the beginning of the 17th century, they would appear extremely licentious. No part was to be extended above or below the staff, or five regular lines, on which it was written; the combination of chords was never to be broken by moving to an unrelative harmony; and the intervals of the sharp seventh, the tritonus, or sharp fourth, false fifth, sharp second, and even the major sixth, were prohibited. Indeed, an excellent composition might now be produced, merely from ancient disallowances.

BERNACCHI, ANTONIO, an eminent opera singer, who first arrived in England in 1716, as a second man, while Nicola was the first. Bernacchi's voice seems to have been flexible and flexible, but he supplied the defects of nature by force of art, that his performance was always much more admired by professors than by the public in general. He died here at that time but one year, after which he went back to Italy; but returned in 1729. After quitting the stage, Bernacchi established a school for singing at Bologna, where he had himself been educated, under the celebrated Padovani, and where he formed several admirable scholars, who rendered his name and school famous. He came to England a second time in 1729, when he was paid his meridian; his voice was never good, but now little was left, except a refined taste, and an artificial manner of singing, which only

professors, and a few of the most intelligent part of an audience, could feel or comprehend. After he quitted the stage, he retired to Bologna, where he formed so many great vocal performers by his instructions, that to have been of Bernacchi's school was almost sufficient to establish the reputation of a young singer.

BERNADIA, or BERNALDA, in *Geography*, a town of Italy, in the kingdom of Naples, and province of Calabria Ultra, 5 miles west of St. Severina.

BERNAGORE, a town of Hindoostan, in the country of Bengal, on the eastern bank of the Ganges, 10 or 12 leagues below Chinsurah, and 5 miles N.W. of Moorshedabad. The coast is fertile of blue handkerchiefs are made here. It is famous on account of the great number of ladies of pleasure, who reside there, and who pay a monthly recognition to the sirdar of Chinsurah, for the free exercise of their profession. It belonged to the Dutch; but was taken by the British forces in October, 1803.

BERNAL, a hill on the west coast of New Mexico, near the coast, and 4 leagues W.S.W. of the burning mountain of San Salvador. N. lat. about 13°. W. long. about 93°.

BERNARD, in *Biography*, abbot of Clairvaux, and a saint of the Romish church, was born of a noble family at Fontaine in Burgundy, in 1091, and educated at the church of Chatillon, where he manifested at an early period an ardent spirit of devotion. At the age of 23, he, and 30 of his companions, entered into the abbey of Citeaux, lately founded by St. Robert. Here he acquired such reputation, that, within two years, viz. A.D. 1115, he was deputed, with a colony of monks, to found the abbey of Clairvaux in the diocese of Langres, of which he was created the first abbot, and where he continued, without seeking or accepting any higher preferment. In a short time he found himself at the head of 700 novices; and, by his eloquence and zeal, Clairvaux became a seminary of the most distinguished reputation, so that, during the life of the founder, it produced one pope, six cardinals, and thirty prelates. In this retreat the influence of Bernard was greater than if he had occupied the throne of St. Peter; he was consulted as an oracle; his censures were regarded with awe in the remotest parts of Europe; and the Cistercians, by his example, became so powerful, that he lived to see the establishment of 160 convents, which acknowledged him as their head. Having exerted himself in restoring peace to the church, which had been interrupted by the schism that had happened between the years 1131 and 1138, he engaged in combating the supposed heresy of Abaelard, who had propagated some opinions that were thought to militate against the doctrines of the church, and succeeded in procuring his condemnation by the council of Sens, in 1140. He also refuted the errors of Peter de Bruys (see PETER BRUSSIAS); combated the fanaticism of the APOSTOLICS; reformed the monk Raoul, who recommended the extermination of the Jews; contended against the followers of Arnold of Brescia; and caused Gilbert de la Porree, and Eon de Pétit, to be condemned by the council of Rheims, in 1148. But his influence was much more signally exerted in promoting the second crusade against the Saracens. In this romantic expedition, he engaged, by his eloquence, Lewis VII. of France, with his principal nobles, and the emperor Conrad; and he boasts, that from Combrance to Cologne, he emptied cities and castles of their inhabitants, and visited the production of only one man being left to seven women. Miracles of various kind were reported to have attended his mission, and he obtained the appellation of "Thaumaturgus," or wonder-worker of the world. The enterprise which he had undertaken with Conrad and Lewis proved unfortunate; and the abbot, who had predicted their success, incurred a variety of censures and reproaches on account of the calamities which he had

been instrumental in bringing upon Europe. He attributed its failure to the sins of the croises, which had hindered the accomplishment of his prophecies. How far he was affected by the discomfiture and general distress in which this expedition terminated, or by the accusations he suffered, it is impossible to say. However, it is certain that he did not long survive that disastrous event; for he died at Clairvaux, in 1153, in the 63d year of his age.

Few men possessed a more extensive and uncontrollable command over the minds of men than St. Bernard: and his influence was wholly owing to his personal qualifications. But though he had an absolute command by his eloquence and writings, he seems to have been more an enthusiast than a politician, and to have wanted worldly wisdom to direct and manage the various engines which he put into motion. With good intentions he blended passion and prejudice, and the love of power. He was, without doubt, a man of distinguished piety, as well as integrity; and, considering the time in which he lived, an elegant and learned scholar. Erasmus gives the following character of him: "Christianè doctus, et sanctè facundus, et piè festivus." As a writer, he was copious; his style was characterized by force, vivacity, elevation, and sweetness; and his imagination furnished him with figures of comparison and strong antitheses in great variety and abundance; so that he has been regarded as the last of the fathers formed upon the models of St. Ambrose and St. Augustin. The best edition of Bernard's works is that of the learned Benedictine Mabillon, in 2 vols. fol. first printed at Paris in 1666, 1667, and reprinted in 1690 and 1719. A Latin impression of this edition was made at Venice, in 6 vols. fol. Cave's Hist. Lit. ii. p. 186. Gen. Dict. Nouv. Dict. Hist. Mosheim's Eccl. Hist. vol. iii. p. 66.

BERNARD of *Menthon*, the founder of a religious community, was born in the Genevoisin 903, and descended from one of the most illustrious houses of Savoy. Having dedicated himself to the ecclesiastical profession, he retired to Aosta, a small town at the foot of the Alps, and became arch-deacon of its church. Here he employed himself in missions among the unconverted Pagans, who inhabited the mountains, and profelyted them to Christianity. Having witnessed the hardships and dangers encountered by the French and German pilgrims, in their passage to Rome over the Alps, which Hannibal had anciently traversed with singular fortitude and perseverance, this benevolent monk founded two monasteries, or hospitia, for their relief, on Mont-joux, called from him "Great and Little St. Bernard." These were peopled with canons-regular of St. Augustin, and Bernard himself became their first provost. He obtained several important privileges for his establishment from successive popes, and it acquired great popularity and large possessions. Bernard died at Novara, at the age of 85, and was canonized by the Romish church. His institution has undergone a variety of vicissitudes, and lost great part of its riches; but it still subsists, and is eminently useful. There are ordinarily between twenty and thirty monks belonging to the convent; eight of whom are usually dispersed among the Alpine parish churches, under their patronage; and ten or twelve constantly reside, being such as, from their age and health, are able to bear the keen atmosphere of the mountain. The few others, who can no longer bear it, are permitted to reside with the aged provost of the whole, in a house belonging to the convent, and situated at Martigny below. The monks of the mountain are industriously employed in the prosecution of their private studies, in the instruction of their novices, in the education of some scholars who are sent to board and lodge with them, and in managing the temporal economy of the whole. They have a prior, the deputy of the provost, and governor of the convent in his absence; a sacristan, who takes

care of their chapels; a cellarer, serving as purveyor, comptroller of the kitchen, and managing all the exterior concerns of the monastery. a clavandeer, who keeps the keys, and dispenses the requisite articles to the monks and to the travellers; and an infirmier, who takes care of the sick in the apartment appropriated to them. The cellarer keeps twenty horses constantly employed during the summer in fetching the magazines of flour, bread, cheese, liquors, and dried fruits, for themselves and their guests; and forage for the milch cows and fattening cattle, during winter. Their firewood, of which they expend a great quantity, is brought to them on the backs of mules, from the distance of four leagues, and by a steep path, that is passable only for six months in the whole year. Before the winter sets in, they send down their horses for the season to a farm which they have on the northern side of the Rhone. To a sympathizing and compassionate mind it is peculiarly pleasing to observe the solicitude of these amiable monks on such days as the pass is most frequented, in personally receiving, warming, and recovering travellers, that are exhausted by their excess of fatigue, or indisposed from the severity of the air. With equal attention they relieve both their own countrymen and foreigners. They make no distinction of state, sex, or religion; and ask no questions concerning the country or the creed of the wretched. In winter and in spring, their solicitude has a larger range of attention and activity. From that very time nearly, in which Hannibal conducted an army over Great St. Bernard, and at which the Romans reckoned the general winter of Italy to commence, from the 1st of November, through the winter, to the 1st of May, a trusty Alpine servant, who, as an Alpine, is denominated a Maronnier, and one or two dogs of an extraordinary size accompanying him, are constantly engaged in going to meet travellers a considerable way down the descent towards the Vallais. These dogs possess an instinct, and receive a training, which fit them to be peculiarly useful in their employment. They point out the road to the guide and the travellers, through fogs, tempests, and snows; they have also the sagacity to discover travellers that have lost their way, that have fallen amidst the drifts of snow, and that are lying upon them, wearied and exhausted. The monks themselves often accompany the guide, and aid him in administering necessary relief. Apprized of the benumbing and stupifying effect of extreme cold, they rouse the sleeping travellers, and exert themselves in a variety of ways in preserving and recovering them from approaching or apparent death; and in doing this, they expose themselves to great danger. In order to avoid the numbness occasioned by the cold, they carry with them short thick staves, armed at the ends with iron, and with these they continually strike their hands and feet. About three miles below the convent, on the road of Hannibal's ascent, they have built a small vaulted room, called the hospita, which is intended for the casual refreshment of travellers benumbed, and unable to reach the convent. The trusty Maronnier visits it frequently, in order to meet the traveller; but principally at the approach of night, and on his return leaves bread, cheese, and wine. On extraordinary occasions, when a storm subsides, he sallies forth to this building, with his flock of wine and meat, and assists all whom he finds distressed. The monks themselves are often seen on the tops of their rocks, watching opportunities for the exercise of their humanity. When the snow just fallen is deep on the ground, they employ themselves in making roads through it, and thus by timely vigilance prevent many fatal accidents. But notwithstanding all their charitable efforts, scarcely a winter passes in which some traveller is not brought to the convent with his limbs benumbed and frozen. The traveller is sometimes overwhelmed at once, and plunged into the body of descending snow. When he is not very deep, the dogs discover

BERNARD.

discover him by the scent, and when they fail, the monk engage in the laborious office. They range upon the snow, and found it with long poles: and they have thus rescued many from imminent danger of being lost. *Nouv. Dict. Hist. Sacrific. Voy. des Alpes*, vol. ii. Whitaker on the Courir of Hannibal over the Alps, &c. 1794. See BERNARD, in *Geography*.

BERNARD, ANDREW, a Latin scholar, and successively poet-laureat to Henry VII. and Henry VIII., was a native of Thoulouse, and an Augustin monk. He was not only the king's poet-laureat, as it is supposed, but his historiographer, and preceptor in grammar to prince Arthur. He obtained many ecclesiastical preferments in England. The pieces which he wrote under the character of poet-laureat, are in Latin. These are, "An Address to Henry VIII. for the most auspicious beginning of the 10th year of his reign," with an "Epithalamium on the marriage of Francis, the dauphin of France, with the king's daughter;" "A new year's gift," for the year 1515; and "Verses," wishing prosperity to his majesty's 13th year. He has left some Latin hymns; and many of his prose pieces in Latin, written as historiographer to both monarchs, are extant. *Warton's Hist. Eng. Poetry*, vol. ii. p. 132.

BERNARD, EDWARD, learned English astronomer and linguist, was born at Perry St. Paul, near Towcester, in Northamptonshire, in 1638, and educated at Merchant-Taylors' school in London, whence he was removed, in 1655, to St. John's college in Oxford. Here he applied himself with the utmost diligence to the study of history, philology, and philosophy: and acquired an accurate knowledge, not only of the Greek and Latin languages, but of Hebrew, Syriac, Arabic, and Coptic: he also directed his attention to the mathematics, which he studied under the celebrated Dr. Wallis. Having taken several academical degrees at Oxford, and engaged the esteem of all who knew him, by his distinguished talents and learning, and no less amiable temper, he removed in 1668 to Leyden, with a view of examining several oriental MSS., and particularly the Arabic version of the three lost Greek books of Apollonius Pergæus's conic sections, brought from the east by James Golius. These books he translated, with an intention of publishing them at Oxford, but his design was never executed. Upon his return to Oxford, he resumed his studies with fresh vigour, and by his collation of the most valuable MSS. in the Bodleian library, the result of which he was always ready to communicate, he was engaged in a very extensive correspondence with learned men of most countries. About the year 1669, he was recommended by the famous Dr. (afterwards sir Christopher) Wren, Cassilian professor of astronomy at Oxford, to be his deputy, and he succeeded this eminent professor, on his resignation in 1673. He had been previously inducted to the rectory of Cheame in Surry, and appointed chaplain to Dr. Mace, bishop of Bath and Wells. A scheme having been proposed in the university of Oxford, which was chiefly promoted and encouraged by bishop Fell, for collecting and publishing all the ancient mathematicians, Bernard, who first formed the project, assiduously engaged in accomplishing it, by collecting all the old books and MSS. in the public libraries, and drawing up a synopsis of their contents. He also printed, at his own expence, as a specimen of this noble design, a few sheets of Euclid in folio, containing the Greek text and a Latin version, with Proclus's commentary in Greek and Latin, and learned scholia and corollaries. With a view of promoting the study of astronomy, he also undertook an edition of the "Parva Syntaxis Alexandrina," or "*Met. Axioms*," of which there is an account in the "*Veterum Mathematicorum Synopsis*," and in which, besides Euclid, are contained the small treatises of Theodorus, Au-

tolycus, Menelaus, Aristarchus, and Hypsicles; but this was never published. In 1676, he was sent to France by king Charles II. as tutor to his two natural sons, by the duchess of Cleveland; but his disposition and habits not being adapted to this situation, he returned, after a year's absence, to his studious retirement at Oxford. During his stay at Paris, however, he cultivated an acquaintance with several learned persons, collated various ancient and valuable MSS., and bought many scarce and curious books for his own library. At Oxford he pursued his studies with renewed alacrity: and besides mathematics, to which he applied according to the duty of his professorship, he devoted himself from inclination to the prosecution of history, chronology, and antiquities. At this time he undertook a new edition of Josephus, which he never completed. In 1683, he visited Holland, for the purpose of attending the sale of Nicholas Heinsius's library, where he purchased many valuable books; and on this occasion he renewed, or contracted an acquaintance with several persons of eminent learning. As he experienced many civilities from the Dutch, and found that in Holland he should enjoy favourable opportunities for making great improvement in oriental learning, he seemed much inclined to settle at Leyden; but disappointed in his expectation of being chosen professor of the oriental tongues in that university, he returned to Oxford. In 1684, he took his degree of doctor in divinity; and in 1691, he was presented to the rich rectory of Brightwell in Berkshire, which, being at the distance of about 9 miles from Oxford, allowed of his occasional residence in this city. Soon after he resigned his professorship of astronomy, which had been for some time irksome and unpleasant to him, in favour of Dr. David Gregory, professor of mathematics at Edinburgh. In 1692, he superintended the preparation of a catalogue of the MSS. in the libraries of Great Britain and Ireland, and in some foreign libraries; and in the following year he married an agreeable lady in the bloom of youth, with whom he lived very happily. In 1696, he attended the sale of Golius's MSS. in Holland; and not long after his return fell into a constitutional decline, of which he died in January 1697; and he was interred in St. John's college chapel. His widow erected a monument of white marble, in the middle of which there is carved the figure of a "heart," circumscribed, according to his own direction, by these words; "Habemus Cor Bernardi." The publications of Dr. Bernard, were some astronomical papers in the *Philosophical Transactions*, N^o 158. p. 567. N^o 163. p. 721. and N^o 164. p. 747; "A Treatise on the ancient weights and measures," first printed at the end of Dr. Pococke's *Commentary on Hosea*, and afterwards reprinted in Latin, with great additions and alterations, Oxon. 1688, 8vo.; "Private Devotions, &c." Oxford, 1689, 12mo. "Orbis eruditi literatura, a characterè Samaritico deducta," in a large sheet of engraving, exhibiting at one view the alphabets of many nations, together with the abbreviations used by the Greeks, physicians, mathematicians, and chemists; "Etymologicum Britannicum," Oxon. 1689, printed at the end of Dr. Hicke's *Grammatica Anglo-Saxonica*, &c.; "Chronologia Samaritana Synopsis," published in the "*Acta Eruditorum Lipsiensia*," April, 1691. He was also the author of some notes and commentaries, printed in editions of learned works. He likewise assisted several learned persons in their editions of books, and collated MSS. for them. Among his papers were found many MSS. of his own composition, with very large collections; which, together with several of his books, were purchased by the curators of the Bodleian library. The rest of his books were sold by auction. Of his great and extensive learning, his work are a sufficient evidence. Dr. Smith, his biographer, represents him as a man of a meek, mild, and conciliating disposition,averse from contels of

BERNARD.

every kind, modest in delivering his own opinions on disputed subjects, caudid in his judgment of other men's performances, steadily attached to the established church, and at the same time liberal in his sentiments with regard to dissenters of all denominations, and desirous of peace and union. His piety was sincere and unaffected; and his devotions, both public and private, were regular and exemplary. The learned Huetius, in his "Comm. de rebus suis," bears this concise but very honourable testimony to his memory. "Edwardus Bernardus Anglus, quem pauci hac setate equiparabant eruditiois laude, modestiã vero pene nulli;" i. e. Edward Bernard, an Englishman, whom few in this age equalled in erudition, in modesty scarcely any. *Biog. Brit. Gen. Dict.*

BERNARD, JAMES, was born in 1658 at Nions, in Dauphiné, studied at Geneva, and became pastor of the church in his native province. But being driven from France by persecution, he sought refuge first at Geneva, then at Lausanne, and afterwards in Holland, where he was employed as a pensionary minister at Gouda. In 1705, he was chosen pastor of the Walloon church at Leyden, and soon after was appointed professor of philosophy and mathematics in that university, and received a doctor's degree. He closed his life of literary labour in 1718. He was the author of several political and historical works; in 1699, he undertook the continuation of Bayle's "Nouvelles de la republique des lettres;" which he continued till 1710, and resuming it in 1716, continued it till his death. He also wrote a great part of the 20th to the 25th vols. of Le Clerc's "Bibliotheque Universelle;" and a "Supplement to Moreri's Dictionary," in 1 vol. fol. Amst. 1714. He also published several theological and historical treatises, in the composition of which he has displayed more learning and industry than genius and skill. *Nouv. Dict. Hist.*

BERNARD, PETER-JOSEPH, a French poet, was the son of a sculptor at Grenoble, and born in 1708. Having been educated in the college of the Jesuits at Lyons, where he made rapid progress in literature, he rambled to Paris in pursuit of pleasure and liberty, and for two years employed himself as clerk to a notary; but here he published some light poems which attracted notice, and in 1734 he was taken to the campaign in Italy by the marquis de Pezay, and acquitted himself with honour at the battles of Parma and Gualtalla. The commander in chief, the marshal de Coigne, pleased with his talents, appointed him his secretary, and procured him the post of secretary-general to the dragoons. He continued with the marshal till his death in 1756. He afterwards lived in the circle of fashion and pleasure at Paris, till the year 1771, when the loss of his memory reduced him to a mere state of vegetation, in which he continued till his death in 1776. His works are all in the easy, elegant, and voluptuous kind. His first performances consist of anacreontics and songs, in short and playful measures, from which he obtained the appellation of "le gentil Bernard." He afterwards wrote the opera of "Castor and Pollux;" and a ballet called "Les Surprises de l'amour." His principal poem is "L'art d'aimer," in three cantos, in which are several tender passages, but in point of style negligently written. His poetical tale, intitled "Phrosine et Melidore," is of similar character. A collection of his works has been published, and the following lines of Voltaire are prefixed:

"Les trois Bernards."

"Dans ce pays trois Bernards sont connus :—
L'un est ce saint, ambitieux reclus ;
Prêcher adroit, fabricant d'oracles ;
L'autre Bernard est l'enfant de Plutus,
Bien plus grand saint, faisant plus grands miracles :
Et le troisième est l'enfant de Phébus,
Gentil Bernard, dont la muse féconde

Doit faire encor les délices du monde,
Quand de premiers on ne parlera plus."

The second, "Bernard" above mentioned is "Samuel," the famous financier under Lewis XIV., called the Lucullus of the age. *Nouv. Dict. Hist.*

BERNARD of *Brussels*, a painter of animals and hunting-pieces, in which he excelled, by giving to his wild animals a strong and spirited expression. He was patronised by Margaret, countess of the Netherlands, for whom he designed subjects for tapestry, and in the service of the emperor Charles V. he painted hunting pieces, in which he introduced the portraits of the emperor and of all his attendants. In a picture of the last judgment, he covered the panel with leaf-gold, before he laid on his colours, and thus preserved them from changing, and gave to his tints a heightened lustre. This method is said to have produced a happy effect, particularly in the sky. He died in 1540; the time of his birth is not known. *Pilkington.*

BERNARD, SOLOMON, an ingenious engraver, was a native of France, and resided chiefly at Lyons. He worked chiefly for the bookseilers, and his engravings were designed with spirit, and executed in a clear, neat style. He appears by his works to be a man of great genius, and fertile invention. His most esteemed performance is a set of prints for the Bible. He flourished from 1550 to 1580. *Strutt.*

BERNARD, FRANCIS, doctor in medicine, was principal physician to King James II., and in considerable practice. He left a large collection of scarce and valuable books, which was sold in 1698, the year after his death, for 1600*l.* His brother Charles, who was surgeon to the princess Anne, and who had the same passion for collecting books, left also a curious library, which was sold by auction in 1711. The "Specchio della Bestia trionfante," by Jordano Bruno, an Italian atheist, which was in this collection, was sold, as we learn from the *Spectator*, N^o 389, for 30*l.* This book was printed, Ames says, in England in 1584, by Thomas Vantrollier. An English edition of it was printed in 1713. *New Gen. Biog. Dict.*

BERNARD, CHRISTOPHER. This surgeon, who lived in the beginning of the 18th century, is only known as the author of two books, very popular in their time, though now in little request. "The present state of surgery, with some remarks on the abuses committed in it," London, 4to. 1703. "The crafts and frauds of physick exploded, discovering the low prices of the best medicines," 8vo. 1703. *Halker. Bib. Med.*

BERNARD, *St.* in *Geography*, a town of Germany, in the archduchy of Austria, 2 miles N. W. of Horn.—Also, an island of North America, in the lake of Nicaragua.

BERNARD, south end of a small sand between Southwold and Leostoff, on the coast of Suffolk, the north end of which is called "Newcomb," about a mile from the shore, within which small vessels may pass in good weather and a full sea.

BERNARD *River*, a river on the west coast of France, which falls into the bay within the island of Belleisle.

BERNARD'S *Bay*, lies on the N. W. side of the gulf of Mexico. The passage into it, between several islands, is called Pasco de Cavallo. N. lat. 28° 30'. W. long. 96° 16'.

BERNARD, *Great St.*, a mountain which is a branch of the Alps (the Alpes Penninæ of ancient writers), that separates the Lower Vallais from Savoy, and particularly from the duchy of Aosta, in the principality of Piedmont, and from which flows into the former country the river Drance, and into the latter, the Doire. On the summit of this mountain is the monastery of St. Bernard (see BERNARD), supposed to be 8006 feet above the level of the Mediterranean. N. lat. 45° 48'. E. long. 7° 2'. It was by this track that Hannibal is supposed to have conducted the Carthaginian army into Italy;

Italy; and it was in the same direction that Bonaparte, the consul of France, led his army of reserve over the Alps, previously to the battle of Marengo, in the year 1800.

BERNARD, *Little St.*, a part of the Alps, anciently *Alpes Graia*, separating the duchy of Aosta from Savoy, and lying to the south-west of the former. Over this lies a road into Savoy, and upon it is a monastery or hospitalium for the convenience of travellers.

BERNARD the Hermit, in *Entomology*, the name by which *Cancer hermitus* is very commonly known. This creature is also called the hermit crab; a name indiscriminately applied to all the parasitical species of the cancer genus; or, in other words, to all those which, having no shells covering to protect the body, inhabit the shells of whelks, or other testaceous animals. See *PAGARUS Fabr.*

BERNARDI, STEFFANO, in *Biography*, was a learned theorist in *Music*, as well as composer of madrigals and madrigals of a most laborate and correct kind. He flourished from 1611 to about 1634, and in 1623 was maestro di cappella of the *Duomo* at Verona. He published a didactic work, called "Porta Musicale," the first part of which appeared at Verona, 1615, in quarto; and, as an elementary tract, it has the merit of clearness and brevity.

BERNARDIA, in *Botany*. See **ADELIA**.

BERNARDIN, in *Biography*, a Romish saint, denominated *St. Bernard*, was born at Massa, in Tuscany, in 1380, according to Mr. Warton, but in 1383, according to M. Du Pin. After studying at Siena, he entered into the confraternity of the hospitallers of la Scala, and distinguished himself by his attendance on those who were afflicted with the plague. In 1404 or 1405, he became a member of the Franciscan order, and afterwards an eminent preacher. Besides the natural and acquired talents which he possessed, the power of working miracles was ascribed to him both during his life and after his death. He visited Jerusalem under the character of commissary of the Holy Land, and after his return visited several cities of Italy, where he preached with great applause. Being accused to pope Martin V. for maintaining some erroneous opinions, he explained himself to the satisfaction of the pontiff, and was absolved. Such were his humility and self-denial that he refused several bishoprics, and contented himself with the office of vicar-general of the observance of St. Francis in Italy, and as such, reformed, or newly founded 200 monasteries. He died at Avignone in Abruzzo in 1444, and was canonized in 1450 by pope Nicholas V. He left several works, which were printed at Venice in 1593, 4 vols. 4to.; and at Paris in 1636, 2 vols. fol. They consist of religious treatises, sermons, commentaries on the Apocrypha, &c. *Du Pin. Gen. D. t.*

BERNARDIN, or *Bernardin*, in *Geography*, a mountain of Switzerland, being part of the Alps, separating the district of Rhodwalden from the valleys of Calanca and Misox. In the mountain springs the river Musia, which flows down the Val Misox. It Horna is a town with the *Castello*, *low Bernardin*.

BERNARDINI, or **BERNARDITES**, in *Theology*, a sect of Heretics, the name of a religious order, differing very little from the Cistercians. They derived their name and order from St. Bernard, abbot of Clairvaux, who was considered as the second parent and founder of the Cistercians (see **BERNARD**). Their usual habit is a white gown, with a black scapulary; but when they officiate, they put on a large white hood with great sleeves, and a hood of the same colour.

BERNARDO, St., in *Geography*, an island, or rather group of islands in the South sea, called *St. Bernardo* of Mendana, and supposed by M. Fleureau, in his "Description of the French in 1768 and 1769, &c." to be Mr. Byron's "Isles of Danger." Mendana says, that St. Bernardo is in S. lat. 10° 30', and 1400 (Spanish) leagues from Lima, i. e. allowing

Lima to be in W. long. 77° 50', and 1400 leagues in the latitude of 10° 30' to make 81° 30' of longitude, the longitude of St. Bernardo will be about 159° 20'. But the situation of St. Bernardo may be more accurately determined from that of the Marquesas, placed by Capt. Cook, in his second voyage, in W. long. 139° 9'; for Figueroa says, that Mendana sailed west 400 (Spanish) leagues from the Marquesas, before he made St. Bernardo; and 400 Spanish leagues in the lat. of 10°, making 23° 13' difference of longitude; if this be added to 139° 9', we shall have 162° 22' W. for the longitude of St. Bernardo. Com. Byron places the Islands of Danger in S. lat. 10° 58', and W. long. 160° 53'; but Mr. Wales, who collated and published the astronomical observations which were made in Hawke's worth's voyages for the Board of Longitude, reduces this longitude to 165° 59' W., exceeding that of Mendana only by 3° 37'. Mr. Fleureau joins M. Pingré (see "Memoire sur le Transit de Venus," Paris 1767, p. 51.) in thinking that this island is not the same with that which Quiros saw, and called St. Bernardo, in 1605; but Mr. Dairymple thinks that they are the same; and it is probable that Quiros thought so; for in enumerating *his own* discoveries to that monarch (see "Dairymple's collection," vol. i. p. 145.) he omitted this island, whence it may be inferred, that he thought it to be a discovery which belonged to another person.

BERNARDO, *St. de Tarijah*, a town of South America, and principal of the district of Chicas, or Tarijah.

BERNARDSTOWN, a township in Somerset county, New Jersey, America, containing 2377 inhabitants, including 93 slaves.—Also, a township in Hampshire county, Massachusetts, containing 691 inhabitants; distant 110 miles W. from Boston.

BERNASCONI, ANDREA, in *Biography*, born at Verona, but who resided chiefly at Venice, was a pleasing and graceful composer. He flourished at the same time as Haffé, and though inferior to him in force and resources, it is said that Faustina, the wife of Haffé, used to prefer the melodies of Bernasconi. He resided long at Munich, in the service of the elector of Bavaria, where he died about the middle of the 17th century.

BERNASCONI, La Signora, daughter of the composer of that name, arrived in England, 1778, as first woman at our lyric theatre, when Pacchiorotti appeared there for the first time. She had gained considerable reputation as an actress at Vienna, in the part of Eurydice, when she sang with Mallico in Gluck's *Orfeo*, which had such great success from its novelty of style; that after being part of this success to the Bernasconi's vocal powers, we expected more than we found. And little is to be said of her as a performer, except that she had a neat and elegant manner of singing, though with a voice that was feeble, and indistinct.

BERNAU, in *Geography*, a town of Germany, in the archduchy of Austria, 5 miles South of Wels.—Also, a town of Germany, in the circle of Upper Saxony, and middle mark of Brandenburg, surrounded with walls, ramparts, and outworks, containing three churches; the principal manufacture of which is beer, of which large quantities are brewed in this town; 14 miles N. N. E. of Berlin.

BERNAVILLE, a town of France, in the department of the Somme, and chief place of a canton, in the district of Doullens, 2 leagues south-west of Doullens. The population of this town consists of 984, and that of the canton of 9994 persons. The territorial extent contains 1851 hectares, and 27 communes.

BERNAY, a town of France, and principal place of a district, in the department of the Eure; 7½ leagues west of Evreux. Its population amounts to 6142, and that of the canton to 14,957 persons. Its extent in kilometres is 107½, and

and it contains 21 communes. N. lat. 49° 6'. E. long. 0° 50'.

BERNBURG, in Latin *Bernburgum*, *Arctopolis*, and *Ursopolis*, a town of Germany, in the circle of Upper Saxony, the capital of Anhalt Bernburg, and the residence of the prince, seated on the Sala. It is divided into the Old and New Town, which had each its own magistracy, till they were united in 1560; besides which, there is a third part, called "Vordenburg," seated on a hill on the other side of the Sala, under a distinct magistracy. The church in this part serves for the castle and the court. The castle is one of the most ancient and most celebrated fortresses in the principality of Anhalt; 20 miles west of Dessau. N. lat. 51° 55'. E. long. 12° 36'.

BERNCASTEL, a town of Germany, in the circle of the Lower Rhine, and electorate of Treves, and chief place of a canton, in the district of Treves, and department of the Sarre, seated on the Moselle, and owing its privileges to the emperor Rodolphus I.; 8 miles E.N.E. of Treves. Its population includes 1263, and that of the canton 11,718 persons. It contains 34 communes. N. lat. 50° 1'. E. long. 6° 36'.

BERNE, a township of America, in Albany county, New York. According to the state census of 1796, there appear to be 477 electors.

BERNECK, a town of Germany, in the circle of Franconia, and principality of Bayreuth.

BERNECOURT, a town of France, in the department of the Meurte, and chief place of a canton in the district of Pont-a-Mousson, 3 leagues S. W. of Pont-a-Mousson.

BERNERA, or **BERNERAY**, one of the western islands of Scotland, is only about four miles in length, and one and a half in breadth. The soil of it is sandy, but when well manured proves extremely fertile, and produces some fine corn and clover pastures. It has a freshwater lake, called Lochbruis, which has some small islands, and abounds with eels. These are frequently caught in great numbers by the inhabitants, who resort in the night, with lights, to a small rivulet, where the eels are found going towards the sea. They are often caught twisted together in heaps. The tides of the sea often produce very singular effects round this island. In their ordinary course the flood runs east in the Frith, where Bernera lies, and the ebb runs west; the sea ebbing and flowing regularly for four days before, and as long after the full and change of the moon. The spring tides commonly rise to the height of 14 feet perpendicular, and the others proportionably; but for four days before and after the quarter moons, there is a singular variation; at those times the tide runs eastward for twelve hours successively, from nine o'clock in the morning till nine at night, when the current turns, and runs westward for the twelve following hours. Thus the reciprocations continue; one flood and ebb running eastward, and another westward, till within four days of the full and change of the moon, when they resume their ordinary course, running east during the six hours of flood, and west during the six hours of ebb. There is another phenomenon in these tides equally remarkable. Between the vernal and autumnal equinoxes, the tides about the quarter moons run all day to the east, and all night to the west; and during the other six months, their course is reversed, being westward in the day, and eastward in the night. The number of inhabitants in Bernera and the isle of Pabbay, which lies between the former and Harris, was 494 in the year 1792. W. long. 7° 30'. N. lat. 67° 45'. The Rev. Mr. McLeod's Account in Sir J. Sinclair's Statistical History of Scotland.—Also, a town of Scotland, in the county of Inverness, in which are barracks; 32 miles N.W. of Fort William.

BERNESSO, a town of Piedmont, in the district of Coni, 4½ miles W. N. W. of Coni.

BERNEVILLE, a town of France, in the department of the Straits of Calais, and chief place of a canton, in the district of Arras, 4 miles S. W. of Arras.

BERNEUT BAY, lies at the point of Quiberon, on the coast of France.

BERNEX, a town of Savoy, 2½ miles N. N. E. of St. Julien.

BERNHARDUS, in *Entomology*, a species of **CANCER**, with heart-shaped, muriated hand claws; that on the right side largest. Inhabits whelks, &c. common on most sea-shores. See **BERNARD the Hermit**.

BERNHARTS, in *Geography*, a town of Germany, in the archduchy of Austria, 7 miles E. S. E. of Feldsburg.

BERNI, or **BERNIA**, **FRANCIS**, in *Biography*, an Italian poet, was a descendant of a noble but indigent family of Bibiena, in Tuscany, and born at Campovecchio about the close of the 15th century. He passed the first 19 years of his life in poverty at Florence; and though he was afterwards patronized by cardinal Bernardo of Bibiena, Angelo, and Giberti, bishops of Verona, his love of unrestrained liberty, and inclination to pleasure and raillery, prevented his deriving any permanent advantage from their patronage. At Rome, however, he was greatly esteemed by the literati, and was one of the most illustrious members of the famous academy "De Vignajuoli." At length, he retired to Florence, and subsisted on a canonry in the cathedral, under the protection of cardinal Hippolito de' Medici, and duke Alexander. It has been said, that he was taken off by poison, because in a quarrel between these two princes, he refused to comply with the desire of one of them, who requested him to administer poison to the other. The æra of his death, as well as the truth of this story, are uncertain: it has been fixed by some to the year 1536; but others have supposed that he lived to a later period. Mr. Roscoe, in his "Life of Lorenzo de Medici," says, that he cultivated a branch of poetry (a kind of burlesque) with so much success, that it has from him obtained the name of "Bernesche." The characteristic of this species of poetry is an extreme simplicity, which the Italians denominate "ideotismo." The most extravagant sentiments, the most severe strokes of satire, are expressed in a manner so natural and easy, that the author himself seems scarcely to be conscious of the effect of his own work. Perhaps the only indication, says Mr. Roscoe, of a similar taste in this country, appears in the writings of the facetious Peter Pindar. Berni, though he seems to have blotted and corrected much, has nevertheless not been sufficiently careful in expunging licentious images, and free equivoque; and his wit is often mere buffoonery. One of his principal performances, was the recomposition of Boiardo's "Orlando Innamorato," which he has rendered much more pure and poetical. The best edition of it is that of Venice, in 1545. His other poems were collected and published, with those of other burlesque writers, in 1548, in 2 vols. 8vo. and reprinted at London in 1721 and 1724, after the edition of Venice. Berni was a caustic satirist, and the avowed enemy of Peter Aretin, whose life he wrote in a strain of bitter invective. He excelled in Latin poetry, and imitated the style of Catullus with success. Gen. Biog.

BERNICIA, in *British Geography*, one of the kingdoms of the Saxon heptarchy. Although the Saxons, soon after the landing of Hengist, had been planted in Northumberland, their progress was slow in overcoming the obstinate resistance with which they were opposed, and none of their princes for a long time assumed the appellation of king. At last, in 547, Ida, a Saxon prince of great valour, who claimed a descent, as did all the other princes of that nation, from Woden, brought over a reinforcement from Germany, in

ships, which arrived at Flamborough, and enabled the Northumbrians to carry on their conquests over the Britons. He entirely subdued the country, now called Northumberland, the bishopric of Durham, as well as the counties of the Merse and the three Lothians, or the whole eastern coast of the ancient Roman province of Valentia; and assumed the crown under the title of king of Bernicia. About the same time, Ælla, another Saxon prince, having conquered Lancashire, and the greater part of Yorkshire, or all the country between the Humber and the Tyne, founded another little state in these parts, which was called the kingdom of "Deira," or "Deiri." These two kingdoms were united, not long after, in the person of Ethelfrid, grandson of Ida, who married Acca, the daughter of Ælla; and expelling his brother Edwin, established one of the most powerful of the Saxon kingdoms, by the title of *Northumberland*, which see. See also *HEPTARCHY*.

BERNICLE, in *Cornology*. See **BARNACLE**.

BERNICLE, in *Ornithology*. See **BARNACLE** *supra*.

BERNIER, FRANCIS, in *Biography*, called the *Mogul*, from his long residence in the court of that prince, was born at Angers in France, about the year 1630. After receiving a liberal education, and taking his degree of doctor in medicine at Montpellier, he went, in 1654, to Palestine, and thence to Egypt. At Cairo he resided about twelve months, and having examined the pyramids, and every thing there deserving attention, he embarked at Suez for the kingdom of the Mogul, and was engaged by Aurengzebe as his physician, in which office he continued, attending that prince in his expeditions for the space of 12 years. Desirous at length of revisiting his native country, and obtaining leave of the Mogul, he returned to France in 1670. He now employed himself in digesting and arranging the observations he had made in his travels, and published in succession, in French, the history of the last revolution of the states of the great Mogul, a letter on the state of Hindoostan, and memoirs and particular observations. These were collected and published together, in 1699, at Amsterdam, under the title of "Voyages de Francois Bernier, contenant la Description des etats du grand Mogul, de l'Hindoustan, du royaume de Kachemire, &c." 2 vols. 12mo. They are esteemed the most perfect account of those countries extant. Captive princes here, says he, destined to die, were compelled to take daily a preparation of poppy, which kept them in a constant state of drowsiness, until life was gradually and quietly extinguished.

To the abolition of the life of the Indians, he attributes their freedom from gout, stone, catarrh, and quartan fever. Even the lues venereal is here, he says, less malignant than in Europe.

He also published an abridgment of the philosophy of Cassand, and other tracts, contained in various periodical publications. In 1685, he came to England, and after a short residence here, returned to Paris, where he died, Sept. 23, 1688. Haller. Bib. Med. New Gen. Bog. Dict.

BERNIER, JOHN, born at Blois, received the degree of doctor in medicine at Montpellier, in 1647. Not succeeding in his practice, and finding persons whom he esteemed less qualified, in full employment, his writings are filled with satirical reflections on his more fortunate brethren. His principal work is, "Essais de Medecine, ou d'un traite de l'Histoire de Medecine, et des Medecins, &c." Paris, 1699, 4to, to which he added a supplement in 1695. He also published "Histoire de Blois," which is not much esteemed. Also, "Antiquarum, de Romanorum, Pictura, Bonis Mot., et Anecdote," which he filled by the name of Poppejan-court, and a criticism on the works of Rabala, whom he severely censures. Elph. Dict. Hist.

BERNIER, NICHOLAS, an eminent French musician, was

born at Mantes-sur-Seine, and became music-master of the holy chapel at Paris, and afterwards of the chapel royal. He was much esteemed and patronized by the duke of Orleans, who submitted his own compositions to his judgment. By his five books of cantatas, for one and two voices, with the words in part by Rousseau and Fuzelier, he acquired great reputation. He also published "Les Nuits des Sceaux," and a number of motets, which are still admired. He died in 1734. Nouv. Dict. Hist.

BERNIN, in *Geography*, a town of France, in the department of the Here, and chief place of a canton, in the district of Grenoble, 8 miles north of Grenoble.

BERNINI, JOHN LAWRENCE, in *Biography*, a celebrated sculptor and architect, was the son of a sculptor, and born at Naples in 1598. At a very early age, he manifested the inclination of his genius; for upon the removal of his family to Rome, when he had attained only the age of 10 years, he shut himself up from morning till night in the Vatican, for the purpose of copying the master-pieces which it contained. Having about this period wrought a head in marble, that excited great admiration, he was sent for by pope Paul V. who desired him to sketch with a pen the head of St. Paul, in his presence; upon which the young artist designed it so well, that the pontiff recommended him to the care of cardinal Maffei Barberini, as one who might become the Michael Angelo of his age. Stimulated by the encouragement he had received, his application was indefatigable, and his perseverance invincible. To this purpose, it is related concerning him, that after having finished with much attention and assiduity a bust of Scipio Borgheze, the pope's nephew, he discovered a defect of the marble, in the forehead. Upon this he immediately procured another block, and in the interval of 15 nights he executed another to his satisfaction. When the first was exhibited to Borgheze, he could not avoid manifesting his chagrin; but he was agreeably surprised when the second was exposed to his view. Both these are preserved in the villa Borgheze. Among the productions of his youth, we may mention his statues of St. Laurence, and of Æneas carrying off his father at the siege of Troy; and more particularly his David and Goliath, which some have reckoned among his best works. His group of Apollo and Daphne, cut from a single block of marble, and the second not more than half a foot from the first, executed for cardinal Borgheze, at the age of 18 years, has been regarded as the chef d'œuvre of sculpture. It is said, that when Bernini saw these performances of his youth 40 years afterwards, he lamented the little improvement he had made in sculpture during this long course of years. In the pontificate of Gregory XV. Bernini was created a knight of the order of Christ; whence he has been commonly distinguished by the appellation of the "Chevalier Bernini." Upon the accession of his patron Barberini to the pontifical chair, under the title of Urban VIII. Bernini was engaged in executing the project, which he had formed for the embellishment of Rome. The decoration of the place called the "Confession," in St. Peter's, employed him for 9 years, and for this exercise of his art he was liberally rewarded. He also constructed a fountain, displaying the richness of his invention, in the piazza d'Europa; and decorated the great niches of the pillars, which support the dome of St. Peter's; and constructed a grand mausoleum for the pope, which is one of the finest ornaments of that cathedral. So much did this pope inter himself in the welfare of Bernini, that he urged him to marry; accordingly, in 1639, he commenced a matrimonial union, which lasted 35 years, and produced a numerous family. Bernini's reputation was not confined to Rome; but Charles I. of England, hearing of his fame, sent

ever fine picture of Vandyke, from which he made three busts of the king in different aspects, which gave great satisfaction, and were munificently rewarded. A bust of the queen was intended, but on account of the troubles which occurred in England, was never executed. Bernini was invited to Paris by Lewis XIII. just before the death of Urban VIII., and allured by very lucrative proposals; but the pope upon being consulted, said, "that he was made for Rome, and Rome for him;" and this determined his stay. The grand fountain of the piazza Navona, constructed under the pontificate of Innocent X. is reckoned among his master-pieces. The fine portico of St. Peter's was erected by this artist, under the pontificate of Alexander VII. and about this time queen Christina visited Rome, and treated him with singular respect. In 1664, he was consulted by Lewis XIV. of France, in consequence of the recommendation of Colbert, concerning the improvement of the Louvre, and at the age of 68 years yielded to an urgent invitation to visit Paris for this purpose. In his journey thither, he was honoured in various places through which he passed, by the most respectful attention; and after his arrival, he began with making a bust of the king, and while he was sketching his portrait, turned back his curls for a better discovery of his forehead, observing at the same time, with the politeness of a courtier, "that he was a king who might freely shew his face to the whole world." This, it is said, gave rise to a French fashion, denominated "frisure à la Bernini." His design for the completion of the Louvre was not executed. He returned to Rome before winter, and as an acknowledgment of his obligations, for the civility and munificence with which he was treated by Lewis, formed a colossal equestrian statue, representing the king as supported by a rock. Upon its removal to Paris, Girarden changed it, on account of its want of sufficient resemblance to the monarch, into a Curtius leaping into the fiery gulf. Among the remaining works in which he employed himself, the most considerable was the tomb of Alexander VII. in St. Peter's. Whilst he was repairing the old chancery palace, by order of Innocent XI. he was seized with a fever, which terminated in an apoplexy, that closed his life in 1680, in the 82d year of his age. His funeral procession to the church of St. Maria Maggiore was attended by all the nobility of Rome.

The genius of Bernini was singularly fertile and comprehensive; and on a medal struck in honour of him by Lewis XIV. he is characterized as "singularis in singulis, in omnibus unicus," i. e. singular in each, sole in all. Several of his pictures, painted for his amusement, amidst his other occupations, and sufficiently indicating his talents in this department of the arts, are preserved in the Florentine gallery, and the Barberini and Chigi palaces. In architecture he displayed a fine taste and rich imagination, though he is said to have departed from the rules and proportions observed by the ancients. But he owed his highest and most distinguishing reputation to sculpture. D'Argenville, however, observes, in his "Vies des Architectes et des Sculpteurs," that, whilst he wrought marble with a surprising suppleness, admirable taste, and singular graces, he often deviated from truth, and was much of a mannerist; that he abandoned the simple drapery of the Grecian statuary; and that he enveloped his figures with such an assemblage of folds and doublings as to disguise and partly conceal them by the flutter and seeming agitation of their dress. Some of his single busts, or portraits after nature, are much admired, and are said to retain the whole spirit and character of the original. His St. Theresa in ecstasy is thought to surpass all his other works for expression. His own talents he estimated with modesty; but by an enthusiastic attachment to his art, and unwearied

assiduity in the exercise of it, he arrived at that eminence for which he was distinguished, and multiplied his works to such a degree as to occasion its being said, that posterity would be apt to suppose as many Bernini's as Hercules. Encyclop. Beaux Arts, t. ii. p. 1. p. 282. Gen. Biog.

BERNINO, in *Geography*, a mountain of Switzerland, being a branch of the Rhetian Alps, about 26 miles N. E. of Chiavenna.

BERNO, in *Biography*, abbot of Richenon, in the diocese of Constance, flourished about the year 1008, and is celebrated as a poet, rhetorician, musician, philosopher, and divine. Of his works, the principal are his treatises "De Instrumentis Musicalibus;" "De Mensura Monochordi;" and "De Musica seu Tonis;" containing a summary of the doctrines of Boethius, an explanation of the ecclesiastical tones, intermixed with pious exhortations, and the application of the music to religious purposes. His learning and piety recommended him to the special favour of the emperor Henry II. and his endeavours to promote literature were so much encouraged, that his abbey of Richenon was as famous in his time as those of St. Gal, or Cluni, then the most celebrated in France. He died in 1048, and was buried in the church of his monastery.

BERNON, in *Geography*, a town of France, in the department of the Aube, and chief place of a canton, in the district of Ervy; 4 miles S. E. of Ervy.

BERNOULLI, JAMES, in *Biography*, a celebrated mathematician, was born at Basil, December 27, 1654. His father, who was a man of rank and learning, intended him for the profession of a minister, and paid great attention to his education. Having passed through the usual course of preparatory studies, and taken his degrees in the university of Basil, he applied, in deference to his father's wishes, to divinity; but his inclination leading him to mathematics, he made great proficiency in geometry, without any collateral assistance either of teachers or of books, from the use of which his father rigorously restrained him. In reference to this restraint, he took for his device Phaeton driving the chariot of the sun, with this motto, "Invito patre sidera verso," i. e. I traverse the stars against my father's inclination. Notwithstanding the disadvantages under which he laboured, he made such progress in mathematical studies, that he was able, before the age of 18 years, to solve a difficult problem in chronology, or to find the year of the Julian period, when the year of the cycle of the sun, the golden number, and the indiction, are given. In 1676, he began his travels. and at Geneva taught a blind girl to write; and at Bourdeaux composed universal gnomonic tables. Upon his return to his own country, in 1680, he derived great pleasure from the perusal of Malbranche's "Search after Truth;" and Descartes's philosophy: and predicted the return of a comet, of which he gave an account, in a short treatise written in his own language. He soon afterwards travelled into Holland, Flanders, and England; and having completed his peregrinations, he settled at Basil in 1682, and commenced a course of public experiments in natural philosophy and mathematics. In this year he published, at Amsterdam, in Latin, his "Essay of a New System of Comets, in order to calculate their Motions and to foretel their Appearances," 8vo. and in the following year, at the same place, his "Dissertations upon the Weight of the Air;" Lat. 8vo. In 1684, he accepted the professorship of mathematics at Heidelberg, and devoting himself to the assiduous study of these sciences, he took occasion about this time to investigate the analytical system of Leibnitz, contained in some essays on the "Calculus differentialis," or "Infinimens petits;" published in the "Acta Eruditorum;" the extent and
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beauty of which he admired, the principles of which he developed, and the utility of which he discovered, and promoted to such a degree, that this great philosopher, whilst he claimed the honour of the original invention, acknowledged that J. Bernoulli and his brother had a great share in the advantage which the public derived from it, and that no person had made a greater use of this invention than they, and the marquis de l'Hospital. In 1687, he was unanimously chosen to succeed Peter Mejerli, as professor of mathematics at Basil, and he discharged the duties of his office with great reputation, that he greatly contributed to the credit of the university, and to the increase of the number of students. In 1699, he was elected a foreign member of the academy of sciences at Paris, and in 1701, of the academy of Berlin. The memoirs of both these societies were enriched by many of his communications. Several of his pieces were also published in the *Acta Eruditorum*, and the *Journal des Savans*. The gout, brought on by unremitting application, produced a fever, which terminated his life, August 16, 1705, in the 51st year of his age. He ordered a logarithmic spiral to be engraved on his tomb, with this motto, "Eadem mutata retergo," I rise the same, though changed. He was married at the age of 30; and left one son and a daughter. By the exercise of extraordinary powers of invention, and persevering application, he made many valuable discoveries, which improved the method of analysis, the doctrine of infinite series, and the higher department of mathematical investigation; such as the quadrature of the parabola, and the geometry of curve lines, of spirals, cycloids and epicycloids. His works, with their respective titles, are enumerated in the General Dictionary, to which we refer; and they were collected and published in 2 vols. 4to. at Geneva, in 1744. The "*Ars conjectandi*," or the art of forming probable conjectures concerning events that depend on chance, in which he was engaged at the time of his death, and which is not included in the above collection, was printed at Basil in 1713, 4to. To this is added a treatise concerning infinite series. An extract from this valuable treatise, containing the foundation of a proof that has yet been given of sir Isaac Newton's famous binomial theorem, in the first and simplest case of it, or that of the integral and affirmative powers of the binomial quantity $a + b$, left by its great inventor without a demonstration, is included in the 3d volume of the "*Scripturae Logarithmici*," for which we are indebted to baron Niclaus.

BERNOULLI, JOHN, the brother of the preceding, and also celebrated as a mathematician, was born at Basil, July 27, 1667. At the age of 15, he commenced the study of philosophy, and soon after he was sent to Neuchâtel to learn the French language, and the principles of commerce; but preferring intellectual pursuits to a mercantile profession, he returned home at the close of the year, for the prosecution of his studies, and received the degree of doctor in philosophy, by 1685. Instructed by his elder brother in the first rudiments of mathematics, he afterwards, viz. in 1684, when he was only 17 years of age, concurred with him in investigating and explaining the principles of Leibnitz's differential calculus. He also was one of the three mathematicians, the two others being Huygens and Leibnitz, who solved the problem of the catenary curve, proposed by his brother James. In 1690, he set out on his travels; and in the progress of them communicated the discoveries of the new analysis to Daniel Cleric, and Patrice de Duillier, at Geneva, and to the marquis de l'Hospital at Paris. On his return to his own country, in 1692, he commenced a correspondence with Leibnitz, which lasted during the life of the latter. Having declined the professorship of mathematics at

Wolfenbuttle, which was offered him in 1693, he undertook, in 1695, a course of philosophical experiments at Groningen, and was furnished by the curators of the university with the necessary apparatus. About this time he discovered, what has been called the mercurial phosphorus, occasioned, as it is now known, by the friction of mercury against glass, in a partial vacuum; for which Frederic I. king of Prussia, honoured him with a gold medal, and with the rank of member of the academy of sciences at Berlin. He was also a member of the royal society of London, and of other learned bodies. He succeeded his brother James at Basil, in 1705, on which occasion he delivered a discourse, "*De Fatis Nova Analytico et Geometrico Sublimis*," and continued till his death in this situation, though he was solicited to remove to Leyden, Padua, and Groningen. He collected his works in 1713, and printed them at Lausanne, in 4 vols. 4to. His correspondence was extensive, and he was much engaged in a controversy with the English mathematicians concerning the invention of fluxions; in another with Renau, concerning the manœuvring of ships; and in another on mathematical subjects, with Jurin, Brook Taylor, Keil, Pemberton, Herman, and Riccati. In 1730, he gained a prize of the academy of sciences for a memoir on the elliptic figure of the planets, and the motion of their apellia; and in 1734, he received the half prize, jointly with his son Daniel, from the same academy, for a memoir on the physical cause of the inclination of the planetary orbits. Bernoulli died January 1, 1748, in the 81st year of his age, and left four daughters and five sons, three of whom were mathematicians. Fontenelle's *Eloges*. Moreri.

BERNOULLI, JOHN, son of the preceding, was born at Basil, January 17, 1695, and died at Petersburg, July 26, 1726. He was licentiate of law, professor of law at Berne; afterwards professor of mathematics at Petersburg, and member of the institute of Bologna.

BERNOULLI, NICHOLAS, nephew of the two preceding, professor of mathematics at Padua, afterwards of logic, and then of law at Basil, member of the academy of sciences and belles lettres at Berlin, and also of the royal society of London, and of the institute at Bologna, was born at Basil, October 10, 1687, and died there, November 29, 1759.

BERNOULLI, DANIEL, M.D. son of John Bernoulli, was born at Groningen, Feb. 9, 1700. Preferring mathematical to commercial pursuits, he passed the earlier part of his life in Italy, and at the age of 24, declined the presidency of an academy about to be established at Genoa, and in the following year accepted an invitation to Petersburg, where he spent several years. On his return to Basil, in 1733, he was successively professor of anatomy and botany, and of natural and experimental philosophy; and had the honour of being a member of the academies of Petersburg, Paris, and Berlin, and of the royal society of London. In 1724, he published his "*Exercitationes Mathematicae*;" and, in 1738, his "*Hydronamica*." Many other pieces have been published in the memoirs of the academy of sciences at Paris, and in those of other societies. He gained and divided ten prizes from the Parisian academy; and on the division of the prize respecting the inclination of the planetary orbits, his father expressed dissatisfaction; more especially as Daniel had embraced the Newtonian philosophy in preference to that of Descartes, to which he himself maintained his attachment so long as he lived. In 1740, he divided the prize on the tides with Euler and Maclaurin. At Basil he was much respected, not only as a man of distinguished talents, but for his simple and modest manners. Although he paid external respect to the religion of his country, he was charged by his pastors with an excessive freedom of opinion.

which he incautiously divulged. At the age of 80, he retained his mental powers in their full vigour; but from this time they began to decay. He died March 17, 1782. *Nouv. Dict. Hist.*

BERNOUILLI, JOHN, L. L. D. brother of the preceding, was born at Basil, May 18, 1710, and died there, July 17, 1790. He was professor of eloquence, and afterwards of mathematics at Basil, and member of the academies of Paris and Berlin.

BERNOUILLI, JAMES, licentiate of law, member of the physical society at Basil, and correspondent of the royal academy of sciences at Turin, was the son of John Bernouilli last mentioned, and born at Basil, October 17, 1759. His natural talents, for which he was distinguished at an early period, were improved by long assiduous application. On his return from Neufchatel, whither he was sent to study the French language, he was admitted to the degree of master of arts, and devoted himself to the study of the law. In 1780, he made the tour of several cantons of Switzerland, of which an account was published in the third volume of the collection of travels, published at Berlin by John Bernouilli. The study of the law, however, did not divert his hereditary inclination for the mathematics; and in these sciences he made such rapid progress, that in 1780, he was thought qualified to supply the place of his uncle, whose age and infirmities rendered him incapable of continuing his lectures on experimental philosophy, though he did not succeed him in the vacant chair of professor after his death. He had also experienced a similar disappointment in his views with regard to the chair of eloquence in 1780; on which occasion he published his "Theses on the Sublime." After these disappointments, he determined to indulge his taste for travelling, and accepted the office of secretary to count de Breuner, minister of the imperial court of Vienna to the republic of Venice. He still retained his attachment to the mathematical sciences, of which he exhibited proofs to the public in the memoirs of the royal academy of sciences and belles lettres at Berlin, and in those of the royal society of Turin; and as he wished to occupy a station in which he might make use of the knowledge he had acquired, he was recommended by his countryman Mr. Fufs to the princess of Dashkof; and by her influence he was elected adjunct in the academy at Petersburg, with a salary of 600 rubles, and the promise of being promoted in the course of a year. Accordingly, he quitted Venice in 1786, and removed to Petersburg. Here he applied with unintermitting activity to physical mathematics, and was soon honoured with the title of ordinary academician. In the interval of about 2 years, he presented eight memoirs, which were inserted in the six first volumes of the "Nova Acta Academiæ Scientiarum Imperialis Petropolitanae;" which display singular acuteness in analytical calculations. In 1788, he was appointed one of the professors, who instructed the imperial corps of noble land cadets, and to the office of teaching algebra to the two first classes he devoted himself with great zeal and assiduity. In 1789, he married the youngest daughter of Mr. John Albert Euler; but being always of a weak and delicate constitution, he was seized with a fit of the apoplexy whilst he was bathing, on the 3d of July in the same year, which speedily terminated his life, in the 29th year of his age, very much to the regret of those who knew and valued him on account of his scientific talents, and modest, amiable disposition. Besides a variety of mathematical and philosophical pieces, which were published in the "Nova Acta, &c." "Rozier's Journal;" "Mem. de l'Acad. Royale, de Berlin, Ann. 1781;" "Mem. des Corresp. de l'Acad. Royale de Turin, Ann. 1784, 1785;"

"Nova Acta Helvetica, tom. i." and "Leipstick Magaz, &c. Part 1, 1786;" and some distinct treatises; he also translated "Merian's Philosophical Memoirs," from the French into German, 2 vols. *Nova Acta Acad. Scient. Imper. Petropol.* vol. x.

BERNOVITZKOE, in *Geography*, a town of Russia, in the government of Smolensko; 40 miles north of Smolensko.

BERNSTADT, a town of Silesia, in the principality of Oels, on the river Weyda.

BERNSTEIN, a town of Germany, in the circle of Upper Saxony, and new mark of Brandenburg; 4 miles N. E. of Berlinchen.—Also, a town and castle of Germany, in the circle of Bavaria; 2 miles W. S. W. of Gravenau.

BERNSTORF, JOHN HARTWIG ERNEST, COUNT VON, in *Biography*, an eminent statesman, was born at Hanover, May 13, 1712, and possessed distinguished talents, which were cultivated by study at the high school of Tubingen, which he entered in 1727, and by travelling through various parts of Europe, under the learned Keyser. Upon paying a visit to Denmark, Bernstorf was taken into the service of Christian VI. and employed in affairs of state from the year 1732 till the year 1737. In 1742, he was envoy to the diet of that year, and to the court of the emperor Charles VII. and from the year 1744 to 1750, he was ambassador to France. In November 1736, he received the chamberlain's key; in June 1746, he was made a knight of the order of Dannebrog; and in October 1749, he was appointed a privy-counsellor. After his recall from France, in 1750, he formed an intimacy with the prince of Wales at Hanover, who wished him to employ his talents in his service; but by the death of the prince, in 1751, he was released from his engagements; and upon this event he was immediately introduced into the privy-council, and entered on the office of minister for foreign affairs, and first secretary of the German chancery, and in 1752, was admitted into the order of the elephant. To Bernstorf were owing the conduct and execution of those beneficial measures which distinguished the reign of Frederick V. Upon a plan suggested by him, was established, in 1753, the hospital in Copenhagen, for the education of poor boys; and he was appointed president and governor of this patriotic and useful institution, to which he gave a donation of 4000 rix-dollars.

In 1754, he advised the crown to purchase from the East-India company all their possessions, privileges, and merchandize; and by this act he promoted the prosperity of the Danish West India islands, which had suffered from the exclusive right of the company. He also distinguished himself by his activity and zeal in promoting the manufactures of the kingdom, which the king entrusted to his management in 1752, and he thus contributed to increase the population, and to excite a spirit of industry and emulation. He concurred in the designs that were formed for the abolition of slavery in Denmark, by the extinction of commons, and by freeing the farmers from the burthen of personal service. He was also one of the first persons in Denmark who counteracted the general prejudice against inoculation for the small-pox, and who endeavoured to reconcile the people to the practice. Bernstorf was likewise indefatigable in his exertions for promoting the instruction of the poor; and he projected a fund for the encouragement and recompence of meritorious, but poor, schoolmasters; nor was he less solicitous to extend the benefits of education, so as to furnish a supply of competent teachers, for which purpose he proposed to establish a seminary at Altona, in connection with the orphan-house of that city; but adverse circumstances prevented the completion of his design. He also distinguished himself by the protection which he afforded to science, and

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to men of letters. With this view, having been one of the first who discovered the beauties of the "Messiah," he invited the young author, Klopstock, who then resided in Switzerland, to Denmark, and for several years entertained him in his own house. By his influence, Oeder was appointed professor of botany; a botanical garden was established, and the professor was sent on a tour through the Danish provinces, the result of which, was the "Flora Danica," published at the king's expence. Cramer, Mallet, Schlegel, and Pafedow, were also much indebted to his patronage. To Bernstorff Denmark owes the establishment of two useful societies; one, the society of the Danish language and fine arts, founded in 1760; and the other, the royal agricultural and economical society, established in 1769, of which the count himself was president. To him it was principally owing, that a society of learned men were sent, in 1761, to travel in Arabia and the east, at the king's expence, for the purpose of making useful discoveries. In consequence of the important services which he rendered, in various ways, to his sovereign and the state, he was created, in 1767, a Danish count; and he was the only minister who had the honour of attending the king, in 1768, on his tour to England. After their return, however, the count was obliged to resign all his employments, in January 1770, and the king, in acknowledgment of his past services, settled on him an annual pension of 6000 rix-dollars. On this occasion he found it necessary to leave a country to which he had devoted the service of 38 years of his life; and, accompanied by his counsellors and Mr. Klopstock, he repaired, in October 1771, to Hamburg, where he spent the winter. Here he spent his time in social intercourse with his friends, but in the beginning of the year 1772, some rheumatic affections, under which he had laboured for several years, returned with an alarming violence, and terminated in a threatening fever. This fever was succeeded by a fit of apoplexy, which carried him off in a few minutes, on the 18th of February. His remains were interred, without pomp, agreeably to the instructions of his will, at the church of Siebeneiche, on one of his paternal estates. Two medals were afterwards struck in honour of him, by two societies of patriots. Bernstorff possessed a retentive memory, great penetration, and a sound judgment. Learned and accomplished himself, he was the liberal patron of literature and the arts. He was well acquainted with the Italian, French, and English languages; intimately conversant with the laws of nations in general, and attached to the rights of mankind; well informed in the ancient and modern history of different states; and not uninterested in the concerns of religion and the church. He corresponded with many learned men of different countries, and collected a valuable library of select books. His political measures were founded on truth and justice; in his transactions with foreign states he was upright and sincere; and he combined, with a vigilant attention to the privileges of the crown, a constant regard to the rights and liberty of the subject. Gen. Bie.

BERNSTORFF, ANDREW PETER, COUNT VON, the nephew of the former, was born at Gartzow in Lauenburg, August 28, 1735, and at an early period acquired the knowledge of ancient and modern history, as well as of geography, mathematics, natural history, and the ancient languages. His studies were completed at Göttingen. Several of his juvenile years were spent in travelling through England, Switzerland, France, and Italy. Having occupied, after his return, some subordinate stations, he was made a member of the privy-council in 1769; but soon dismissed along with his uncle. Towards the end of the year 1771, after the fall of Struensee, he was recalled; and about the close of

the following year he obtained the foreign department, and was at the same time appointed minister of state, and negotiator of the German chancery; and he was employed in negotiating with Russia the exchange of the Gottorf part of Holstein for Oldenburg and Delmenhorst. In 1776, he was made a knight of the order of the elephant; and in 1780, during the American war, when an order was issued by the British government for intercepting all vessels belonging to neutral powers, laden with naval stores, and bound to any of the enemy's ports, he had an opportunity of exercising his diplomatic talents; and in a note submitted by him to the courts of the belligerent powers, the Baltic was declared a mare clausum; and it was further stated, that the king of Denmark had determined not to grant a passage through the Sound to armed ships belonging to the powers at war. It was also added, that the other northern powers had adopted and professed the same system. In a subsequent note, transmitted to the three belligerent powers, England, France, and Spain, Bernstorff expressed himself in the following terms: "An independent and neutral power never loses, by others being at war, the rights which it had before that war, since peace exists for it with all the belligerent powers without its having to receive or follow the laws of any of them. It is authorized to carry on trade, contraband excepted, in all places, where it would have a right to do so, if peace existed throughout all Europe, as it actually exists in regard to it." Soon after, Denmark and Russia entered into a treaty for the protection of their trade, to which Sweden, Prussia, and other states acceded; and the result was that league formed against Great Britain, known under the title of the "armed neutrality." Towards the end of the year 1780, Bernstorff resigned all his employments, and retired to his estates in Mecklenburg, where he resided till 1784, when he was recalled, and resumed his diplomatic functions: and to his exercise of these, Denmark owed the preservation of peace, when hostilities broke out between Sweden and Russia, in 1788. In 1791, Bernstorff interposed his mediation when the British ministry were preparing to assist the Turks against the Russians, to restore and promote tranquillity. In consequence of the French revolution, his Danish majesty was invited by the courts of Prussia and Vienna to join in the treaty which had been concluded between them. To this proposal Bernstorff replied, in 1792, with considerable address; and in 1793, when his Britannic majesty's envoy extraordinary at Copenhagen presented a note to that court, in consequence of the plan concerted by the allied powers for blockading the ports of France, Bernstorff returned an answer, which was alluded to by the marquis of Lansdowne in the house of lords, February 17, 1794, in the following terms: "The reply of count Bernstorff to our remonstrances, was one of the bold, wise, and most honourable replies I have ever read. It is a state paper, which should be kept as a model by every cabinet of Europe." The conduct of Bernstorff was highly satisfactory to his fellow citizens; various institutions were distinguished by his name; and medals were struck to perpetuate the remembrance of his services. At length, he fell a victim to the gout, to which he had been subject for many years, and which baffled all remedies, on the 21st of July, 1797; and his remains were interred with great pomp, and amidst numerous attendants, who lamented the loss of him, in Frederic's church at Christian Haven.

His figure was agreeable, and his countenance engaging, his disposition lively, and his conversation natural. In business he was active and indefatigable; in conversation communicative and concise; aversive from flattery, and yet respectful in his behaviour; sparing of professions and promises, and

punctual in performing them; prudent in his plans, and firm and zealous in executing them. His memory was tenacious, his benevolence extensive, his reverence of the Deity unfeigned, and his attachment to the Christian religion unwavering. Gen. Biog.

BERNUS, in *Geography*, a mountain of European Turkey in Macedonia; 10 miles S.E. of Saloniki.

BERNY, a town of France, two leagues south of Paris.

BEROALDO, PHILIP, the *Elder*, in *Biography*, was born at Bologna in 1453, and at the age of 19, became professor of the belles lettres in his native city. He also read lectures at Parma, Milan, and Paris, and at the latter place, or, as some suppose, Perugia, he held a public school of eloquence. But, recalled by his countrymen, he renewed his scholastic labours at Bologna with such reputation, that he had 600 hearers at a time. To the study of polite literature, he added those of philosophy, medicine, and jurisprudence; and he also engaged in public employments assigned to him by his country. His disposition was convivial, and his conduct not exempt from the charge of licentiousness, before his marriage in 1498. By his good humour he escaped or conciliated literary contests, and maintained an uninterrupted intercourse with the greatest number of learned persons of the age in which he lived. He died in 1505. His commentaries and notes extended to all the Latin writers of eminence; and are more distinguished by their erudition, than their elegant taste and sound criticism. With the more obscure authors of antiquity he was particularly conversant, and he took pleasure in reviving the use of words that were barbarous or obsolete. Besides his commentary on the "Golden Ass of Apuleius," printed in 1501, and affording a specimen of his manner, he published a great number of his own orations, letters, poems, and other works, of which a collection was printed at Basil in 1513. Most of his observations on authors are contained in Gruter's *Thesaurus Criticus*. Moreri. Gen. Biog.

BEROALDO, PHILIP, the *Younger*, nephew of the former, was a native of Bologna, and professor of belles lettres in the university of that city, and afterwards at the Sapienza in Rome. In 1516, he was appointed librarian of the Vatican by Leo X., but about two years after, before he took regular possession of the office, with its emoluments, he died at the age of about 40 years. His Latin poems, by which he acquired great reputation, are published with those of his uncle, to which they are prefixed, in the first volume of the "Deliciae Poetarum Italarum." A collection of his elegies and epigrams, in 3 books, was published at Rome in 1530. His Latin version of an oration of Licoerates, and notes on the first five books of the *Annals* of Tacitus, were published by order of Leo X. Nouv. Dict. Hist.

BEROE, in *Entomology*, the name assigned by Cramer, to the species of *PAPILIO Europa* of Fabricius and Gmelin.

BEROS, in *Natural History*, the name of a species, *MEDUSA (Pileus)* in Aët. Helv. Berœ with an octagonal body, and very long tentacula, Gronovius.—Berœ is also the name under which *medusa infundibulum* (Müll. and Fabr.) is figured and described in Brown's *Hist. Jam.*—Linnaeus, in the tenth edition of his "Systema Naturæ," calls it *medusa berœ*, and in the twelfth, *volvox (Berœ) ovatus, angulis ciliatis novem*.

BEROE, in *Mythology*, one of the nymphs, who, according to Virgil, was companion to Cyrene, the mother of Aristæus. Berœ was also the name of the nurse of Semele.

BERŒA, BERRHOÏA, or BERÆA, in *Ancient Geography*, *Cera-ventia*, a large and populous city of Macedonia, south-west of Ægæ or Edeffa, north-west of Pella, and east of Cyrhus, at the foot of mount Bermius. Under the Greek Chris-

tian empires, it became the see of a bishop. This was the city to which Paul and Silas fled from Thessalonica, where they found a synagogue of Jews and proselytes, who are commended for their unprejudiced and impartial investigation of divine truth, and where, in consequence of this disposition, they gained many converts to Christianity. Acts, xvii. The medals of this city are bronze, gold, and silver.—Also, a town of Syria, between Antioch and Hierapolis, which some have supposed to be the modern Aleppo, anciently called Chalep. (See ALEPPO.) In the collection of Dr. Hunter, there was a bronze medal of this city, with a legend and a dolphin twisted about a trident. At this city there were struck Imperial Greek medals in honour of Trajan, Antoninus, and Adrian.

BEROLHEIM, in *Geography*, a town of Germany, in the circle of Franconia, and principality of Anspach, seated on the Airmuhl, with 2 churches, 5 miles west of Weissenburg.

BEROLINENSIS, in *Entomology*, a species of *CANTHARIS*, of a black colour: base of the antennæ, and wing-cases yellowish; tip of the last black; legs ferruginous. Herbit.

BEROLINENSIS, a species of *CURCULIO* that inhabits Europe. It is whitish, varied beneath; thorax rugose, black, sides variegated; on the wing-cases, two undulated black bands. Herbit.

BEROLINENSIS, a species of *CRYPTOCEPHALUS*, (*Crioceris*) found in the vicinity of Berlin. The head and thorax are scarlet and glossy; wing-cases granulated, black; eyes of the same colour; legs fulvous. Herbit.

BEROSUS, in *Biography*, a famous ancient historian, was a native of Babylon, and priest of the temple of Belus, and flourished about the time of Alexander. Tatian informs us, that he dedicated his work to Antiochus Theos, the third king after Alexander. While the Macedonians were masters of Babylon, he learned of them the Greek language, and passing from Babylon to Greece, settled in the island of Cos, and there opened a school, in which he taught astronomy, and astrology. From Cos he removed to Athens, where he acquired such reputation by his astrological predictions, that the Athenians erected to him a statue in their gymnasium, with a golden tongue. (Vitruvius, lib. ix. c. 7.) The ancients cite three books of his history of the Chaldeans of Babylon, of which Josephus, Alexander Polyhistor, and Eusebius, have preserved some fragments, that are useful in forming the series of Babylonian kings. Josephus says, that he agreed with Moses in his accounts of the deluge, the fall of man, and the ark, in which the restorer of mankind was saved: and adds, that he mentions the descendants of Noah and their respective ages, to Nabulasser, king of Babylon; and that, relating the actions of that prince, he speaks of the taking and burning of Jerusalem by his son Nebuchadonosor, on which occasion, says he, the Jews were carried captives to Babylon, whence ensued the desolation of that city for 70 years, till the time of Cyrus. He is quoted by Pliny, Tatian, Clement of Alexandria, Tertullian, Vitruvius, and Eusebius; whence we may infer, that he was esteemed a writer of authority. In the series he gives us of the ten kings, whom he supposes to have reigned at Babylon before the flood, there are some small variations in the authors who have transcribed that historian. These ten successions exactly answer to the ten generations from the creation to the flood: the first king, by name Olorus or Alones, has been supposed by some to be the same with Adam, by others Nimrod, as Xisuthrus, the last in the series, plainly appears to be Noah. Pliny (H. N. l. vi. c. 55. l. vii. c. 31 and 37.) informs us, that his book contained the astronomical observations of 480 years, commencing from the

ria of Nabonassar. Annius, a monk of Viterbo, published a work under the name of this historian, full of fables, which obtained some credit among the learned, but was soon recognized to be a forgery. Berofus is said to have had a daughter who uttered predictions like himself, and became the Cunean sibyl. Brucker's Hist. Phil. by Ersfeld, vol. i. p. 34. Bryant's Analysis, vol. iii. p. 25, &c. Fabricius, Bib. Græc. vol. xiv. p. 175.

BEROSUS, in *Ancient Geography*, a mountain of the Tauric Chersonesus, south of mount Trapæzus. This chain of mountains comprehends, according to M. Pnyssonnel, the mountains now called "Tehadir-dagi," the highest of the whole peninsula, and those of "Balyklava," and "Cabarta."

BEROTH. See BEROETH.

BEROTHA, or BEROETH, a city situated on the northern frontiers of Palestine: supposed to be the same with "Berotlai," one of the cities of Hadadezer, which David took, and in which he found much brass. (2 Sam. viii. 8.) According to some, this was Berœe of Syria, according to others, Berytus of Phenicia, or the same that is mentioned by Ezekiel (ch. xlvii. 16.) between Hethalon and Emefa.

BÉRQUET, in *Commerce*, a weight of 173 pounds, by which hemp and other goods are sold in Russia.

BERQUIN, LOUIS DE, in *Biography*, was born in Artois about 1490, and was much esteemed at the court of France, where he obtained the title of king's counsellor. Although he does not appear to have left the Catholic church, or joined the Lutherans, he followed the example of Erasmus, in declaiming against the ignorance and superstition of the clergy. Having incurred the charge of heresy by his publications, which were chiefly books of Erasmus, and extracts from his works and those of others, with his own notes, he was twice prosecuted; but in the first instance acquitted, and in the second condemned, unless he retracted his errors, and gave satisfaction, to be burnt. His spirit was resolute, and he demurred against submission; his judges, however, desirous of saving him, deferred the execution of the sentence; and upon the return of Francis I. from Spain, he was set at liberty. But Berquin, though dissuaded from it by Erasmus, publicly accused his enemies, Noel, Beda, and others, of irreligion; and upon a third prosecution, he was sentenced to make a public recantation, and to suffer perpetual imprisonment. Refusing to acquiesce in this sentence, because it implied an acknowledgment on his part, that his sentiments were erroneous, he was condemned as an obstinate heretic, and accordingly strangled on the Grève, a public place near the Seine, appropriated to bonfires and the execution of criminals, and afterwards burnt. He suffered death with great constancy in April 1529; and though the monk who attended him intimated that he discovered some signs of abjuration at the stake, Erasmus ascribes the suggestion to the fraud and falsehood usually practised on such occasions. Berquin was a person of great abilities, invincible fortitude, and irreproachable character. Gen. Dict. Jortin's Life of Erasmus, vol. ii. p. 476-478.

BERRA. See BERIA.

BERRÉ, in *Geography*, a town of France, in the department of the mouths of the Rhone, and chief place of a canton, in the district of Aix, situated at the mouth of a river, running into the lake of Martigues, called "the lake of Berré," in an island of the channel. It was formerly one of the strongest towns of Provence. It was taken after a long siege, in 1511, by Charles Emanuel, duke of Savoy, during the wars of the League; and when the rest of the province submitted to Henry IV., he could not drive the Savoyards from Berré, till it was given up in 1593, in consequence of the peace of Vervins; 41 leagues S.W. of Aix. The po-

pulation of the town is estimated at 1800, and of the canton at 6769 persons. The territory comprehends 257½ kilometres, and six communes.

BERRĒA, in *Ancient Geography*, Bra, a town of Bulgaria, 10 or 12 leagues from Philippopolis, upon the river Braea.

BERRĒTINI, PETER, commonly called *Pietro da Cortona*, in *Biography*, an eminent painter of history and landscape, was born at Cortona, in Tuscany, in 1596; and acquired the first rudiments of his art under Andrea Commedi, and Baccio Ciarpi. At Rome, whither he went in his youth, he studied the antiques, in the works of Raphael, Buonarroti, and Polidoro, with such diligence, that he attained to great excellence as an artist. At this early period, he was patronized and employed by the marquis Sacchetti; and in his palace, he painted the "rape of the Sabines," and the "battle of Alexander," which were much admired for invention, disposition, elevation of thought, and an excellent tone of colour, and deemed to be equal to the performances of the best masters. His fame was completely established at Rome, by the saloon of the Barberini palace, and by several works in the Vatican, and in some of the principal churches of the city. For further improvement, he travelled through Lombardy and Venice; and returning by way of Florence, he was employed by the grand duke Ferdinand II. in decorating some rooms in the Pitti palace, with pictures of virtuous and heroic actions from ancient history. At Rome, where he afterwards resided, he adorned the gallery of the palace of Innocent X. on the piazza Navona, with various subjects from the *Æneid*; and as an architect, in which profession he excelled, he gave designs for a number of churches, palaces, chapels, and monuments. To the church of St. Martina, which was of his own construction, he left a large sum for the erection of a grand altar-piece of bronze, and of his own mausoleum. Pope Alexander VII. was so well satisfied with the portico he built for the church of Peace, that he made him a knight of the golden spur, and gave him a rich cross, appendant to a gold chain. In his more affluent and more humble condition, Berretini displayed the same equanimity, and uniformly maintained a respectable character. The gout, to which he was subject, disabled him, towards the close of life, from undertaking any great works, and at length confined him to his bed. He died at Rome in 1661. "As an artist, his character was richness of invention, with grace, beauty, and facility of execution. His dispositions are fine, his management of lights good, and his ornaments and back-grounds charming; but his drawing is incorrect, his figures defective in expression, and too much alike. His fresco paintings were uncommonly brilliant and clear. He succeeded better in great compositions than in small. An Italian writer has said of him, that "he had fire in his colours, vehemence in his hands, and fury in his pencil." Besides his capital works in the palazzo Sacchetti, the Barberini palace, and the palazzo Pitti at Florence, there is, in the palace of the king of Sardinia at Turin, a small sketch representing the "Annunciation of the Virgin," which is touched with exquisite skill and spirit, and in the palace of the prince della Torre, at Naples, there is an incomparable picture of the "Flight into Egypt." The design is correct; the heads are wonderfully graceful; the composition is extremely fine, and the colouring is excellent. Many of his works have been engraved by the best artists. D'Argenville Vies des Peintres. P. d'Argenton.

BERRĒTONI, NICOLÒ, an historical painter, was born at Macerata in 1617, and under Carlo Maratta, whose disciple he was, he studied design and colouring for some years, and became so distinguished as a painter, that he was called the

slavouty

jealousy and envy even of his master. His early works, after he quitted the school of Maratti, were in the style and taste of Guido; a circumstance which, of itself, highly recommends them. He died in 1682. Pilkington.

BERRHŒA, in *Ancient Geography*. See **BERŒA**.

BERRHŒA, a town of Thrace, between Nicopolis of Mœsia, and Philippopolis of Thrace. Ammianus Marcellinus speaks of it as a large city.

BERRIMAN, **WILLIAM**, in *Biography*, a learned English divine, was born in London in 1683, and from Merchant Taylors' school was removed, at the age of 13, to Oriel college, Oxford, where he prosecuted his studies with great assiduity and success. With a view to the critical examination of the Scriptures, he combined with skill, in the Greek tongue, the study of the Hebrew, together with the Chaldee, Syriac, and Arabic; and in explaining the sacred writings, he had recourse to the rules of grammar, criticism, logic, and the analogy of faith. The articles of doctrine and discipline, which he deduced from the scriptures, he traced through the primitive church, and confirmed by the evidence of the fathers, and the decisions of the more generally received councils. After he left the university, where he was graduated M.A. in 1711, he served two churches in London. His first appearance in print, was on occasion of the Trinitarian controversy, in 1719, when he published "A reasonable Review of Mr. Whitton's Account of Primitive Doxologies," which was followed in the same year by "A second Review." These performances recommended him to the patronage of Dr. Robinson, bishop of London, who, besides conferring upon him a living in the city, and appointing him his chaplain, left him at his death the fifth part of his large and valuable library. In 1722, he accumulated, at Oxford, the degrees of bachelor and doctor in divinity. In the years 1723 and 1724, he was appointed to preach lady Moyer's lecture in defence of the commonly received doctrine of the Trinity, and his eight sermons, delivered on this occasion, were published, in 1725, under the title of "An Historical Account of the Trinitarian Controversy." In consequence of this service, he was elected, in 1727, a fellow of Eton college. His "Historical Account" contained some observations relating to miracles, and drew upon him the animadversions of Dr. Conyers Middleton; in answer to which, he published, in 1731, "A Defence of some passages in the Historical Account." By his "Brief Remarks on Mr. Chandler's Introduction to the History of the Inquisition," printed in 1733, and followed by a "Review of the Remarks," he incurred the charge of favouring the principles of intolerance, and in this controversy he incurred the severe strictures of that acute and learned nonconformist. His next publication was his course of sermons at Boyle's lecture, preached in the years 1730, 1731, and 1732, and given to the world in 2 vols. 8vo. in 1733. In this work he states the evidence of our religion from the O. T.; vindicates the Christian interpretation of the ancient prophecies; and points out the historical chain and connection of these prophecies. In the preface, he asserts the authority of Moses, as an inspired historian and law-giver. Besides the writings already enumerated, Dr. Berri-man printed a number of occasional sermons. He departed this life at his house in London, on the 5th of February 1749—50, in the 62d year of his age, and in his funeral sermon, preached by Mr. Ridley, a great character is given of him, both as a minister of his parish, and as a private Christian. His piety was unaffected and sincere; and his benevolence extensive. In the year of his decease, two volumes of his sermons were published in 8vo., under the title of "Christian Doctrines and Duties explained and recommended;" and in 1763, 19 sermons appeared in one volume,

under the same title. "With respect to Dr. Berri-man's practical discourses, it is allowed that they are grave, weighty, and useful, and well fitted to promote pious and virtuous dispositions; but when he treats on the power, rights, and dignity of the priesthood, or on doctrines which have been greatly disputed, different opinions will be formed, according to the different sentiments of his readers." *Biog. Brit.*

BERRINGEN, in *Geography*, a town of France, in the department of the Lower Meuse, and chief place of a canton, in the district of Hasselt. The place contains 646, and the canton 10,360 inhabitants: the territory includes 232; kilometres and 9 communes.

BERRY, *Bacca*, a grain, fruit, or seed, produced by several herbs, trees, and shrubs, thence called "bacciferous," for the conservation and reproduction of their kind. Some define berries as a fruit smaller than apples, growing in bunches, but not so thick or close as grapes. Others, a soft, fleshy, succulent fruit, having stones or kernels within them. Such are the fruits of laurels, olives, currants, and the like. The berry, or bacca, in a strict sense, denotes a pulpy pericardium without valves, in which the seeds are naked. See **BACCA**.

Berries are of various sizes, forms, properties, and uses, according to the plants whereon they grow.—Some are used in medicine, as juniper-berries, buckthorn-berries, &c. Others in dyeing, as French or yellow berries, &c. The yellow berry-wash may be thus prepared: take a pound of the French berries, and put them to a gallon of water, with half an ounce of alum; boil them an hour in a pewter vessel, and filter off the fluid; put them again into the boiler, and evaporate the fluid till the colour appear of the required strength.

BERRY-Bearing Alder. See **RHAMNUS FRANGULA**.

BERRY, Avignon. See **AVIGNON**.

BERRY, Ale. See **ALE**.

BERRY, in *Geography, a province of France, before the revolution, now comprehended under the departments of Indre and Cher, of which Bourges was the capital; bounded on the north by Orleannois, on the south by Bourbonnois and Marche, on the east by Nivernois, and on the west by Poitou. Berry was divided into the Upper and the Lower, and extended about 90 miles from north to south, and 73 from east to west; it is watered by several rivers, as the Loire, Creuse, Cher, Indre, &c. enjoys a temperate air; is fertile in corn, fruit, wine, hemp, flax, and pasturage; and contains several stone quarries, and some mines of silver, iron, and ochre. Besides the trade in wine, carried on at Bourges, the principal commerce of this province consists in fat cattle sent to Paris, and the great number of sheep, which produce fine wool, manufactured in this and other parts of the kingdom. In Berry there are two kinds of manufactures; one for cloths and serges, and the other for knit and wove stockings.*

BERRY Haven, lies about a mile south of the entrance into Donnegal haven, on the west coast of Ireland, and 5 miles N. N. E. from the haven of Ballyshannon.

BERRY Head, a noted promontory on the south coast of Devon, being the south-west limit of Torbay, and running far out south into the sea. Off this head, out of the way of the entrance into the bay, is a rock, called Berry-rock.

BERRY'S Islands, a small cluster of islands on the north-west point of the great Bahama bank, in the channel of Providence. N. lat. 25° 30'. W. long. 75° 40'.

BERSABA, in *Ancient Geography*. See **BEER-SHEBA**.

BERSABORA, a large, strong, and populous town of Persia.

BERSARII, in *Writers of the Middle Age*, a kind of hunters, or sportsmen, who pursued wild beasts in forests and chafes. The word seems derived from the barbarous Latin *bersarc*,

bersare, "to shoot with a bow." On which principle it should properly denote archers only, or bowmen. Or it might be derived from *berfa*, the "fence or pales of a park." In which view it should primarily import those who hunt or poach in parks or forests.

Hincmar speaks of a kind of inferior officers in the court of Charlemagne, under the denomination of *berfarii, vebararii*, and *beverarii*. Spelman takes the first to denote those who hunted the wolf; the second, those who had the superintendency of the hounds for that use; and the third, those who hunted the beaver.

BERSCHETZ, or BERSCHESZ, in *Geography*, a little town of Carniola, seated on a high rock near the Adriatic sea, and containing a small harbour. In this place is produced a thick and sweet wine, of a black red colour.

BERSELLIO, or BRISELLO, a town of Italy, in the duchy of Modena, seated on the Po. It was taken by the imperial troops under prince Eugene in 1702, and by the French under the duke of Vendome in the following year. The emperor Otho died here, after his defeat by the army of Vitellius. The town is small, but fortified; 27 miles north-west of Modena. N. lat. 44° 55'. E. long. 10° 30'.

BERSHEK, a mountain of Persia, on the north-west side of the lake of Zurra, noted for a fire-temple, the resort of the Guebres.

BERSIMA, in *Ancient Geography*, a town of Asia, in Mesopotamia, seated on the left bank of the Euphrates, north-west of Nicephorium.

BERSKOI, in *Geography*, a town of Siberia, 20 miles north-east of Kojivan.

BERSTADT, a small town of Moravia, in the circle of Olmutz.

BERT. See BRIT.

BERTAUT, JOHN, in *Biography*, an early French poet of reputation, was born either at Creil, or at Condé, in Perche, in 1552; and being known at court by his wit, was appointed first almoner to Catherine de Medicis, private secretary and reader to Henry III. and was much esteemed by Henry IV. in whose conversion he was eminently instrumental. In 1594, he was made abbot of Aulnai, and, in 1626, Bishop of Senec. After his advancement to this see, his conduct was irreproachable, though some blame attached to him, because, instead of suppressing the free poems of his youth, he published them with the pious poems of his advanced age. He died in 1711. As a poet, he is rated to have been more natural and clear than Ronsard, more forcible than Desportes, and more ingenious and polished than either of his contemporaries. Some of his stanzas are said to possess the cast and elegance of a more refined period. His fondness for poetry, with which his piety abounded, he seems to have derived from his attachment to Senec. His "Poetic Works" were printed in 1620, Paris, 8vo. He left also a translation of some books of St. Ambrose, controversial sermons, and a funeral oration for Henry IV. *Nonv. Dict. Hist. Gen. Hist.*

BERTH, in *Sea Language*. See BRITH.

BERTHEAU, CHARLES, in *Biography*, an eminent French protestant divine, was born at Montpellier, in 1660, and after having studied philosophy and divinity, partly in France, and partly in Holland, was admitted a minister in the Synod of Vigan in 1681. His first settlement was as pastor to the church at Montpellier, whence he removed to be minister of the church at Paris, which met at Clarenton. Upon the revocation of the edict of Nantes, he came over to England, and in 1686, was chosen one of the ministers of the Walloon church in Threadneedle-street, London, in which capacity he officiated, with very general applause, for

44 years. He died, much regretted, in December 1737. He was distinguished by sound judgment, by a retentive memory, so that he is said never to have forgotten any thing which he had seen, read, or heard, by his accurate and extensive acquaintance with ecclesiastical history, and by his eloquence as a preacher. Two volumes of his sermons have been printed in French; the first in 1712, and the second at Amsterdam, where the former was reprinted, 1730. *Gen. Dict.*

BERTHEAUME POINT, in *Geography*, the west limit of the bay so called about 1½ league east from St. Matthew's point, without the entrance into the road of Brest. Within the point, on the west side of the bay, are the castle and rock of Bertheaume.

BERTHEVIN, St., a town of France, in the department of the Mayenne, and chief place of a canton, in the district of Laval, $\frac{2}{3}$ of a league west of Laval.

BERTHING, in the *Sea Language*, denotes the raising or bringing up of ship-sides. Thus they say, a clinker hath her sides berthed up before any beam is put into her.

BERTHOLZ, in *Geography*, a town of Germany, in the archduchy of Austria, 5 miles W. N. W. of Zvelt.

BERTHONCELLES, a town of France, in the department of the Orne, and chief place of a canton, in the district of Belleme, 13 miles north-east of Belleme.

BERTI, JOHN-LAURENCE, in *Biography*, an Augustin monk, was born in 1696 at Seravezza, a village in Tuscany, and upon being called to Rome by his superiors, was appointed assistant general of his order in Italy, and prefect of the angelic library. In a great work, entitled "De Disciplinis Theologicis," printed at Rome, in 8 vols. 4to. he appears to have adopted the sentiments of St. Augustin, which involved him in a controversy with the Jesuits, and caused him to be denounced to pope Benedict XIV. as a disciple of Baius and Janfenius. Against this charge he defended himself in a learned apology, comprehending 2 vols. 4to. He afterwards composed in Latin an "Ecclesiastical History," in 7 vols. 4to., which was afterwards abridged in one volume, 8vo. In this work he represents the pope as supreme monarch and arbiter of all kingdoms and empires. He also wrote many other works, some of which are Italian poems, all of which were published together at Venice in folio. He was invited by Francis I. grand-duke of Tuscany, to Pisa, and received a considerable pension, with a professorship in the university, under the title of "Imperial theologian," and here he died, in 1766, much lamented by his colleagues. *Nonv. Dict. Hist.*

BERTILL, in *Geography*, a maritime county of America, in North Carolina, and Edenton district, having for its south boundary the Roanoke, and on the east Albemarle sound. In this county is situated the ancient Indian tower of Tuticwora. It contains 12,626 persons, of whom 5141 are slaves.

BERTIERA, in *Botany*, derives its name from M. Bertier of France, and was so called in honour of him, by M. Aublet. *Lin. gen. Schreb. n. 304. Aubl. 69. Juss. 200. Clair. and ord. v. part. india nonogynia. Nat. Ord. Contorta, Lin. Rabinia, Juss. Gen. Char. Calyx, perianth turbinate, five-toothed. Cor. one petalled; tube short; mouth villose; border five-clift; lobes ovate, acute, spreading. Stam. filaments five, very short, inserted into the tube beneath the orifice; anthers linear, erect. Pist. germ roundish, inferior, crowned by a gland; style filiform; stigma two-plaited. Per. berry globose, crowned by the tooth of the calyx two-celled. Seeds very many, roundish, adfixed to the disseminium.*

Ess. Char. Cal. turbinate, five-toothed. Cor. tube short, with a villose mouth; berry globose, inferior, two celled, many-seeded.

Species, 1. B. guianensis. Aublet. Guian. 180. t. 69. This is a shrub six or seven feet high, and the thickness of the human arm; branches opposite, knotty, tomentose; leaves opposite, ovate, acuminate, and tomentose underneath; petioles short, convex beneath, channelled above; stipules stem-clasping, two-lobed; flowers in terminating racemes; corolla white. Found by Aublet in the wood of Aroura, in Guiana, flowering and fruiting in the month of June. Martyn.

BERTIN, NICHOLAS, in *Biography*, an historical painter, was born at Paris in 1667; and after studying under some of the principal artists, and gaining, at the age of 18 years, the prize of merit in the academy, was sent to Rome for further improvement, where he acquired a good taste for composition, and in Lombardy he completed his knowledge of colouring. Some time after his return to Paris, he was made academician in 1703, and professor in 1705. His drawing was correct; his invention ready in all sorts of subjects; and he painted in a strong, pleasing, and finished style. He was much employed by Louis XIV.; and his performances were valued and sought after by foreigners. He excelled more in small works than great ones; and from this circumstance, and some others, he was referred only to the second rank of artists. Among his most considerable performances we may reckon the ceiling at the chateau of Pleffis St. Pierre, the subject of which was the adoration of the Magi, and an historical composition, representing the baptism of the eunuch of the queen of Candace, by St. Philip. He temper was reserved, and he was much addicted to religion. He died at Paris in 1736. Pilkington. Gen. Biog.

BERTIN, JOSEPH, EXUPERE, was born at Tremblay, in the department of Rennes, June 28th, 1712. Having gone through the usual course of study, in anatomy, physiology, and therapeutics, he was created doctor in medicine at Paris, in 1740. The following year he published "Non datur imaginatiois maternæ in fœtum actio," combating an opinion, which had long prevailed, that the imagination of the mother had the power of marking and disfiguring the fœtus in utero. His next production, which is much commended by Haller, is a treatise on "Osteology," in 4 vols. 12mo. The bones of the head are described more exactly and minutely, Haller says, than in any other work extant. About the same time, he had a long, but not very interesting dispute, with Monf. Ferrein, on the formation of the voice. In the year 1764, he joined Meürs. Le Bas, Petit, and others, in defending the cause of Madame Renné, who had been delivered of a male child ten months and twenty days after the decease of her husband, and who wished to get the child acknowledged as his. Bertin, with his coadjutors, endeavoured to establish as a principle, that there is no fixed term for the birth of the child, and that, according as the constitution of the parents was more or less vigorous, a greater or less portion of time might be required for the perfection of the fœtus. A child might be ripe, and fit for the birth, they maintained, at the end of the seventh month, if the parties enjoyed great strength of constitution; or in an opposite state of them, it might require ten, eleven, twelve, or more months, to fit it for exclusion. This doctrine was attempted to be established by recurring to a great number of cases and observations, and to the decisions of the courts, of which they produced several, legitimate children, supposed to have been born in the eleventh or twelfth month after conception. Recourse was also had to the histories of monstrous births, to shew the aberrations of nature. These arguments and cases were ably and judiciously opposed by M. Louis. The cases adduced by his antagonists were shewn to be defective in evi-

dence, and though he admitted that the time of gestation in women, as well as in animals, might be protracted for a few days, yet he much doubted whether, in any instance, it had been extended to the end of the tenth month, or at the most to more than two or three days beyond that term. In support of this opinion, he cited the authority of some of the ablest philosophers, physicians, and lawyers; and the court, according to this determination, declared the child to be illegitimate. Though the court in this decision were probably influenced by the peculiar circumstances of the case, the husband being 76 years of age at the time of his death, and for the last month in such a state as to be incapable of performing the conjugal rites, yet the arguments and authorities adduced by M. Louis, must have had great weight with them, and well deserve to be had recourse to in deciding on general principles, what is the utmost term to which a woman may carry a living child. M. Bertin was author of several dissertations, principally on anatomical subjects, which were published in the Memoirs of the Royal Academy of Sciences, and other philosophical and medical journals and transactions; the titles and accounts of which are given by Haller, in his *Bib. Anatom.*

BERTINCOURT, in *Geography*, a town of France, in the department of the Straits of Calais, and chief place of a canton, in the district of Arras. The place contains 1275, and the canton 13,035 inhabitants; the territory includes 112½ kilometres and 17 communes.

BERTINORO, a town of Italy, in the state of the church, the see of a bishop, suffragan of Ravenna; seated on a hill, and defended by a citadel, 15 miles south of Ravenna.

BERTIUS, PETER, in *Biography*, an eminent geographer, was born at Beveren, a village in Flanders, in 1565, and acquired the knowledge of the learned languages in England. Having travelled through Germany, and other countries, he settled at Leyden, where he became professor of philosophy; but after occupying this post for 26 years, he was expelled for joining the Arminian party. Upon his expulsion he migrated to Paris, where he abjured the protestant religion in 1620, and was made cosmographer to the king, and professor-royal extraordinary of mathematics. He died in 1629. His principal works are "Theatrum Geographiæ Veteris," Amst. 2 vols. fol. 1618, 1619; which is a collection of the works of almost all the ancient geographers, illustrated by notes, and esteemed a valuable publication; "Introductio in universam Geographiam;" "Comment. Rerum Germanic. lib. iii." Amst. 12mo. 1635, containing a good description of Germany, and a map of the empire of Charlemagne; "Notitia Episcopatum Galliæ," Par. fol. 1625; "De Aggeribus et Pontibus," Par. 8vo. 1629. The works above enumerated are held in high estimation by geographers. We may add "Illustr. Virorum. Epist. select. superiori sæculo script. vel a Belgis vel ad Belgas," 8vo. 1617. Bertius also wrote several pieces in the controversy between the Gomarists and Arminians, and published discourses on various occasions. Nouv. Dict. Hist.

BERTON ROAD, in *Geography*, lies within Dalkey island, at the south point of the entrance into Dublin bay, Ireland.

BERTONA, BERTONIA, BERTHONA, BARTON, or BERTON, properly denotes that part of a country farm where the barns and other inferior offices stand, and wherein the cattle are foddered, and other business is managed. *Berton* is also used to signify a farm, as distinct from a manor. Du-Caoge. In some parts of the west of England, they call a great farm a *berton*, and a small one a *living*. Hence also *bertonarii* was anciently used for those we now call farmers, or tenants of bertonns.

BERTONCOURT, in *Geography*, a town of France, in the department of the Moselle, and chief place of a canton, in the district of Boulay, 10 miles north-east of Metz.

BERTRAM, **COLLEUS BONAVENTURE**, in *Biography*, a learned orientalist, was born at Thouars, in Poitou, in 1531, and became professor of Hebrew at Geneva, and afterwards at Lausanne, where he died in 1594. His works are "A Dissertation on the Republic of the Hebrews," 8vo. Geneva, 1580, and Leyd. 1641; "A Revision of the French Bible of Geneva," Gen. 1588, which is more correct and liberal than the other, and is used by the Calvinists at the present time; "A new edition of Pagnin's Treasure of the Sacred Tongue;" "Parallel of the Hebrew and Syriac Languages;" and "Lucebrationes Frankendaleses," Frank. 1586. He contributed also to the edition of Mercerus's comment on the book of Job. Gen. Dict. Nouv. Dict. Hist.

BERTRAND, **GABRIEL**, a surgeon of eminence at Paris, published, in 1610, in 8vo. "A Refutation of the Errors contained in Guillemeau's Description of the Muscles of the Human Body," which is much commended by Portal; also "Les Verités Anatomiques et Chirurgicales des Organes de la Respiration, et des artificieux moyens dont la nature se fert pour la preparation de l'air," Paris, 1629, 12mo. He had observed pus formed in the chest to be absorbed and conveyed out of the body with the urine. Haller. Bib. Anatom.

BERTRAND, **JOHN BAPTIST**, born at Antignes, July 12th 1670, was member of the academy at Marseilles, where he also practised medicine with reputation and success. He published "An Historical Account of the Plague," which desolated that city in the year 1719, of which he was witness; also "Letters addressed to M. Deidier on the Causes of Muscular Motion;" and "Dissertations on the Effects of Sea Air." He died September 10, 1752, aged 82 years. Eloy. Dict. Histor.

BERTRAND de Comminges, *St. in Geography*, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the district of St. Gaudens. Before the revolution, it was the see of the bishop of Comminges; distant 3 miles south-west of St. Gaudens. Its population is estimated at 639, and that of the canton at 8165 persons. Its territory comprehends 137½ kilometres, and 18 communes.

BERTRANDI, **AMEROSI**, in *Biography*, a celebrated anatomist and surgeon of Turin, where he was born, October 8, 1733. Showing early marks of an uncommon genius and talent for his profession, he was sent by his sovereign to Paris, and afterwards to London, to acquire a knowledge of the improvements making in these places. At London, he was for six months under the direction of Mr. Bromfield, then at the head of his profession. Having employed three years in his travels, in 1754 he returned to Turin, where he was preferred to the offices of professor extraordinary, and principal surgeon to the king. In 1748, he published, in 8vo. "Dissertationes duæ anatomice, de hepate, et de oculo," which have considerable merit. But his principal work was published at Nice in 1763, 8vo. under the title of "Trattato della operazione di chirurgia," in which he has described the manner of performing the principal operation in surgery. The work was translated into French by M. Soler, and published at Paris, in 1769, with engravings. He died in 1765, in the 32d year of his age. Hall. Bib. Clur. Eloy. Dict. Hist.

BERTRONMONTIER, in *Geography*, a town of France, in the department of the Vosges, and chief place of a canton, in the district of St. Dié, 4 miles east of St. Dié.

BERVA, a district of Africa, in the south part of the

country called "Kiaferak" by the Arabians, and by us "Cassaria." See **BRAYA**.

BERVAN, a town of Asia, in Tartary, in the kingdom of Thibet, near the lake Bervan, which lake is said to be 40 leagues long and between 30 and 34 broad.

BERVIE, or **INVERBERVIE**, a royal burgh in the county of Kincardine, Scotland. N. lat. 56° 44'. W. long. 2° 4'. It is seated on the eastern coast, at the mouth of the river Bervie, called *Bervie bay*, which forms a small harbour for fishing-boats. This town was constituted a royal burgh in 1342, by charter from king David, who, being at sea, was forced in here by stress of weather, and kindly received and entertained by the inhabitants. The place where he landed is still called *craig David*. In 1595, James VI. renewed the charter, with all its former privileges and immunities. This town has lost nearly the whole of its trade and commerce, and many of its houses are fallen to decay. Most of the fishermen who frequented this port are removed to Gourdon, a village about two miles south, where they enjoy a more eligible situation. Fresh water has lately been brought into the town by means of pipes, and a new bridge has been recently thrown across the river Bervie. The population of the borough is about 607 persons.

BERVINE, a river of the Netherlands, which passes by Dalem, and runs into the Menfe, near Vifet.

BERVISCH, in *Ichthyology*, the name by which the Hollanders call the lump-fish; *cyclopterus lumpus* of Linnaeus.

BERULLE, **PETER DE**, in *Biography*, cardinal and founder of the congregation of the fathers of the oratory in France, was born at Serilly near Troyes, in 1575, and educated with a view to the ecclesiastical profession, first among the Jesuits, and afterwards in the university of Paris, where he was distinguished by his proficiency in literature, and by the amiableness of his disposition. Such were his attainments in doctrinal and controversial divinity, that he bore a principal part in the conference at Fontainebleau, in 1600, between cardinal du Perron on behalf of the catholics, and du Plessis Mornay on the side of the protestants. At this time he was almoner to king Henry IV.; and in 1604, he was employed in bringing over a colony of Carmelites from Spain, and settling them at Paris; of this order he was constituted superior-general. The first foundations of the congregation of the oratory of Jesus were laid by him in 1611, and from this institution he derived the greatest honour. **St. ORATORY.** After the death of Henry IV., Berulle was chief of the council of the queen-mother, Mary of Medicis, and he took an active part in promoting conciliatory measures between the contending parties during the minority of Lewis XIII. In 1624, he was deputed on a commission to Rome, to solicit a dispensation for the marriage of the princess Henrietta Maria, to Charles I. of England; he was appointed her confessor, and accompanied her to take possession of the throne. But as he strenuously and inflexibly maintained her stipulated rights, he contributed in some measure to the mischief that resulted from this impolitic union, and at length incurred the reproach of a dissembler. The duke of Buckingham, as he says, complained of him to the king of having conspired against his life and fortune. On his return to France, he was active in urging the proceedings against the Calvinists at Rochelle. Having refused several rich benefices and bishoprics, he was nominated cardinal by Urban VIII., without his knowledge, in 1627; but he continued his abstemious and mortified mode of living; and at length, exhausted by his labours and austerities, he died during the celebration of mass, Oct. 2, 1629. His numerous pieces on controversial theology were collected and published in one volume folio, in 1644, and have since appeared in two other editions. Gen. Dict.

BERUS, in *Geography*, a town of France, in the department of the Moselle, and chief place of a canton, in the district of Sar-Louis, 4 miles S.S.W. of Sar-Louis.

BERUS, in *Zoology*. *Coluber berus* is the common European viper. Linnæus, who, in describing the *amphibia serpentes*, conceived it quite sufficient to distinguish all the species of the several genera included in that order, by the number of abdominal scuta, or plates on the belly, and the scales on the tail, states them at 146—39. Fn. Suec. Amoen. Acad. &c. The opinion entertained in this respect by that eminent naturalist, we perceive from later observations on the species he describes, was not perfectly correct. This is exemplified for instance in the common viper, in which both the abdominal plates and caudal scales are liable to vary in point of number; one writer speaks of the viper having 148—42, Weigel, &c.; another (Scopoli) mentions 177—68, &c. Notwithstanding therefore the example of Linnæus to the contrary, we cannot but approve of characters taken rather from the various marks, spots, and other striking particulars in the general appearance of the species in this order, as Linnæus has done himself in the reptile tribe. Dr. Shaw seems also to prefer the latter, considering the number of plates on the belly, and scales on the tail, in a secondary point of view. He thus describes the common viper: *Coluber cinereus*, maculis capitis biloba, vitta dorsali atra dentato repanda. *Cinereus viper*, with a bilobate spot, and a black flexuous zigzag bend down the back.

Gmelin, in the *Sytema Naturæ*, has four varieties of *coluber berus*; namely, (2.) a native of India, in which the spots along the back are roundish and confluent, so as to form almost one continued stripe; those spots near the tail are disposed transversely. In the island of St. Eustace, another variety (γ.) is also found, of a sordid colour, with the head variegated, and the neck slender. (δ.) This inhabits India, and is distinguished by having the arch of the occiput, or hind head, intercepting a white spot. The fourth sort (ε.) has an aggregated spot of many parts on the head; and is a native of the Celebes. Figures of all these varieties of *coluber berus* are to be found in the magnificent work of Seba.

The common viper of Europe and northern Asia is the same as that found in this country. With us, the viper seldom exceeds the length of eighteen inches or two feet. Pennant tells us, he once saw a female viper almost three feet in length, observing at the same time, that the females are usually one third larger than the males. The colour, generally speaking, is of a silvery greyish, or tawny brown, paler or more vivid in different individuals, and sometimes blackish all over; but in all these varieties the spots are pretty nearly the same, the back being marked with a chain or series of rhomboidal spots connected with each other, and forming one continued indented stripe from the head to the extremity of the tail. A series of dark or dusky spots extends likewise along each side of the body; other spots appear again on the belly, which in most specimens is almost entirely black, and finely glossed with purple. The situation of the fangs proves the viper to be one of the poisonous kinds of serpents; they are situated on each side of the fore-part of the upper jaw, and are commonly two in number, with a few smaller ones near them. Petiver describes a black viper, *vipera Anglica nigrans*, which is thought to be nothing more than a dark variety of the common kind, *berus*. This, however, is not certain, and we should hesitate in admitting it as a variety only, since Linnæus considered it, from the description which Petiver has given, as the *coluber pfeffer* of his *Fauna Suecica*. For a further account of *coluber berus*, see VIPER.

BERWICK, NORTH, in *Geography*, a royal borough of East Lothian, in the county of Haddington, in Scotland. This town is of very remote antiquity, and has been a scene of considerable manufacture and commerce, but is now reduced to poverty, its harbour being in ruins, and a few cargoes of grain are the only exports from its quay. Its original charter was lost or destroyed, and James VI. granted it a new one, under which it has since been governed. The parish extends about three miles along the sea-coast, and consists wholly of arable land, except a fine conical hill called *North Berwick Law*. This rises immediately above the town, and forms a conspicuous landmark to the sailors who navigate the Frith of Forth. The ancient castle of Tantallan stands about two miles from this town, and is elevated on a high rock, three of whose sides are laved by the surge of the sea, and the fourth guarded by a deep fosse and drawbridge. See BASS. N. lat. 56° 40'. W. long. 2°.

BERWICK, commonly called *Berwick-upon-Tweed*, is a large respectable town, situated between England and Scotland. From its having been a frontier garrison town, long before the glorious æra of the union, and from its situation on the shore of the ocean and on the bank of an unfordable river, it was considered, when in possession of the English, as a key to England, and when in possession of the Scots, as a key to their own country. This peculiarity of situation rendered it a scene of repeated siege and devastation. Berwick is pleasantly situated on the northern bank of the river Tweed, within half a mile of the German ocean; 336 miles north-west from London; and 54 miles south-east from Edinburgh. N. lat. 55° 48'. W. long. 1° 45'. The ground, on which the town stands, rises gently from the river, and from its southern aspect, is rendered cheerful by the sun. Its circumference, within the present walls, is about one mile and three quarters, but the circumference of the old walls extended two miles two hundred and eighty-two yards. The town of Berwick is mentioned as a place of strength in the reign of Osbert, one of the last kings of Northumberland, who died in the beginning of the ninth century. It was successively conquered and possessed by the Saxons and Danes, until the Scottish king Gregory, who was cotemporary with Alfred the Great, took it by assault. It continued part of the Scotch dominions till about the year 1098, when it was given by Edgar to the see of Durham, but was again restored to the Scots. During the repeated wars between England and Scotland, this town and its castle were frequently taken and retaken by the armies of each kingdom, and in each direful conflict suffered materially. In one of these, between Alexander of Scotland and John of England, the greater part was destroyed by the latter, who made it a practice to consume the house every morning in which he had lodged the preceding night. On the 2d of August 1291, the states of England and Scotland, with Edward I., assembled at Berwick, to settle the claims of Robert Bruce and John Baliol to the Scottish crown, when the latter was appointed on the 17th of the following November. During these reigns Berwick was besieged and conquered by Edward I.; and the conflict was so great, that Matthew of Westminster states the loss of the Scots to amount to 60,000 persons. An English parliament was summoned here in 1296, when the Scotch nobility paid homage to king Edward. In the following reign, Robert Bruce collected an army of 30,000 combatants, with which he entirely routed and discomfited Edward II. and his army near Stirling castle. This battle, commencing on Midsummer day, 1314, continued several days, and it is acknowledged by most authors, that the English suffered more in this contest than in any other since the time of William the Conqueror. It was in this battle

that the privy seal was lost; and Edward issued a proclamation from Berwick, informing his subjects of the circumstances. Berwick was afterwards a scene of great revelry and rejoicings. The marriage of Joan, sister to Edward III., with David of Scotland, was performed at this place with great pomp and ostentatious solemnity. In spite of this family alliance, the two kingdoms soon returned to their former hostilities, and Berwick became the seat of many battles and destructive sieges. It was several times afterwards in the possession of each country, and never relinquished by either without a vigorous and obstinate resistance. In the reign of Richard III. of England, and James III. of Scotland, commissioners were appointed by each crown to ascertain the limits of Berwick; and it was agreed, that the ground in dispute should remain uncultivated, uninhabited, and uninhabited. But in 1502, this agreement was annulled by another, which stipulated that the town and castle should be "preserved in perpetual peace, friendship, league, and confederacy." In the same year was solemnized the marriage of Margaret, eldest daughter of Henry VII., with James IV. king of Scotland; but this circumstance did not terminate the jealousies and animosities between the two kingdoms, as Edward VI. marched to Berwick with a large force, which was augmented by a fleet of 34 ships, 30 transports, and a galley. These lay encamped here for some time, and were destined to invade Scotland. This monarch, and Mary queen of Scotland, by treaty, made Berwick a county town, and declared it independent of both states. Queen Elizabeth fortified and invested it with a strong and expensive military establishment, consisting of 980 men, whose annual salaries amounted to 12,734*l.* 19*s.* 2*d.* All this was abrogated, and the place rendered peaceable by James VI. of Scotland, who was proclaimed at Berwick, in the year 1603, king of England, France, and Ireland. The union of the two kingdoms, in 1707, terminated the long series of hostilities, which had proved so destructive to the commerce, population, and agriculture of the borders, and to this place in particular.

Berwick, though originally a Scots town, was erected into an English borough, at a very early period, and its last charter was granted by James I.; under which the burghesses claim their various privileges, immunities, &c. as well as some large territorial possessions and domains. It has an exempt jurisdiction, and is independent of the adjoining counties of Durham and Northumberland, yet it is not a county in itself. Since the union, it has been partly subject to the English laws, but is locally regulated by its own code. The town is governed by a mayor, recorder, four bailiffs, and an indefinite number of aldermen. The first is annually elected, and receives 100*l.* during his mayoralty. Two members of parliament are returned from this town, and the number of electors amounts to nearly one thousand, though not more than seven hundred have been known to vote at one election. Several manufactures are established here; the principal of which are for making damask and diaper, lacing, sail-cloth, cotton and muslin, stockings, carpets, felts, hats, boots, shoes; besides several others connected with the shipping. The coasting trade and foreign commerce of Berwick are very considerable, though about sixty years since, only two small vessels of fifty tons each were employed between this place and London. Now about 400 vessels belong to this port, whose principal lading consists of salmon and eggs. The first are mostly caught in the river Tweed, whose fisheries afford a great revenue to the proprietors, and give employ to about 300 men. The salmon fishing continues from the 10th of January till the 10th of October, during which time above 40,000 kits of these fish,

besides a vast quantity of salmon trout, have been sent to London. The latter are often conveyed alive in the bellies of the vessels. About 80 boats are employed on the Tweed; and the yearly rentals of all the fishing waters amount to nearly 10,000*l.* The article of eggs is also a curious and lucrative branch of trade: they are brought to this town in carts and panniers from all parts of the adjoining country, and mostly parted for grocery goods. From the 10th of October 1797 to the 10th of October 1798, 5284 chests of eggs were sent hence to London. The vast increase of trade at this port may be estimated from the custom-house revenue, which has risen in the last 20 years from 1000*l.* to 6000*l.* a year.

It was the universal practice, till within these few years, to boil all the salmon before it was packed up in the kits; but in 1788, a new mode was adopted, and has continued ever since. This consists in packing it with ice, which being wanted in great quantities, induced the merchants to construct several ice-houses near the town. In the year 1798, the two companies of Berwick had in 7600 cart loads, which cost them about 450*l.* There are 32 salmon coopers in this town. Four modes of catching salmon are practised here; the sweep, the still, the hobbs, and the hanging nets. (See SALMON.) Besides the salmon-fishery, the herring and lobster fishery employs several hands. The latter are caught in cruives, which are three feet in length and one and a half in height. These have a hole at each end, where the lobsters are tempted to enter for the enclosed baits.

The *Public Buildings* are the governor's house, the barracks, the ordnance-house, the main-guard, the town-hall, reservoir, church vicar's house, and the bridge; all these are constructed with stone, and the two first were built in 1719. The town hall is a handsome building of three stories, with an ornamental tower and spire at one end. It was built from the designs of Joseph Dodds, and finished in 1754. The church was built, in 1652, under the direction of colonel George Fenwick; but it has neither tower nor bells: these are annexed to the town hall. The bridge over the Tweed is constructed with fine hewn stone, and has fifteen spacious arches. It extends 1164 feet in length, and 17 in width, and was finished building October 12, 1634, after a period of 24 years 4 months and 4 days, from the commencement.

Here are a charity-school, and six free-schools, also a custom-house and excise-office. Berwick is still surrounded with fortified walls, which are mounted with 54 guns. It has four principal gates, and has a complete garrison establishment, to which Holy island is an appendage. Among the antiquities of the town, are the remains of its ancient castle, and a pentagonal bell tower near it, a square fort of Magdalene field, entrenchments on the top of Hallydown hill, and an old pier called queen Elizabeth's pier.

Here is one weekly market on Saturdays, and one annual fair; but the corporation has established three annual markets, called High markets, for the hiring of servants, and selling of horse, cattle, &c. Fuller's History of Berwick-upon-Tweed, 8vo. 1799.

BERWICK, or *Alboston*, a neat town of America, in York county, Pennsylvania, at the head of Conowingo creek, 123 miles W. by S. of Philadelphia, 23 miles W. of York, and 26 miles S. S. W. of Harrisburg. The town is regularly laid out, and contains about 100 houses, and a German Lutheran, and Calvinist church. N. lat. 39° 54'.

BERWICK, or *New Berwick*, a small town of Northumberland county, in Pennsylvania, on the north-western side of the east branch of Susquehanna river, opposite Nescopeck falls and Nescopeck creek, 32½ miles north-east from Northumberland

thumberland and Sunbury, at the junction of the east with the west branch of the Susquehanna, and 160 north-west of Philadelphia. N. lat. $41^{\circ} 3'$.

BERWICK, a township of York county, and district of Maine, containing 3894 inhabitants. It has an incorporated academy, and lies on the east side of Salmon Fall river, 7 miles N. W. of York, and 86 E. by N. from Boston.

BERWICKSHIRE, a county of Scotland, famous in the historical annals of Britain for the many desperate battles fought between the English and Scots within its boundaries. This county formerly constituted about half of the earldom of Dunbar or March, and is generally called by the country people *Merse*. It is nominally divided into three districts, respectively called Lauderdale, Lammermuir, and Merse, or Marsh. The latter comprehends the most beautiful subdivision, and follows the course of the Tweed, from the foot of the Eldon hills to within a few miles of Berwick. Lauderdale is the valley which accompanies the river Leader, or Lauder, whose waters are celebrated in Scottish song. Lammermuir comprehends the ridge of hills, which separates this county from east Lothian, and is chiefly appropriated to the feeding of sheep and black cattle. This county is bounded on the north by Haddingtonshire, on the east by the German ocean, on the south by the river Tweed, which divides it from Northumberland in England, and on the west by the counties of Roxbury, Peebles, and Midlothian. Its length is estimated at 32 miles, and breadth at 17 miles. It is divided into 32 parochial districts; and besides the royal borough of Lauder, has the towns of Greenlaw, Dunse, Coldstream, Coldingham, Ayton, and Eyemouth, within its limits. The chief rivers of the county are the Tweed, the Leader, the Eye, the Whiteadder, and the Blackadder. The state of agriculture in this county is highly improved within the last twenty years; and many parts that were then uncultivated, are now inclosed and rendered profitable to the landlord and the husbandman. By way of agricultural pre-eminence, this county is often called the Norfolk of Scotland. Many farms now let at 300l. and 400l. per annum, which at no very distant period were scarcely deserving of notice. This increase of prosperity enables the county to export from the ports of Berwick and Eyemouth "above 80,000 bolls of victual annually;" and nearly the same quantity is conveyed to the markets of Edinburgh, Dalkeith, Haddington, and Dunbar. The minerals of this district hitherto discovered are few, and these not very valuable. Coal is found in small quantities near Eyemouth; freestone is abundant; and rock and shell marl are found in different places. Copper has been obtained in the vicinity of Lauder; and some few years past a mine of the same ore was discovered in the parish of Bonkle. A small quantity of iron stone is found in the parish of Mordington. The rocks, which compose the Lammermuir hills, are mostly schistus, with alternate strata of sandstone. At Eyemouth is a rock of Puddingstone, which is found to contain fragments of porphyry, granite, and limestone. In the parish of Chirnside, is a species of gypsum, which is advantageously used to manure certain lands. Near Dunse is a celebrated mineral spring, which is much resorted to. Its water, somewhat similar to that of Tunbridge Wells, contains iron dissolved in fixed air, with a little sea salt and bittern; and its effects prove rather diuretic and corroborant. Among the gentlemen's mansions of the county, those of Hirsfel, the seat of the earl of Home, and of Marchmont, the seat of the earl of Marchmont, are the most considerable; though there are some other handsome mansions. Besides the castle and fortifications of Berwick, there are several others in dif-

ferent parts of the county, particularly at Lauder, Cockburn path, Home, and Chapel on Beach. There were also seven nunneries, two hospitals, and one Dominican convent. Among the eminent natives of this county, the following names occur; James Thomson, the poet; John Scott, or Duns Scotus, who was born at Dunse. Of the same place, was John Brown, author of the Brunonian system of physic: Thomas the Rhymer, or sir Thomas Lermont, is distinguished in the history of metrical romance. The real land-rent of this county is estimated at 118,800l. sterling. Home's Agricultural Report of Berwickshire. Sir John Sinclair's Statistical Account of Scotland. Fuller's History of Berwick.

BERWIN, or **BEROUIN**, a considerable range of mountains, which passes through parts of the counties of Montgomery, Merioneth, and Denbigh, in North Wales. The prospect from different spots on the summit of this ridge strikes the mind with awful astonishment. "Nature," says lord Lyttelton (*Works*, vol. iii. p. 337.), "is in all her majesty there; but it is the majesty of a tyrant frowning over the ruins and desolation of a country. The enormous mountains, or rather rocks, of Merionethshire, inclosed us all around. There is not upon these mountains a tree, or shrub, or blade of grass; nor did we see any marks of habitations or culture in the whole place. Between them is a solitude fit for despair to inhabit; whereas all we had seen before in Wales seemed to inspire the meditations of love."

BERY, **BERIA**, or **BERIE**, was anciently the name of the vill or site of the habitation of a nobleman, or of a dwelling or mansion-house, being the chief of a manor; formed of the Saxon "beorg," which denotes a hill or castle; for noblemen's seats were formerly castles, situate on hills, of which there are still some remains. It was anciently taken for a sanctuary. See **BERIA**.

BERYL, or **BERYLL**, *βερύλλος*, *Aquamarine of Siberia*, *Berill*, Germ.; *Emeraude, vert bleuâtre*, Haüy; *silex smaragdus beryllus*, Werner.

The colour of the beryll is a blueish green, passing into mountain apple, or alparagus green, and honey yellow on one side, and light sky blue on the other. It is almost always found crystallized in rectangular six-sided prisms, sometimes truncated on the edges and angles; the sides of the prism are occasionally alternately broad and narrow, and sometimes convex, which gives the whole crystal a cylindrical form. It is not unfrequent for the prisms to have the appearance of having been broken across and imperfectly cemented together. Sometimes, instead of having plane surfaces at their extremities, they are convex or concave, like articulated basaltites. The size of the crystals varies considerably, the smallest being always the longest in proportion to their diameter; some are of no greater magnitude than a hair, while others have been found a foot long and three or four inches in diameter. The beryll has many points of resemblance with the emerald; and in particular the crystals of both are divisible parallel to the sides and extremities of a regular hexahedral prism; on which account M. Haüy has comprehended them both under one species.

The beryll is externally shining, or little-shining, with a vitreous lustre. Its parallel fracture is minute-conchoidal; the cross fracture is completely conchoidal. It is generally transparent, but sometimes is only semi-transparent or translucent. It is sufficiently hard to scratch quartz, though with some difficulty. Specific gravity of the light blue variety 2.67; of the blueish green 2.75; of the mountain green 2.65.

This mineral appears to have been first analysed by Vauquelin, and afterwards by Rose and Schaub, with the following results:

	Vau.	R.	S.
Silex,	69	69.5	66.5
Aluminc,	13	14	16.75
Glucine,	16	14	15
Lime,	0.5		
Oxyd of iron,	1	1	1
	99.5	98.5	99.25

In a common fire the beryll undergoes scarcely any change of colour, but it loses its transparency, and flies to pieces. At a more intense heat it becomes opaque and milk white, but shows no signs of fusion; by the assistance, however, of oxygen gas, it melts without much difficulty. Borax is a perfect flux for it.

The beryll is found in Daouria, upon the borders of China, near Nertschink, also in the granitic ridge between the rivers Onon and Ononborfa. It is found in rivers, accompanying rock-crystal, indurated clay, mica, fluor, wolfram, and arsenical pyrites.

The beryll, when cut and polished, has a considerable lustre; but its colour is for the most part but indifferent. It is ranked among the gems, but its value is trifling when compared with the ruby, sapphire, topaz, &c. Haüy. Emmerling. Widenmann.

BERYLL, *Oriental*. See CORUNDUM.

BERYLL, *Beryllian*. See TOURMALIN.

BERYLL, BERYLLUS, is also a name given to a kind of crystal looking-glass, superstitiously consecrated to the purposes of conjuring and divination. Hence also the term *beryllifica*, used for the mysterious art of seeing future or distant events in such glasses.

BERYLLINA, in *Entomology*, a species of CHRYSIS, found in Europe. The head is greenish blue; thorax blue, greenish in front, behind bidentated; abdomengreen, changeable to rufous and blue; legs blue, with testaceous dots. Linnæus, &c.

BERYLLINUS, a species of CIMEX (*Spinosus*); thorax obtusely spined, and dentated on the sides; tips of the spines and bifid shield of the head greenish blue. Linn.

BERYLLUS, in *Biography*, a learned and pious bishop of Bostra, or Bozrah, in Arabia, flourished about the year 230, and taught that Christ had no proper subsistence or divinity distinct from that of the father, before his birth of Mary; or that Christ did not exist before Mary, but that a spirit issuing from God himself, and therefore superior to all human souls, as being a portion of the divine nature, was united to him at the time of his birth. Many conferences were held with Beryllus on this opinion; and at last it was so completely refuted by Origen, and so much to the satisfaction of Beryllus himself, that he gave up the cause, and returned into the bosom of the church. The acts of these conferences were long preserved, and the dialogue between Origen and Beryllus was extant in the time of Jerom. Eusebius also refers to them. Eccl. Hist. l. vi. c. 33. Cave's Hist. Lit. vol. i. p. 122. Mosh. Eccl. Hist. vol. i. p. 306.

BERYLLUS, in *Entomology*, a species of CIMEX (*Rotundatus*), that inhabits India. It is of the middle size; pale; border of the thorax orange; wing-cases with a ferruginous spot, and marginal black lines. Fabricius.

BERYTIS, in *Ancient Geography*, a town of Asia Minor, in the Troade. Steph. Byz.

BERYTUS, BAIROUT, BEROT, or BEIRUT, a town of Phœnicia, situated about 24 miles south of Byblus. Stephanus Byz. says, that it was so called on account of its waters. Others deduce its name from Beroc, as it was sometimes called by the poets, who was a nymph of the

ocean, and the nurse of Semele. Bryant supposes it to have been derived from Baris, Barit, or Barith, the ancient name of the ark, but properly signifying a covenant; and that it was the city of the ark, where the Canaanit or Phœnician deity Baal-Berith had a temple, and where the rites of his worship were performed. This city is not much inferior to Byblus in antiquity, since it is said to have existed in the time of Cronus. The kings of Egypt had possession of it; but when Antiochus the Great subdued this province, it became subject to the kings of Syria, and remained under the successors of this prince till the time of Diodotus, denominated "Tryphon," who entirely destroyed it about 140 years before the Christian æra. The Romans, after the conquest of Syria, rebuilt it near the spot where the ancient city had stood. Agrippa, the grandson of Herod the Great, decorated it at an immense expence with a theatre and amphitheatre, baths, and porticoes, and established in it magnificent games, mentioned by Josephus in his "Antiquities." It was in this city that Herod the Great, by permission of Augustus, held an assembly which condemned to death his sons Alexander and Aristobulus, under the false accusation of Antipater, their eldest brother, for having conspired against the life of their father. Titus, the son of Vespasian, came to Berytus, after the capture of Jerusalem, to celebrate the feast of the birth of his father; according to Josephus "De Bello." Berytus enjoyed the privilege of the "jus Italicum," according to a law of the Digest. Pliny (H. N. l. v. c. 20.) and Josephus (De Bell. Jud.) inform us, that it was a Roman colony. Under the Roman emperors, Berytus was no less famous for the study of the law in the east, than Rome was in the west; and hence it was styled by the emperor Justinian "the mother and nurse of the laws." The civil law was taught here in Greek, as it was at Rome in Latin. It is not certainly known by whom the academy was founded; but that it flourished long before the reign of the emperor Dioclesian, is manifest from a decree of that prince. According to Heineccius (Jur. Rom. Hist. p. 351—356.), the splendor of this school may be computed to have lasted from the third to the middle of the sixth century; and its institution has been ascribed to Alexander Severus. From this academy the two famous civilians Dorotheus and Anatolius were called by Justinian, that they, in concurrence with others, might be employed in comparing the Digests; and that prince would allow of no other academies, but those of Rome, Berytus, and Constantinople, to explain the laws. This city was overthrown by an earthquake in the 25th year of Justinian, A. D. 551, July 9; and as the schools of Berytus were filled with the rising spirits of the age, many youths were probably lost on this disastrous occasion, who might have lived to be the scourges or guardians of their country. The metals of this city are bronze, gold, and silver. After it became a Roman colony, its medals had a legend, COL. FIL. BER. i. e. "Colonia Felix Berytus," and were struck in honour of Cæsar, Augustus, Tiberius, Claudius, and other Roman emperors. For the present state of Berytus, see BAIROUT. The suburbs are almost as large as the city itself, consisting of gardens, with a house for the owner in each; and these, interspersed among the numerous fruit trees, particularly olives and figs, which this fertile soil supports, give the whole a picturesque and beautiful appearance. European vessels, in the summer, anchor near a small point of land, which runs into the sea before the city, and is called "Berith point;" but in the winter, they call anchor to the north, in a kind of gulf, which is sheltered from the north and east winds by the mountain, and is said to be very serene. The staple commodity of the country is raw silk, which is carried to Cairo, Damascus, and

and Aleppo, and part of it to Europe. They also fabricate a kind of jars and jugs of earthen ware, which, from the peculiar nature of the clay in the adjacent country, are highly esteemed, and carried to all parts of the coast. Brown's Travels in Africa, p. 377.

BERYTUS, a town of Arabia, formerly called Diofpolis. Steph. Byz.

BERZETIN, in *Geography*, a town of Hungary, in the district of Gomor, not far from the river Sajo, and formerly noted as the residence of many noble families.

BERZETTO, a town and abbey of Italy, in the duchy of Parma.

BERZOWITZ, a town of Hungary, 12 miles N.N.E. of Leutsch.

BES, or BESSIS, an ancient Roman weight, containing two-thirds of the *as*, that is, eight *uncie*. See *As*.

The bes originally weighed two asses; whence the origin of the word *quasi binus as*. Though Scaliger conjectures it to have been formed from *dues*; as *bellum* from *duellum*, or *bonum* from *duonum*. *Bes* was also a linear measure of the ancient Romans. *Bes* was also a measure of capacity.

BES was also used in the mensuration of lands, to denote two-thirds of a *jugerum*, or acre. See *MEASURE*.

BES was also a money of account, and a current coin among the ancient Romans. See *COIN*, and *MONEY*.

BESA, in *Ancient Geography*, an ancient city of the Thebaide upon the Nile, consecrated to a god of that name, but formed into a new city by Adrian, who built a temple in it in honour of Antinous, and called it *Antinoe* or *Antinopolis*; which see.

BESA, in *Mythology*, a deity belonging to the city of Abydus in the Thebaide, mentioned by Ammianus Marcellinus in his History, lib. xix. The mode of consulting the oracle of this deity was by writing the subjects of inquiry on sealed billets, which the priests carried into the sanctuary of the god, and to which they brought back the answers. Isaac Casaubon has suggested, in consequence of a passage occurring in the Bibliotheca of Photius (Cod. 279.), that this deity was adored at *Antinoe*, or *Antinopolis*; which see.

BESAILLE, or BESAYLE, Fr. denoting the father of the grandfather, in the *Common Law*, a writ that lies where the great-grandfather or great-grandmother was seized the day that he or she died, of any lands or tenements in fee-simple; and after his or her death, a stranger entered the same day upon him or her, and keeps out the heir.

BESALU, in *Geography*, a town of Spain, in Catalonia, at the foot of the Pyrenées, erected by pope Benedict VIII. into an archbishopric, but soon after suppressed; 7 leagues from the Mediterranean, and 5 north from Gerona.

BESANCON, a city of France, and before the revolution the see of an archbishop, and capital of Franche Compte, now of the department of the Doubs. This city is surrounded by mountains, and seated on the river Doubs, which divides it into the upper and lower town, joined by a handsome bridge. Of the former, nothing remains except the castle, or citadel, which is a long square built on a sharp rock, and commanding the city, which is defended by a wall flanked with eight towers like bastions. The latter has three long and handsome streets, which are adorned with houses built of free stone, and covered with slate; chiefly about the square called "Battan," which is ornamented with a fountain, whose water proceeds from the statue of Bacchus. The metropolitan church is built at the bottom of St. Stephen's hill, and is a handsome structure, with a high tower steeple. In the middle of the choir is the great altar, on which they expose at certain times, relics in silver shrines enriched with gold and jewels. Near the church of

Notre Dame is a triumphal arch, erected in honour of the emperor Aurelian, on which are seen several mutilated figures of men and animals. This serves as a gate to the cloister of St. John the Great. The great hospital of the order of St. Esprit, for foundlings, is a structure worthy of notice. The prison is remarkable for its excellent economy, and the humane attention paid to its unhappy occupiers. The town-house is a large edifice with four wings, having in its front the statue of Charles V. in bronze, with a globe in one hand, and a sword in the other. The imperial eagle is raised over a large basin, and spouts out water by both its beaks. The governor's palace is magnificent; and beyond it is a fountain, adorned with the figure of a naked woman discharging water at her nipples. Under the Romans, this was one of the most magnificent places which they had in Gaul, and many remains of their superb buildings are yet visible. After the death of Julian, it was almost destroyed by the Germans, and a second time by Attila. It afterwards became an imperial city, till the time of Lewis XIV., who, in 1674, made himself master of it, repaired its fortifications, and united it to France. The university of this city is an ancient and celebrated foundation; and in the year 1752 a literary and military society was instituted in this place. It contains 8 parishes; and the number of inhabitants, which was formerly estimated at 40,000, is now supposed to be reduced to 30,000. The canton of north Befançon is said to contain 15,618, and that of south Befançon 16,662 persons. The territorial extent of Befançon comprehends 97½ kilometres; the former canton includes 3, and the latter 4 communes. N. lat. 47° 13 45". E. long. 6 2 40".

About 20 miles from Befançon, near the abbey of "Grace Dieu," there is a natural ice-cellar, in a very romantic situation. On the highest part of a mountain, covered with a thick grove of lofty trees, is the opening of the cavern, which resembles by its depth, said to be above 220 feet, and by the solemn gloom of the surrounding wood, what poets have feigned of the descent into the infernal regions. The cavern itself is 60 feet in length and height, and 40 in breadth; the bottom is covered with ice, of which vast pyramids rise from it, while others appears suspended from the arched roof, with their points opposite to those of the former. Within the cave is a hole or well, always full of water, and never frozen; and, at the entrance, some mould, which seems to have been accidentally thrown there, and adorned with primroses and other wild flowers. The ice, which in the cavern appears of a beautiful azure, is, when seen by daylight, remarkably white. From this natural repository, the ice-houses in Befançon are supplied, when the winters are too mild to freeze water in the open air. This cavern has been the subject of repeated investigation, the result of which may be seen in the "Memoirs of the Academy," for 1712 and 1726.

BESANT, or BEZANT, BIZANT, or BYZANT, a sort of coin, struck at Byzantium, in the time of the Christian emperors, and well known in England, and indeed all over Europe, for some ages before the Norman conquest. Few coins ever had a longer or more universal currency than these besants or byzantines; having been current from the very beginning to the end of the eastern empire, not only in all its provinces, but also in all those countries which had been provinces of the western empire, and amongst others in Britain. With us gold and silver besants were received in payments. But though they are frequently mentioned by all the historians of the crusades, they are rarely spoken of by ours. Neither are they named in Domesday book, nor in the public acts of Henry I. or Stephen, nor in the last will of king Henry II. However, some mention is made of them in private deeds and leases, and also in the Exchequer rolls under Henry

Henry II. The gold besant was pure, or twenty-four carats fine; but writers are not generally agreed with respect to its value. Out of the Greek pound of gold, which was the same with our Tower pound, 72 Lyzaatines were coined, each weighing 73 troy grains, and worth 40 Saxon pennies, 8 Saxon shillings, and 9 shillings and four-pence halfpenny of our present money. (Henry's Hist. vol. iv. p. 275.) The silver besant, in the 12th century, was rated at two shillings English. (Lytelton's Hist. of Henry II. vol. i. p. 411.) Hence the gold offered by the king at the altar, or festivals, is still called besant, or bisant. Thirteen besants, or bisantines, were presented at the mass at the coronation of the kings of France. Henry II. had that number coined on purpose.

BEZANTS, in *Heraldry*. See BEZANTS.

BESARABA, in *Geography*, a town of European Turkey, in the province of Bulgaria, 48 miles north of Turnova.

BESBICUS, in *Ancient Geography*, a small island of the Propontis, now the sea of Marmora, situate between Cyzicum and the mouth of the Rhyndacus. This, according to Pliny (N. H. l. ii. c. 8.), is one of those islands which, being first joined to the continent, were separated from it by the violence of the sea, or by earthquakes.

BESBOROUGH, in *Geography*, an island in Norton Sound, on the west coast of North America. N. lat. 64° 10'. W. long. 161° 15'.

BESBRE, a river of France, in Nivernois.

BESERG HENLY, a town of Asiatic Turkey, in the province of Carmania; 24 miles north of Akserai.

BESHARRAI, a village of Syria, situate among the mountains in the pachalic of Tripoli, on the road to the Cedars, and distant from them 3 leagues, which is frequented by the Europeans, and where the missionaries have a house. During the winter, many of the inhabitants leave their houses under the snow, with some person to guard them, and remove to the sea-coast.

BESHETZK, or BEZETZK, a district in the government of Tver in the Russian empire, situate on the Mologa. N. lat. 58° 30'. E. long. 34° 24'.

BESITZERS, and BESITGED, in the *Military Art*, denote those who fly to a fortified place, and those who defend it. See *SIEGE*.

BEITHHEIM, in *Geography*. See BEISEHEIM.

BESILLUS, in *Ancient Geography*, a river of Spain, in Bætica.

BESISTAN, or BESESTAN, a name given to those places as Cassia, India, Adria, &c. and some other; viz. to the dominions of the Grand Seigneur, where the people have their shops, and expose their goods to sell. A particular besistan belongs to each class of merchants and workmen. These besistans are commonly large galleries vaulted over, whose gates are shut very tight. The vendors, or keepers, sell for hire, for a few farthings for the purchase of, or being put under a moderate price for each shop. See *BARBANS*.

BL. J. F. IRON, in *Bio-graphy*, born at New-Bury, Sept. 27th, 1766, and created doctor in medicine at Halle in 1792, was a high reputation for his learning, and industry in his profession; that he was seven times appointed dean of the college of New-Bury, and inspector of the medicines of that college, &c. there. He died November, 1822.

BLESER, BASIL, brother to Jerom, was born at Nuremberg in 1561, where he studied as an apothecary. Applying to the study of botany, he soon became conspicuous in that science of several authors. In 1613, he published "Hortus cysletensis, seu delineatio accurata omnium plantarum ex variis orbibus, terræ partibus, singulari studio collectarum, quarum

celeberrimis viridariis artem episcopalem ibidem cingentibus, hoc tempore conficiuntur, delineatio, et a vivum representatio," Nurem. b. 1613, in 4 vols. Atlas folio. The most splendid botanical work, Haller says, that had then appeared. The plates, 356 in number, and delineating 1533 plants were engraved at the expense of Conrad, bishop of the see. The work is unequal to its execution, as besides the errors committed in the description of many of the plants, some of the delineations are fictitious, taken from fancy, or from the rude accounts of ignorant travellers. But the far greater part of them are correctly drawn, and beautifully executed. As Basil was ignorant of the Latin language, his brother Jerom furnished the preface. He also published "Fasciculus rariorum, et ad ipsa dignorum varii generis, quæ ceteri incidi curavit," Norib. 1616. 4to. Max. containing some marine plants and fruits; also, "Icones florum et herbarum, &c." fol. 1622. It is a continuation of the hortus cysletensis, which have been several times reprinted. The time of his death is not known. Haller Bib. Bot.

BESLER, MICHAEL RUPPERT, son of Basil, was born in 1607. Having passed some years at Altdorf, where he was admitted doctor in medicine, he returned to Nuremberg, and was advanced to the same offices that had been enjoyed by his uncle. In 1631, he published, in 4to. "De sanguine secundum et præter naturam;" and in 1640, folio, "Admiranda fabricæ humane muliebris partium generationis potissimum intervientium, et sætus fidelis quinque tabulis hactenus nunquam visa delineatio." The work is ingenious, but the plates, which are copied from Fabricius, are ill executed. This work was followed, in 1642, by "Gazophylacium rerum naturalium ex regno vegetabili, animali et minerali de promptario fidelis representatio," fol. and the same year, by "Observatio medica singularis, mulieris tres filios emaxæ," 4to.

BESLERIA, in *Botany*, so named by Plumier after Basil Besler, an apothecary at Nuremberg, editor, with the assistance of Jungermann, of a sumptuous work, entitled "Hortus cysletensis," 1613. Lin. Gen. n. 755. Reich. 813. Schreb. 1012. Plum. 5. Jacq. Amer. 187. Juss. 121. Gærtn. t. 52. Class and order, *didynamia angiospermia*. Nat. Ord. *Polymoniae*. *Scrophulariæ*, Juss. Genia. Cal. Perianth one-lipped, five-parted, acuminate, erect, loose, with reflected tops. Cor. monopetalous, rugent; tube the length of the calyx, roundish, gibbous on one side at the base, and at the top; border five-lobed, division roundish, the lowermost largest, and the two upper lobes divided. Stam. Filaments four, within the tube of the corolla, of which two are a little shorter; anthers oblong, twin, hanging down on each side. Pist. Germ. globular, sitting on a glandulous body, which embraces it, and is permanent, cordate where the corolla is gibbous; styl. subulate, erect; stigma bifid, obtuse. Per. Berry subglobular, one-celled; partition, two opposite semi-ovate laminae, not coherent. G. Seeds numerous, round, very small, nestling, fixed to the inner surface of the berry.

Ess. Char. Cal. five-parted; berry subglobular, many-seeded.

Species, 1. *B. melitifolia*. "Peduncle branching; leaves ovate." It has a smooth, woody, jointed stalk; with two ovate terve leaves opposite at each joint, which are crenate at their edges; the flowers proceeding from the wings of the leaves upon short branching footstalks, each sustaining six or eight flowers. A native of South America. 2. *B. lutea*. L. n. l. a. Brown, Jan. 27. f. l. &c. fl. luteo, major, Plum. Gen. 29. "Peduncles simple, or wided; leaves lanceolate." Rising with a lignous stem, six or seven feet high, divided towards the top into many irregular branches, with spear-shaped serrate leaves, having many transverse veins; the flowers issuing at the wings of the leaves in large clusters, each

on a separate foot-stalk, and small, tubulous, of a pale yellow colour." A native of Martinico, Jamaica, &c. 3. *B. cristata*. "Peduncles simple, solitary; calyxes ferrate-crested." A shrubby plant, differing in its habit from the foregoing, climbing up trees, and adhering to them by roots issuing from the joints; the twigs round, hirsute, and long; the leaves ovate, acute, ferrate, hirsute, wrinkled, veined, petioled, opposite, two inches long; peduncles one-flowered, axillary, bent down, almost as long as the leaves; calyx bright scarlet; corolla yellow; stamens proceeding from a common membrane, fastened to the tube of the corolla, and cleft longitudinally at its gibbous part. Before the dispersion of the pollen, the filaments are upright; afterwards interwoven as in *Martynia*. A yellow conspicuous gland embraces the germ. A native of Martinico, in moist mountainous woods. 4. *B. bivalvis*. "Calyxes bivalve, torn." Stem herbaceous, long, creeping, hairy, round; leaves opposite petioled, veined, hairy, nerved, a hand's breadth long; peduncles lateral, opposite, shorter than the leaves, two from each axil, one-flowered; berry oval, with a hard two-celled nucleus; resembling the third species in the leaves and calyx, but very different in the fruit, and in wanting the five-leaved perianth. Observed at Surinam by Dahlberg. 5. *B. biflora*. *Cyrtandra biflora*, Forst. gen. 3. n. 1. "Peduncles two-flowered; involucre caducous, inflated; leaves ovate, quite entire." A native of the island of Otaheite. 6. *B. cymosa*. "Peduncles cymed; pedicels with little bractes; leaves ovate, crenate." A native of the island of Tanna.

Propagation and Culture.—These plants grow naturally in the warm parts of America. The seeds should be sown on a hot-bed early in the spring, and the plants, when half an inch high, transplanted each into a small pot filled with light fresh earth, and plunged into a hot-bed of tanner's bark, watered and shaded till they have taken root; afterwards according to the warmth of the season, and of the bed in which they are placed. When the plants have filled these small pots with their roots, they should be shaken out, and their roots trimmed and put into large pots filled with light fresh earth, and plunged again into the hot-bed, where they should have much air in warm weather, and be frequently watered. Thus managed, the plants will thrive in summer, but in winter they must be removed into the stove, and often, but sparingly, watered. In the second year these plants will flower; they sometimes perfect their seeds in this country; but as they will not live in the open air, they must be constantly preserved in the stove. *Martyn*.

BESONS ROCKS, in *Geography*, are two small rocks off the western point of Cornwall, bearing W.S.W. from cape Cornwall, and N.N.E. from the Long ships. Ships may sail within them without danger.

BESORCH, in *Commerce*, a coin of tin, or of some alloyed metal, current at Ormus, at the rate of about $\frac{3}{4}$ parts of a farthing sterling.

BESOS, or **BERULUS**, in *Geography*, a river of Spain in Catalonia, which runs into the sea not far from Barcelona.

BESSAPARA, in *Ancient Geography*, a town of Thrace, situate 12 miles from Philippopolis.

BESSARA, a town of Asia in Assyria, seated near the Tigris. *Ptolemy*.

BESSARABIA, **BUDZIAC**, or **BOODJAK**, in *Geography*, is a small country of Turkey in Europe, situate between the north branch of the Danube and the river Dneister, and bounded on the west by Moldavia, on the south by the Danube, on the east by the Black sea, and on the north by Russia. It was anciently the country of the Getæ and Peucini; but it is now inhabited by the independent Tartars, of whom some have fixed habitations in their villages, and others lead a

kind of wandering life, subsisting on the flesh of their oxen and horses, and on the milk of mares, and the cheese which is made of it. In their religion, manners, and customs, they resemble the Crim Tartars. When an army is sent to attack them, they retire into inaccessible mountains, on the coast of the Black sea, whence it is impossible to expel them, on account of the morasses and defiles. The chief towns are Bender, Akerman, Kilia, and Ismail. This country, and also Walachia, on which it borders towards the south-west, contain some lakes of considerable extent, as those round Ismail, and that to the east of Surza, which communicates with the Danube, and forms a part of that river.

BESSARION, **CARDINAL**, in *Biography*, was born at Trebifond in 1395, and educated at Constantinople, under some of the most learned Greeks of that period. In the course of his education, he adopted the principles of the Platonic philosophy, and was more confirmed in them by the lectures of George Gemistus Pletho, on whom he attended in the Morea. These principles he combined with his system of Christian theology. Having taken the religious habit of St. Basil, he was soon advanced to the bishopric of Nicæa, and employed by the Greek church to attend on their behalf at the council held under pope Eugenius IV. first at Ferrara, and afterwards at Florence, in 1439; with a view of effecting an union between the Latin and Greek churches. But he incurred the displeasure of the Greeks by inclining to the party of the Latins, and proposing an union of the two nations, to the prejudice of the former, who were required unequivocally to declare that the Roman pontiff was the supreme head of the universal church. Bessarion became unpopular in his own country, nor could he venture to revisit Constantinople; but remaining at Rome, and subscribing the articles of the Latin church, he was recompensed, in 1439, by a cardinal's hat, and he was also created titular patriarch of Constantinople. Having perfected himself in an acquaintance with the Latin language, he was from this time employed by the popes in several concurus of moment. Nicholas V. after naming him to the bishopric, first of Sabina, and afterwards of Frascati, sent him as legate to Bologna, where he resided from the year 1450 to 1455, and contributed to revive and increase the reputation of the university. Upon the death of Nicholas, the cardinals had an intention of advancing him to the papal see; but when they waited upon him with this view, they were prevented from seeing him by one of his attendants, who would not allow him to be disturbed in his studies; upon which Bessarion, when he was informed of the fact, said to him, "Perot, thy incivility has cost thee a hat, and me the tiara." Bessarion was employed by the popes Calixtus III. and Pius II. in negotiating the wished-for league against the Turks, and deputed for this purpose to Alphonso, king of Naples, and the emperor Frederic. During the pontificate of Paul II. he lived at Rome, and distinguished himself in the promotion of literature, by opening an academy in his palace for the study of philosophy, and for gaining a critical knowledge of the Greek and Latin languages: nor was he less liberal and active in encouraging every other branch of science, by countenancing with his presence and patronage those assemblies that were frequented by the Greeks and Italians for the purpose of mental improvement. His library, which contained many Greek MSS., is said to have cost him 30,000 crowns; and this he presented, in 1468, to the republic of Venice, where it became the chief foundation of the library of St. Mark. Having received from pope Sixtus IV. the appointment of legate to France for the purpose of reconciling king Lewis XI. and the duke of Burgundy, he paid his first visit to the duke, and thus offended Lewis to such a degree, that he treated him with rudeness, and dismissed him without

without entering on the business for which he was deputed. This kind of reception affected him so much, that on his return he fell sick at Turin, and died at Ravenna in 1472. He was regarded as a person of unparalleled genius and erudition; and he was the author of many works, both in Greek and Latin, some of which were printed, and others left in MS. The chief of these was his defence of Plato, against George of Trebizond, in a treatise entitled "In calumniatorem Platonis, lib. iv.," first printed without a date at Rome in 1470, and re-edited at Venice in 1503 and 1516, folio. In this publication he examines Plato's opinions, particularly with regard to morals, and shews that they approach much nearer to the doctrines of Christianity than those of Aristotle. Others of his printed works are letters, orations, and translations of Xenophon's Memorabilia, the metaphysic of Aristotle, and that, falsely ascribed to Theophrastus. According to Brucker, these translations are very obscure; but Huet commends Bessarion as the model of all good translators. Brucker's Hist. Philos. by Ensfield, vol. ii. p. 407. Fabr. Bib. Græc. l. v. c. 43. § 9. tom. 10. p. 401.

BESSARIONOVA CAPE, in *Geography*, is the west point of a bay in the sea of Azof, of which the east point is cape Berdinskaya. N. lat. 46° 35' E. long. 36° 46'.

BESSA-STÄDER, or **BASSE-STED**, a place of Iceland, (N. lat. 64° 6') the residence of the king's prefect. In this place is a woollen manufactory, with a fulling mill belonging to it.

BESSAY, a town of France, in the department of the Allier, and chief place of a canton in the district of Moulins, 8 miles south of Moulins.

BESSE, **JOHN**, in *Biography*, of Peyruffe, in the Rouergue, was educated under M. Chirac, at Montpellier, whose theory of fermentation he adopted. He then went to Paris, where he published, in 1702, "Recherches analytiques sur la structure du corps humain," 8vo. He derives all the functions of the body, and even the formation of the fœtus, from a due mixture of acid and alkali. He does not allow the imagination of the mother to have the power of marking or disfiguring the fœtus in utero. The following year he was created doctor of physic by the faculty at Paris, and soon after was made physician to the queen dowager of Spain. In 1723, he published "Lettre critique, contre l'idée générale de l'économie animale, et les observations sur la petite vérole," in 12mo. In this work, the first part of which was written to oppose the principles laid down by Helvetius, he gives an account of a malignant species of small-pox, which raged in the year 1716, and speaks of the benefit accruing in these cases from bleeding, and administering purges, on the attack of the secondary fever, a doctrine approved by Drs. Mead and Friend. He commends the dissection of dead bodies, with the view of discovering the causes of disease, which he frequently practised, and mentions his having found 13 calculi in the gall-bladder of a person who died of jaundice. For other smaller pieces by this writer, see Haller's Bib. Med. Præc. He died, we are told, at Paris, at an advanced age.

BESSE, in *Commerce*, a Persian copper coin, in value 1½ d sterling.

BESSE, in *Geography*, a town of France, and principal place of a district, in the department of the Puy-de-Dôme, 6 leagues south of Clermont. The town contains 1913, and the canton 11,016 persons. Its extent comprehends 445 kilometres and 12 communes. N. lat. 45° 31'. E. long. 2° 52'.—Also, a town of France, in the department of the Var, and chief place of a canton in the district of Brignols, 6 miles S. E. of Brignols. The town includes 1578, and the canton 8165 persons. The territory contains 317½ kilometres and 7 communes.—Also, a town of France, in the department of the

Sarte, and chief place of a canton in the district of St. Calais, on the river Braye, 5 miles south of St. Calais.

BESSENAVY, a town of France, in the department of the Rhone, and the district of Lyon, 4 leagues west of Lyons.

BESSENBACH, a town of Germany, in the circle of the Lower Rhine, and archbishopric of Mentz; 6 miles east of Achenhausenburg.

BESSERNE, a small island of Denmark, 2 miles S. E. of Veyeroe.

BESSI, in *Ancient Geography, a people who inhabited a district of Thrace, near mount Hæmus, called *Bessica*. They lived in huts, and maintained themselves by plundering their neighbours. They were the most savage and inhuman of all the Thracians, according to the account given of them by St. Jerom, Paulinus of Nola, Eutropius, and Ovid. Their chief city, Uteudama, is now known by the name of Adrianople. They lived under their own kings, undisturbed by the neighbouring princes, till the consulate of M. Licinius Lucullus and C. Cassius Varus. Lucullus invaded their country; after a signal victory took possession of it, and subjected the whole nation to the Roman laws. The Romans afterwards allowed them to live under their own kings; but Piso, while he governed Macedon as proconsul, having treacherously seized Raboecentus, whom Strabo calls prince of the Bessi, caused him to be publicly beheaded; and this affront so exasperated the whole nation, that they shook off the Roman yoke; however, they were vanquished in a considerable battle by Octavius, the father of Augustus. During the civil wars of Rome, they again attempted to recover their liberty, but were subdued by the famous M. Brutus, junior. In the reign of Augustus, one Vologeses, a native of the country and priest of Bacchus, having, under pretence of religion, assembled a numerous body of people, made himself master of the whole country, and entering the Chersonesus, committed most dreadful ravages; but was at last overcome by L. Piso, who obliged the savage inhabitants to lay down their arms, and submit to such conditions as he was pleased to impose. From this time the Bessi continued subject to the Romans, without making any further attempts to recover their ancient liberty. Eutrop. l. ii. Oros. l. iv. c. 3. Flor. l. iv. c. 12. Sueton. in Octav. Dio Cass. l. xlviii.*

BESSIERES, in *Geography*, a town of France, in the department of the Upper Garonne, 5 leagues N. E. of Toulouse.

BESSIGBEIM, a town of Germany, in the circle of Swabia, and duchy of Wurtemberg, near the conflux of the Ens and Necker, 8 miles south of the Heilbron, and 13 north of Stuttgart. The district of the same name is a good wine country.

BESSIN, the name, before the revolution, of a small country of France, in Lower Normandy, near the sea-coast.

BESSINES, a town of France, in the department of the Upper Vienne, and chief place of a canton in the district of Bellac, situate in a deep, narrow, rocky valley, 6 leagues north of Limoges. The town contains 2511, and the canton 9372 persons. Its territory includes 180 kilometres, and 7 communes.

BESSIS. See **BIS**.

BESSIS Centesima, denotes two-thirds of centesimal interest, or usury at eight per cent.

BESSONIE, **L. A.** in *Geography*, a town of France, in the department of the Tarn, and chief place of a canton in the district of Castres, 3 leagues N. N. E. of Castres.

BESSY BELL, a mountain of Ireland, in the county of Tyrone, 10 miles south of Strabane.

BESTAAD, a town of Norway, 36 miles N. N. E. of Drontheim.

BESTAGNO, a town of Italy, in the duchy of Monteferrat, on the Bormida, 18 miles East of Alba.

BESTAIL, or **BESTIAL**, in *Ancient Statutes*, is used for all kinds of cattle. 4 Edw. III. c. 3. It has been appropriated more, in former times, particularly to those that were purveyed for the king's provision.

BESTARCHA, a dignity in the courts of the emperor of Constantople, supposed to answer to that of the *master of the wardrobe* among us.

The word *bestarcha* seems to have been formed from *vestarcha*, by a change of the *v* into *b*.

BESTERTZE. See **BISTRITZ**.

BESTIARI, among the *Ancient Romans*, those who were hired to combat with beasts, or those who were exposed to them, by sentence of law.

We usually distinguish two kinds of *bestiarii*: the first were those condemned to the beasts; either as being enemies taken prisoners, or as being slaves, and guilty of some enormous crime.—These were all exposed naked, and without defence, to the beasts; nor did it aught avail to conquer and kill the beast, fresh ones being continually let loose on them, till they were dead. But it seldom happened that two were required for the same man; on the contrary, one beast frequently dispatched several men. Cicero mentions a lion, which alone dispatched two hundred *bestiarii*.—Those who succeeded the first were called *επίδροι*, and the last *εσχάτοι*; among the Romans, *meridiani*.

The Christians were *bestiarii* of this kind, even some of them who were Roman citizens; though it was the legal right of such to be exempt from it.

The second kind of *bestiarii*, Seneca observes, consisted of young men, who, to become expert in managing their arms, fought sometimes against beasts, and sometimes against one another; and of bravoës, who, to shew their courage and dexterity, exposed themselves to this dangerous combat. Augustus encouraged this practice in young men of the first rank; Nero exposed himself to it; and it was for the killing beasts in the amphitheatre, that Commodus acquired the title of the Roman Hercules.

Vigenero to these adds two kinds of *bestiarii* more: the first were those who made a trade of it, and fought for money; the second was where several *bestiarii*, armed, were let loose at once, against a number of beasts.

BESTOROZIN, or **BESZERMEY**, in *Geography*, a town of Hungary, 8 miles N. N. W. of Debreczin.

BESTRITZA, or **BISTRICRA**, a large town of Lower Hungary, on the Wag, with a castle facing it, seated on a high rock on the opposite side of the river.

BETA, deriving its name from the form of the letter *BETA*, which it has when swelled with seed, in *Botany*. Lin. gen. 310. Reich. 338. Schreb. 436. Tourn. 286. Gærtn. t. 75. Juss. 85. Class and order, *pentandria digynia*. Nat. Ord. *Holoraceæ. Atriplices*, Juss. Gen. Char. *Cal.* perianth five-leaved, concave, permanent; divisions ovate-oblong, obtuse. *Cor.* none. *Stam.* filaments five, subulate, opposite to the leaves of the calyx, and of the same length with them; anthers roundish. *Pist.* germ. in a manner below the receptacle; styles two, very short, erect; stigmas acute. *Per.* capsule within the bottom of the calyx, one-celled, deciduous. *Seed* single, kidney-form, compressed, involved in the calyx.

Ess. Char. *Cal.* five-leaved. *Cor.* none. *Seed* kidney-form, within the substance of the base of the calyx.

Species, 1. *B. vulgaris*, red garden beet. Varieties *α. B. rubra vulgaris*, Bauh. pin. 118. Raii hist. 204. n. 2. Ger. emac. 318. n. 2. Park. theatr. 751. f. 3. Common red beet. *β. B. rubra major*. Bauh. pin. 118. Blackw. t. 235. Ger. 251. n. 3. emac. 392. *B. italica*. Park. par. 490. Raii hist. 205. Great red beet. *γ. B. rubra, radice rapæ*, Bauh. pin. 118. Raii hist. 204. n. 4.—*romana rubra, ra-*

posfa dicta. Park. par. 489. Turnep-rooted red beet. *δ. B. lutea major*. Bauh. pin. 118. Raii hist. 204. n. 5.—*fyriaca*. Park. theatr. 752. n. 3. Yellow-rooted beet. *ε. B. pallide virens major*. Bauh. pin. 118. Green-leaved red beet. “Flowers heaped; leaflets of the calyx toothed at the base.” This species has large, thick, succulent leaves, generally of a dark red or purple colour. The roots are large and deep red, on which their goodness depends; for the larger they grow, the more tender they will be, and the deeper their colour, the more are they esteemed. A native of the sea-coast of the southern parts of Europe. The variety *α.* has the leaves shorter than in the white beet, more or less red, and sometimes so dark, as to be called black beet; its root white. *β.* has leaves large and red, as is the whole of the plant, as well root as stalk, and flowers full of a purple juice, tending to redness; the midribs of the leaves are very broad and thick, like the cabbage leaf, and equal in goodness when boiled. Gerard says, that it grew with him in 1596, to the height of eight cubits, and brought forth its rough seeds very plentifully. These, though taken from a plant of one colour, produce plants of many and valuable colours. *γ.* Stem higher than the common red beet; root thick, within and without of a high blood colour. *δ.* Leaves paler than those of the white beet, of a greenish yellow colour; the root of a fine high yellow, sweet and well tasted. All these are mere feminal varieties. The beet is subject to change, and to degenerate, at least in our climate. It has been supposed, that the *B. cicla* is not specifically different from the *vulgaris*, and that both are derived from the *maritima*, cultivated on a rich soil, in southern climes. The beet is said to be prejudicial to the stomach, and to yield little nourishment. Taken in quantity, it tends to loosen the belly. The juice of the root and leaves is said to be a powerful emetic, and to occasion a copious discharge of mucus, without provoking sneezing. A good sugar may be obtained from the juice of the fresh roots. This species was cultivated in 1656 by Mr. John Tradescant, jun. 2. *B. cicla*, white garden beet. *B. hortensis*. Mill. Dict. n. 2. *B. vulgaris*, *ζ. η.* Lin. Spec. 322. *B. alba*. Ger. 251. n. 1. emac. 318. n. 1. Raii hist. 204. *B. communis alba*. Park. par. 489. 1. *B. alba vel pallescens, que cicla offic.* Bauh. pin. 118. and *B. communis viridis ejusd.* “Flowers three-fold; leaflets of the calyx unarmed at the base.” The root of this sort seldom grows larger than a man's thumb; the stalks grow erect, and have oblong, spear-shaped leaves growing close to the stalk; the spikes of flowers are axillary, long, and have narrow leaves placed between the flowers; the lower leaves are thick and succulent, and their footstalks broad; and for the sake of these it is cultivated. A large variety of this has been lately introduced from abroad, under the titles of “*Racine de disette*,” “*Root of Scarcity*,” and “*Mangel Wurzel*.” The ancients called the white beet *Cicla*, or rather *Sicla*, by contraction from *Sicula*, Sicilian beet; as we call the Savoy-cabbage, *Savoys*. Mr. Miller mentions three varieties of this, viz. the white, the green, and the Swiss or chard beet; by the last of which he probably intended the same as the modern “*Mangel Wurzel*.” He says that they vary from one to another in culture, but that they never alter to the first or the third. 3. *B. maritima*, sea-beet. Lin. spec. 322. sylf. 262. Reich. 623. Hudf. 108. Wither. 277. Eng. Bot. t. 285. Smith. Flor. Brit. 115. *B. sylvestris maritima*. Bauh. pin. 118. Park. theatr. 750. 2. Raii syn. 157. hist. 204. Ger. emac. 318. 2. Sea-Beet. Pet. H. Brit. t. 8. f. 9. “Flowers double or twin; stalks decumbent; leaflets of the calyx even, not toothed.” It differs from the others, according to Linnæus, in flowering the first year; in having oblique or vertical leaves; and in the leaflets of the calyx being equal, not toothed; accord-

ing to Ray, in having a perennial root. This is probably the original parent of all the garden beets. A native of Holland and Great Britain, on the sea-coast, and in salt marshes: it is also found plentifully about Nottingham. It is perennial, and flowers in August. 4. *B. patula*, spreading beet. Ait. hort. kew. i. 315. "Flowers heaped; all the leaves linear-lanceolate; branches divaricated. "Stem short, hardly a foot high, very branching; branches long, divaricate; calycine leathers at the base, but not toothed." Flowers in August. A native of the island of Madeira. Introduced in 1788. Martyn.

BETA, in *Gardening*, comprehends several different useful esculent roots and culinary herbs of the hardy kind, as the *B. cicla*, or common culinary beet, which has a small, oblong, white root, producing from its crown many large, oblong, succulent leaves, on broad footstalks, and erect branching feed; stems two or three feet high, garnished with close-setting leaves, and long spikes of greenish flowers, which are succeeded by plenty of ripe seed in autumn. The varieties of which are the *common green-leaved beet*; *large white beet*; *chard*, or *great Swiss beet*, having very broad leaves, with thick foot-stalks and ribs. These often vary from one to the other, the seed of one frequently producing some of each sort, though by proper care in sowing it, the difference may be preserved.

The *B. major*, or *great German beet*, commonly called *mangel wurzel*, has a large, long, reddish, or sometimes whitish red root; and very large, oblong, thick, succulent leaves. The varieties of which are—the *dark-green leaved*—*light green-leaved*—*red-veined leaved*. This species has been very much recommended, on account of its vast growth and great utility both in its root and leaves; experience has, however, shewn the former to have little claim to esteem for domestic uses, as it is of an insipid and unpalatable taste; but the leaves being large and succulent, are good to use occasionally, in the manner of common beet, and particularly to boil as spinach, or put into soups; and the stalks and midrib of the leaf to be stewed and eaten as asparagus. Dr. Lettson, who took much pains to introduce the mangel wurzel, informs us, that on his own land, which was not favourable to its growth, the roots, upon an average, weighed full ten pounds; and if the leaves were calculated at half that weight, the whole product would be fifteen pounds of nutritious aliment, upon every square of 18 inches.

The *B. rubra*, or *red beet*, has a large, red, eatable root, crowned by many large, oblong, reddish-dark-purple leaves; and when it shoots, sends up erect stalks and branches, terminated by long spikes, of flowers and seed. The varieties of which are *common red beet*, with a large, longish, dark-red root; *turnep-rooted red beet*, with a short, large, dark-red root; with a red root and green leaves; with a yellow root; but the first of these varieties is mostly preferred for general culture, though the second is equally good, but the root is not of so good a shape as that of the former; the other two are not proper to cultivate for a crop.

Methods of Culture of the common Beet. All the varieties are propagated by seed sown annually in the spring, in February, March, or April, in the place where the plants are to remain, in order to attain proper growth for use in summer and autumn. They will continue till spring, when they shoot for seed. If the sowing be neglected in the spring, some seed may occasionally be sown in summer, any time till the beginning of August, in a moist situation, but the spring is the most eligible season for obtaining a good crop. They may be sown in any common soil, allowing each sort a

separate plat or bed. The ground should be dug one spat-deep in the usual way; the seed then either sown broadcast on the surface, and raked in; or, as it is a large seed, shallow drills may be drawn, at the distance of six inches for the common green and white varieties, but almost double that for the large white and chard beet, sowing the seeds thickly, and raking the earth over them, about an inch deep; then trimming the surface smooth. The plants come up in about a month, and when they have leaves an inch or two broad, they should be hoed, to thin and destroy weeds, cutting out the common green and white sorts to about six inches distance; but the chard beet should be allowed ten or twelve inches room every way, that their large succulent leaves may have full scope to spread. They are commonly in perfection in June and July, and it is necessary to observe, in gathering them, to take the large outward leaves, the others coming in for use in their turn, an abundant successive supply rising from the root. A succession crop must be raised every year from seed in the spring, &c. for although the same crop might be occasionally continued two years, by cutting down the seed-stems of the year-old plants, according as they advance in spring and summer; the roots abiding, produce a supply of leaves, but which are much inferior in substance to those of the annually-raised seedling plants; it is better, therefore, to sow every year, in order to have a good production. The large white and great chard beet are in much esteem, for the stalks and ribs of the large leaves, being divided of the leafy part and peeled, are great improvers of soup, and useful also for stewing, and to be dressed and eaten like asparagus, and the leaves themselves are fine pot-herbs; for all which uses, the several varieties of this species may, as has been seen, be obtained almost the year round.

The Mangel Wurzel Beet. This sort has generally been reckoned a variety of the *B. cicla*; but some botanists have made it a distinct species, under the title of *B. altissima*. It is raised from seed sown annually in the spring, the same as the other sorts, in any open situation, but should generally be sown thinner, either in drills one or two feet asunder, or broadcast on the general surface, and raked in; and when the plants are come up one, two, or three inches in growth, they should be thinned to a proportionable distance, to give room for the full expansion of their large leaves. Some, however, advise transplanting, when the young plants are of two or three inches in growth, setting them in rows one or two feet asunder; this seems, however, unnecessary; especially, as they have long, downright, tap roots, which generally are the most successful when they remain where sown; the method may, nevertheless, be practised occasionally by way of experiment. The plants generally continue to produce leaves the greatest part of the year, and the roots attain perfection for use in autumn and winter, till spring; but when it is required to have a principal crop of full-sized roots, some should be allotted for that purpose, without cutting or gathering the leaves. This sort is valued most generally for its leaves, for which it principally merits culture in the gardens; as we cannot much recommend the root, which, although it grows very large, sometimes of several pound weight, is greatly inferior in use, both to the red beet, and that of most others of our esculent roots, for any domestic purpose. It is sometimes dressed in the manner of carrots, and parsneps, &c. sliced, and kersed up with butter, but is generally of a mawkish, unpalatable relish.

The leaves, however, which, if the plants have large scope of room, grow twelve or fifteen inches broad or more, and of proportionable length, are exceedingly good, when young, to use as the common white and green beet; and the young, thick, fleshy stalks, divided of the leafy part, peeled or

scraped, then boiled and served up with butter, are tender and agreeably tasted; also the leaves to boil occasionally as spinach and other small greens; and of which the root is remarkably productive in quick growth, to afford frequent successive gatherings all summer and autumn, either cutting them off close, or gathering only the larger outward ones, as in either method they soon shoot up again in plentiful succession.

The Red Beet. This is raised from seed sown annually in March or April, in the place where the plants are to remain, being careful to procure that of the best dark red sort. It should be allowed a light, rich, deep soil, in an open exposure. The market gardeners often sow this sort thinly among their crops of onions, carrots, &c. that are to be drawn off while young; so that when these are gone, the beet commences a full crop.

It is, however, a better practice to sow the principal crop separate. The ground should be dug one spade deep at least, and well broken, the seed sown directly, which may either be broad-cast on the surface, or raked well into the ground; or, as observed of the first sort, in drills drawn an inch deep, and at the distance of ten or twelve inches; or you may dot or prick it, as is often practised, with a blunt dibber, in lines at the above distance, making the holes an inch deep, and eight or ten asunder in the rows, dropping two or three seeds in each hole, though only one good plant should be left in each place. In May or June, when the plants have leaves an inch or two broad, they require thinning and cleaning from weeds, which may be performed either by hand-weeding or small hoeing; the latter is the most expeditious for large crops, and it loosens the surface of the earth, to the great advantage of the young plants; carefully eradicate all weeds, and thin the plants to ten or twelve inches distance. Some of the roots will be fit to take up for use about the end of August, though they will not attain full perfection until October. In November, a quantity of the roots should be taken up, their tops trimmed off, not too close, and then laid in sand or dry earth, under shelter, to be ready for winter use.

This sort of beet is highly valued for its large red root, which in the common variety, often grows twelve or fifteen inches long, and three or four inches thick or more; but that of the turnep-rooted sort is much shorter, and generally thicker, and of equal goodness in every respect for use; and in both of which, those that are of the largest growth and darkest red colour, are the most valuable: these roots being tender, sweet, and palatable, are boiled, sliced, and eaten cold, &c. are also sliced and scraped in sallads, both as an eatable ingredient, and by way of garnish; slices of the root are also in request not only as garnish to dishes, but as a pickle: the other varieties are never cultivated for any principal crop.

Saving of Seed. In order to save seed from any of the varieties, either mark some of the best plants in spring, to be left to run up, or transplant some of them in February or March into a convenient place, to have shelter from winds; they shoot up stalks in May; in June they must be supported with stakes; and the seed will ripen in September.

That a great quantity of sugar might be obtained from white beet, has been long known. The famous chemist Margraaf made some experiments, half a century ago (published in the year 1747) for determining the quantity of sugar contained in various European plants. He found that the white beet produced a much greater quantity than any of the other plants. The beet has of late been much cultivated, particularly in Germany, with a view to the sugar that is obtained from the root. M. Achard of Berlin, first in-

roduced this subject into general notice, and recommended that the sugar should be procured by boiling the beet-roots, when taken out of the earth; that they be sliced when cold; that afterwards the saccharine juice be pressed out; and that it be filtered, evaporated, and, after evaporation, the sugar be procured by crystallization and pressure. He has published his method at full length, in "Ausführliche Beschreibung," Berlin 1799. 8vo. He lays much stress on the mode of culture, and observes, that crude sugar can be produced at about three-pence a pound. His peculiar mode of culture consists chiefly in planting the seeds at a certain distance from each other, and in not transplanting the roots. M. Achard reckons three varieties of the beet-root; but he prefers that which has the skin of a reddish colour, and the flesh white. The kinds of beets which have been used for this purpose, are varieties of the *B. vulgaris*. Mr. John Taylor of Leipsig has given a particular account of the method of cultivating the common beet, and of preparing sugar from its root, in a letter addressed to his father, the secretary of the society for the Encouragement of Arts, &c. and published in the 18th volume of their Transactions. He observes, that the soil should be a good black earth, not too moist; and that it should be prepared, like that designed for cabbages, by dunging it in autumn with short rotten dung, and ploughing it, and by turning it again in spring, and ploughing it a third time to a greater depth than before. After the third ploughing, says M. Achard, it should be carefully harrowed, to render it smooth and even, and to brake all the lumps of earth which may happen to be in it. The seeds are usually placed at the distance of from 12 to 18 inches from one another, from 9 to 12 inches according to M. Achard, and at the depth of one inch in the earth. One seed is laid in each hole, and immediately covered with earth. In four or five weeks time the ground must be weeded, and afterward shod. Some prefer transplanting the roots, to sowing the seed in the ground where the plants are intended to remain. M. Achard forbids all transplanting; and one of his reasons for this prohibition is, that the lower part or points of the roots are liable to be thus broken off, which part, he says, gives more sugar than the upper part. After they have been some time in the ground, the earth should be loosened with a hoe, and the weeds destroyed. The method invented by professor Gottling for separating the sugar from the beet-roots, is easily practicable, and adapted to this country. It is as follows:—He recommends the taking of the beet-roots out of the ground from the middle of September to the middle of October, that the weather may be favourable for drying them, which should be done carefully, lest, as M. Achard observes, they should be damaged, and any of the juice which oozes out be lost; and washing them as speedily as possible from the earth that adheres to them, and cutting off their small fibres as well as such part of the root as had arisen, whilst they were growing, above the surface of the earth. The roots are afterwards wiped with a cloth, and laid upon a dry floor; the heads are cut off and given to the cattle; and the roots are sliced lengthways, along the middle, each half being cut again into slices, and loosely hung, not too near each other, lest they should spoil, on strong thread, suspended on nails, in an airy chamber or place secure from the rain. In the course of two or three weeks, with proper attention, they will be sufficiently dry for the extraction of their sugar. If the drying season is far advanced, or a frost expected, the beet-roots should not be exposed to the outward air; they should be dried in the kitchen or warm rooms, either on strings or netted frames, resembling the flakes used in Yorkshire for drying oat-cakes; or they may be dried in stove-rooms by artificial

artificial heat, taking care to prevent their being smoked or burnt. If an opportunity does not occur for slicing the roots immediately after being taken out of the earth, they should be placed in cellars, and covered with straw, or put into holes in dry sandy earth, and preserved till they are wanted.

M. Achard says, that after the roots are washed and cleaned, they should be sliced by means of a machine, or ground in a sort of mill, consisting of a cylinder furnished with points, like a rasp, which turns round in a box. The roots are put in this box, and pressed, by means of a weight against the cylinder, which, upon being turned round, soon reduces them to a kind of pulp. When the beet-roots are dry, they are ready for the extraction of their sugar. For this purpose, three wooden tubs, wide, but not deep, made of oak, ash, or willow, should be provided, or, for family use, earthen mugs. Near the bottom of the tubs, cocks or spigots should be fixed, and the tubs should be placed in a cool situation of about 52° of Fahrenheit, upon a stillage near each other, and at such a height from the ground that smaller vessels may stand below them for receiving the liquor when drawn off, and clear water should be at hand so as to be pumped into the higher vessels. When the beet-roots, thoroughly dried, have been sifted, so as to be free from the dust and loose fibres, one of the higher tubs should be half filled with them, and clear cold water poured upon them, about one-third in height above the roots. In this state they should remain for about three hours, stirring them at different times with a wooden paddle. At the end of this time, the same number of clean dried roots should be put into the second tub; and the sweet liquor drawn from the first tub into the vessel under it, should be poured upon the roots in the second; and the first tub should be supplied with fresh water in such quantity as just to cover the roots, and the tubs should remain three hours more, and the roots be repeatedly stirred, as before. The liquor which had been poured from the first tub to the second, will be now much absorbed by the roots in the latter tub. After standing again for three hours, the sweet liquor from the second tub must be drawn off, which, if the roots were of the red and white sort, will be of an agreeable red colour. It must then be passed through a sieve, or filtered through a flannel, and thus be rendered fit for boiling down for sugar. After this, draw the liquor from the first tub, pour it on the second, and put into the first tub more fresh water, and let it stand three hours longer. Then put into the third tub the usual quantity of dry roots, and pour on them the liquor drawn from the second tub; remove the liquor from the first to the second; and the roots in the first tub being now deprived of their saccharine matter, may be used for feeding hogs or cattle. After three hours more, the liquor should be drawn from the third tub and filtered as before, and then boiled down for sugar. Then draw off the liquor of the second vessel, and pour it into the third; add fresh water to the second vessel, and let it remain three hours more, the roots being occasionally stirred. During this time cleanse out the first tub, and add fresh roots, as before. After three hours, draw the liquor from the third tub, and pour it upon the fresh roots in the first; then draw the liquor from the second tub, and pour it on the third. The roots of the second tub will be now exhausted, and may be given to the cattle. After three hours draw off the liquor from the first tub, filter it, and it will be ready for boiling down. On the contents of the first, pour the liquor of the third, and put fresh water in the third tub; let it remain three hours, and stirred as usual; during which time cleanse out the second tub, and let the roots be given to the cattle. In

the second tub place again fresh roots; and proceed by extracting the saccharine matter, as before; and continue the operation, till all the dried roots have been thus freed from their sugar. By this management, the liquor becomes more charged with saccharine matter, than when the juice is pressed out of the roots, and a considerable quantity of fuel is spared. The roots from which the liquor has been extracted will have swelled much in the operation, and have lost their sweetness: their farinaceous residuum will, however, afford good food for cattle. Whenever there is a sufficient quantity of dried roots ready, the process of extracting the saccharine liquor should be continued day and night, as it is not proper to let the liquor remain longer than three, or at most four hours, before you boil it, lest a dissolution of the mucilaginous particles of the roots should take place. If it be not convenient to boil down all the saccharine liquor at once to a state of crystallization, yet it should be daily boiled down to the consistence of a syrup, in order to prevent its fermentation. In boiling the liquor, the scum that arises should be carefully taken off.

The process of boiling, crystallizing, &c. the beet sugars is as follows. First boil the extracted saccharine liquors down to the consistence of a syrup; then put it into a copper, of which one-third at least is empty, and let it boil away by a moderate fire, until a phial, which holds one ounce of water, will contain eleven drams of the syrup, or until the syrup pours somewhat broad from the ladle. The scum or froth should be taken off as it arises. When the syrup is arrived at the state above mentioned, by gentle boiling, the fire must be removed from underneath the copper, and the syrup gradually run through a clean woollen cloth, placed over a wooden or stone vessel. The syrup must not cool too much before this filtration, or else it becomes ropy. When the filtered syrup is somewhat cool, it should be laded into shallow wooden or stone vessels, to crystallize; for this purpose, shallow earthen vessels, such as are used to produce cream, or vessels made of tin, are proper. These vessels, filled with syrup, must be placed in a room heated to about 68° of Fahrenheit, and care must be taken to keep them free from flies and dust. If the syrup has been of a proper consistence, crystals will soon begin to form at the bottom of the vessels; and in an interval of 18 or 21 days the crystallization will be completed. The mass must then be put into a strong linen sack, well secured, and placed under a press, to squeeze out the liquid from the sugar which remains in the bag. The liquid matter may be set to crystallize a second or third time, and will yield sugar of a coarser quality. A cheese-press, or long lever, will serve for the purpose of pressure. The sugar first obtained, may be rendered purer by mixing with it a small quantity of clear spring water, and placing it again under the press; the coloured syrup will then run out, and leave the sugar in the bag in a much purer state than before. By repeating the operation, it is so far improved, that, when dried and rubbed, it becomes a fine white powder sugar. The separated syrups should be again carefully boiled, and more sugar will be obtained from them by crystallization. If the sugar procured by the first pressure be dissolved in as much clear water as will form a syrup, and placed again in a warm room to crystallize, it will yield a much purer and harder sugar: the syrup may then be separated without pressure from the sugar, merely by inclining the vessel, and allowing the syrup to run off from the crystals. All the syrups thus prepared, are fit for family use, and are much superior in taste to those prepared from the pressure of the raw or boiled roots. The remaining thick syrups may be used as treacle or molasses, and will serve to distil forrum or spirits. From the experiments

of professor Lampadius of Freyberg, near Dresden, it appears, that beet-roots contain water, fibrous matter, sugar, mucilage, glair, starch, colouring matter, scented matter, and a bitter substance. The water is in the proportion of from one-half to two-thirds of the weight of the roots; the fibrous matter of the roots differs, and it is considerably more in poor than in rich land; the saccharine particles vary from two to five per cent.; the mucilage is from three to five per cent.; and the glair, or matter resembling white of egg, is about one per cent.; the starch is in very small quantity, being only about two or three ounces in a hundred weight; the colouring matter undergoes several changes by exposure to the air, as yellowish, brown, and red, and may be precipitated by acetite of lead; the scented matter is volatile, rising in distillation of the root with water, combining closely with spirits of wine, and occasioning a peculiar contraction in the organs of taste. By boiling the beet roots, the smell and taste are very much lessened. The bitter substance is soluble in water, and remains behind in the first syrup after the crystallization of the sugar. From other experiments of the same professor, it appears, that 110 lbs. of beet-roots, the beta cicla of Linnaeus, or white English beet, washed, peeled, cleaned, and then grated, gave a mass which weighed 87 pounds; out of which were pressed $41\frac{1}{2}$ pounds of juice, which was boiled with $20\frac{1}{2}$ ounces of charcoal powder. This, when filtered and evaporated down until crystallized, produced full five pounds of a brownish yellow-grained sugar, and also five ounces of brown syrup. The above brown sugar, after being dissolved in six pounds of lime-water, mixed with one pound of blood, then boiled, filtered, and afterwards evaporated, yielded four pounds $5\frac{1}{2}$ ounces of purified brown sugar, and $6\frac{1}{2}$ ounces of syrup. The four pounds $5\frac{1}{2}$ ounces of sugar, thus prepared, were again dissolved in six pounds of lime-water, mixed with one pound of milk, and then boiled for a quarter of an hour; during the boiling, a small quantity of white wine vinegar, and a little more milk, were added; the saccharine matter was filtered, and treated as before; the product was four pounds of well-grained white powder sugar. The residuum after pressure, the brown syrups of the two first processes, and the remains of the filtrations, weighed, when collected, 40 pounds; they were mixed with one quart of yeast, and 80 quarts of water, heated to 112° of Fahrenheit's, and after fermenting 48 hours, were distilled. They furnished, at the first distillation, 15 quarts of weak spirit, which, on a second distillation, gave eight quarts of a better; from which, when rectified, were produced $3\frac{1}{2}$ quarts of spirits resembling rum. From the result of this series of experiments it appeared, that after paying the farmer for the roots, and discharging all incidental expences whatever, a profit was yielded of nearly cent. per cent. on valuing the four pounds of white powder sugar at one shilling per pound, and the three quarts and a half of rum at one shilling per quart. The produce of beet-roots and their quality for yielding sugar, have, however, been variable; and of course the profit accruing from them. From M. Achard's account we learn, that 24 measures of roots, each of which weighs about 90 pounds, (in all 2160 pounds) and costs about 6d. English, produce 100 pounds of raw sugar; that is, 20 pounds of roots produce nearly one pound of sugar. One hundred pounds of raw sugar give 55 pounds of refined sugar, and 25 pounds of molasses. Another statement informs us, that 14 pounds of raw sugar gave $1\frac{3}{4}$ pound of lump-sugar, $1\frac{1}{2}$ pound of white powder sugar, and $1\frac{1}{2}$ of darker-coloured powder sugar, and eight pounds of brown syrup; from which more sugar might have been obtained. It is computed, in M. Achard's account, that a German square mile of land, (that is, 16

square miles, English), properly cultivated, would produce white beet sufficient to furnish the whole Prussian dominions with sugar.

BELANCOS, BETANZOS, or BITANZE, in *Geography*, a town of Spain, in Galicia, $\frac{3}{4}$ leagues from Coruna, 9 from Compostella, and 7 from Ferrol. It has a good harbour in the mouth of the river Mandeo. N. lat. $43^{\circ} 15'$. W. long. $7^{\circ} 55'$.

BETEL, in *Botany*, an Indian plant, in great use and esteem throughout the East, where it makes a considerable article of commerce. See PIPER.

The betel bears some resemblance to the pepper-tree. It grows like ivy, and twists round other trees. Its leaves are long and sharp-pointed, but broad towards the stalk, and of a pale green colour. They are like those of ivy, only softer, and full of red juice, which, among the Orientals, is reputed of wonderful virtue for fortifying the teeth, and rendering the breath sweet. The Indians are continually chewing these leaves, which renders their lips so red, and teeth black, a colour by them vastly preferred to the whiteness affected by the Europeans.

The consumption of betel leaves is incredible; no body, rich or poor, being without their box of betel, which they present to each other by way of civility, as we do snuff. In many places they chew the areca nut, either alone or mixt with the betel leaf and lime, and the leaves of this plant are sometimes chewed alone; but they are too sharp, and usually injure the teeth, and it is not uncommon to find men of 25 wholly toothless in this part of the world, merely from their having chewed this plant to an excessive degree. The prepared betel is a very common present among the poorer sort; and on taking leave of a friend, it is always the custom to make him a present of a purse of the leaves prepared for use. When the poorer sort are to appear before the rich, they always chew a large quantity of betel to give them a sweet breath; and the women, on certain occasions, never fail to take largely of it as a provocative. On all visits, the company is regaled with prepared betel. The principal time of using it is after dinner, at which time, they say, it prevents sickness at the stomach; and they never abstain from it, except on the solemn occasions of the funerals of their relations, and their days of fasting. Moderately used, it is said to strengthen the gums, corroborate the heart and stomach, discuss flatulencies, purge both the stomach and brain, and prevent the scurvy. If chewed after breakfast it makes the breath sweet for the whole day. The Portuguese women are as fond of the betel as the Indians themselves, and cannot live a day without it. It is said, however, that few Europeans can accustom themselves to the use of it. On many occasions it produces sickness, and sometimes intoxication, of no long continuance. The Chinese also use the leaves of betel, covered with quicklime, and wrapped round the nut areca, which in shape much resembles a nutmeg. They chew these leaves continually, and pretend that they strengthen the gums, comfort the brain, expel bile, nourish the glands of the throat, and serve as a preservative against the asthma; a disease which, from the heat of the climate, is very common in the southern provinces. They carry betel and areca (see ARECA) in boxes, and present it when they meet one another.

BETELGEULE, or BEDELGAEZF, in *Astronomy*, a fixed star of the first magnitude in Orion's hind shoulder.

BETESKOE, in *Geography*, a town of Siberia, on the west side of the Irtysh, 230 miles S.E. of Tobolsk.

BETH, in *Literary History*, makes the title of a multitude of books in the Hebrew language; *e. gr.* "beth avoth," or, the house of the fathers; "beth Elohim," or, the house of God; "beth Israel," or, the house of Israel, &c.

BETHABARA, *i. e.* the *House of Passage*, in *Ancient Geography*, is supposed by many to be the place at which men passed over Jordan, over against Jericho, at the common ford of this river where the Israelites passed it under Joshua. Ch. iii. 16. Lightfoot refers it to the passage at Scythopolis, out of the precincts of Judæa, where the Jews dwelt among the Syro-Grecians, over against Galilee. Cellarius places it between these two, observing that there were many passages over Jordan. At this place, beyond Jordan, John is said to have baptized. Chap. i. 28. Origen found, as he tells us, in almost all his MSS., or, if we may judge from what follows, in every one of them, without exception, this verse thus written, "These things were done in Bethany beyond Jordan, where John was baptizing." But he rejects this reading for the following reason: "As I have been in that country, in order to trace the footsteps of Christ and his apostles, I am persuaded that we ought not to read Bethany in this passage, but Bethabara. For Bethany, as the evangelist himself relates, was the birth-place of Lazarus, Martha, and Mary, and only 15 stadia from Jerusalem; but the Jordan was at least, to speak in round numbers, 190 stadia from that city. Nor is there any city whatsoever of the name of Bethany near to that river. But there is a city of the name of Bethabara on the banks of the Jordan, where, it is said, John baptized." To this alteration it has been objected, that Origen grounds the reading, which he has substituted for Bethany, on no other authority than the relation of such persons as conduct travellers to the places in Palestine, which are mentioned in the sacred writings. These persons either had no inclination to conduct Origen to the Bethany, which lay on the other side of the Jordan, as the journey might have been attended with danger, on account of the tribes of wandering Arabs, who infest that country; or they were wholly ignorant of the place. Not to lose, therefore, their profits arising from conducting strangers, they shewed Bethabara to Origen, as the place where John baptized, and the learned father was credulous enough to believe them. Besides, if the text itself be examined, Origen's objections to the common reading will vanish. He says, that Bethany lay near to Jerusalem, and therefore at a distance from the Jordan. But it may be asked, whether there was not more than one city of that name, and whether we must necessarily suppose, that the city in question was the place where Lazarus resided. It appears, even from the expression used by St. John, that, whether we read Bethany, or Bethabara, there was more than one city of the name, which he mentioned. St. John mentions a circumstance by way of distinguishing it, and when he speaks of Bethany beyond Jordan, we are led to suppose, that there were two cities of that name, and that the city which he meant was different from that which was situate on the mount of Olives. But Origen says, that there was no town of the name of Bethany on any part of the Jordan. To this it might be replied, that Origen hardly visited all the towns on the bank of the Jordan, as he probably took the route pointed out by his guides, or that the wars between the Jews and the Romans had so desolated, or altered the face of the country, that many towns might have existed in the time of John the Baptist, of which no traces remained in the days of Origen. But this mode of reply is needless, because the evangelist uses a very indeterminate expression, when he says, that the place, where John baptized, was on

the other side of the Jordan; an expression which by no means implies that the town lay on the banks of that river: for it might have been situated either on the Jabbok, or on some other stream considerably to the eastward, where John had a sufficient supply of water for the purpose of baptizing. The alteration, therefore, made by Origen, and which upon his authority, and that of Chryostom and Epiphanius, is introduced into our copies, was wholly without foundation. See Michaelis's *Introd. to the N. T.* by Marsh, vol. ii. p. 400.

BETHABARA, in *Geography*, the first settlement of the Moravians in America, in the lands of Wachovia, in North Carolina, begun in 1753, 6 miles N. of Salem, situate on the west side of Grassy creek, which unites with the Gargales, and several others, and falls into the Yaokin, and containing a church of the United Brethren, and about 50 dwelling houses.

BETH-ACHARA, or **BETH-HACCERIM**, (Jer. vi. 1.) *i. e.* *house of the vineyard*, a city seated on an eminence, between Jerusalem and Tekoa. See Nehem. iii. 14.

BETHAGLA, or **BETH-HAGLA**, a town of the tribe of Benjamin, (Josh. xviii. 21.) on the northern boundary of the tribe of Judah. In the time of Jerome and Eusebius there was a village in this situation of the name of Agla, distant 10 miles from Eleutheropolis, towards Gaza.

BETHA-GABRIS, now **BAIT-DJIBRIM**, a village of Syria, about $\frac{1}{2}$ of a league to the south of El-Tell; situated between Jerusalem and Ascalon.

BETH-ANATH, *House of a Song*, of an *Answer*, or of *Affidition*, a city of Naphtali. Josh. xix. 38.

BETHANO, **CAPE**, in *Geography*, lies on the coast of China, or Quinan, off which is Pulo, or Island Canton, which is about 9 or 10 miles from the coast. N. lat. 16°. E. long. 108° 30'.

BETHANY, in *Ancient Geography*, a village at the foot of the mount of Olives, east of Jerusalem, in the way to Jericho. It took its name from a part of ground so called from "Athene," which signifies the dates of palm-trees, which grew there plentifully. The town of Bethany, where Lazarus and his sisters dwelt (John xi. 1.) and where he was raised from the dead, was 15 furlongs, or about 2 miles distant from Jerusalem (John xi. 18.); but the district, or tract of ground, that bore that name, reached within 8 furlongs from Jerusalem, it being only a sabbath-day's journey from it (John xxiv. 50. Acts i. 12.); and then commenced the tract called "Bethphage," from the "phagi," *i. e.* the green figs which grow upon it, extending to near to Jerusalem, that the outermost street within the walls was called by that name. A charge of self-contradiction has been alleged against the evangelist Luke, from the passage above cited. In the Gospel he tells us, that Jesus ascended into heaven from Bethany, and in the Acts of the Apostles, of which he is the reputed author, he informs us, that he ascended from Mount Olivet. This charge is founded on an ignorance of ancient geography, or must proceed from an unwarrantable prejudice against Christianity; because Bethany, as we have above observed, was not only the name of a town, but of a district of Mount Olivet adjoining to the town. See **BETHABARA**.

BETHANY, or *Bethania*, in *Geography*, a Moravian settlement and post town of America, in the lands of Wachovia, in North Carolina, begun in 1760, 9 miles N.W. of Salem; containing about 60 houses and a church.

BETH-ARABAH, in *Ancient Geography*, a city of Judah (Josh. xv. 6.), afterwards given to Benjamin (Josh. xviii. 22.)

BETHARAMPITHA, a town of Galilee, on the right bank

bank of the Jordan, on the western side of the lake Gennesareth, at the influx of the Jordan into that lake. Lightfoot places it on the left bank of the Jordan in Perea. It was fortified and ornamented by Herod the tetrarch, and called "Julias," in honour of Julia, the daughter of Augustus, and wife of Tiberius. See BETHSAIDA.

BETHARAN, or BETHARA, a town of the Peræa beyond Jordan, called also by the Syrians "Betharamphtha," and by Herod "Libias," or "Livias," in honour of Livia, the wife of Augustus. Josephus calls it Julias, and confounds it with the Betharamphtha of the preceding article: but it lay more to the south, nearly, according to Ptolemy, in the same latitude with Jerusalem, in the vicinity of the Dead sea, and of the mountains Abarim, Nebo, and Pisgab, and of the city Heshbon.

BETHAVEN, *the House of Iniquity*, a name given to "Bethel," by way of derision, after the introduction of idolatry into it by Jeroboam. (Hosea iv. 15. x. 5.) Bethaven was also the name of a distinct town near Bethel, and south-east of it, belonging to the tribe of Benjamin. Josh. vii. 2. xviii. 12. 1 Sam. xiii. 5.

BETH-BASI, a city of Judah, fortified by the two Maccabees, Simon and Jonathan. 1 Maccab. ix. 62. 64.

BETH-DAGON, a city of Asher (Josh. xix. 27.)—Also, a city of Judah (Josh. xv. 51.) so called, because it had probably a temple of Dagon, before the Israelites took possession of it.

BETHEL, *the House of God*, a name given to that town, which was before called Luz, on account of Jacob's vision. (Gen. xxviii. 19.) They seem, however, to be distinguished in Joshua xvi. 2. though they were contiguous places; and the name Luz might probably be lost in that of Bethel. It was a city of Samaria, on the confines of the tribes of Benjamin and Ephraim. Eusebius says, that it was 12 miles from Jerusalem in the way to Sichem. It obtained among the prophets the name of Bethaven, on account of its idolatry.

The Mahometans believe their temple of Mecca to be founded on the stone, on which the patriarch Jacob slept at Bethel, and hold it in great veneration. Some have supposed that the superstitious respect manifested by the ancients to their Bætyli, or stones anointed and consecrated to great men, after their death, derived its origin from Jacob's pouring oil on the stone of Bethel. See BÆTYLOS.

BETHEL, in *Geography*, a small Moravian settlement in America, on the Swetara river, in Pennsylvania, 14 miles from Mount Joy.—A township in Dauphin county.—Also, a township in Windsor county, Vermont, containing 473 inhabitants, N.N.W. of, and bounded by Stockbridge, and about 67 miles N.N. easterly of Bennington. Hence rises a small branch of White-river.—Also, a township in Delaware county, Pennsylvania.

BETHENCOURT, JOHN DE, in *Biography*, a Norman baron, in the beginning of the 15th century, obtained a grant from Henry III. of Castile, of the Canary islands, erected into a kingdom in 1344, by pope Clement VI. Having visited these islands in 1402, Bethencourt returned to them, and by assistance from Henry, conquered them, held them under the title of king, as a fief of the crown of Castile, and transmitted the possession of them to his family for some generations. His posterity settled in Spain. Although his conquest of these islands was not complete, Bethencourt is reckoned the first Christian who subdued the Canary isles, which before his time had been occasionally visited by freebooters. Robertson's Hist. Amer. vol. i. p. 54.

BETHENCOURT, JAMES DE, physician at Rouen, where he practised with much reputation, towards the end of the 15th

and the beginning of the 16th centuries, is now only known by his treatise on the venereal disease, published in the year 1527, under the singular title of "Nova Penitentialis Quadragesima, nec non Purgatorium, in Morbum Gallicum, feu Venereum, una cum Dialogo aquæ argenti, et ligni guiaci luctantium super dicti morbi prelatura. Opus fructiferum." Paris, 8vo. By his penitence, he means the strict regimen enjoined those who underwent the guaiacum, or sweating process, for the cure of the lues, and by the purgatory, the pains and torments endured while under the salivation by mercury, for the same purpose. Though he treats of the method of curing by the guaiacum, as well as that of mercury, yet he manifestly gives the preference to the latter mode, which is laid down by him, Astruc says, in a more judicious manner, than it had been by any preceding writer. He says the disease was unknown to the ancients, and that it made its first appearance, or was first noticed in Europe, about the year 1495. He does not consider it as imported from America, or the West Indies, by the Spaniards, but as procured from causes similar to those that occasion the plague, and other infectious diseases. Astruc commends the work, but it has not obtained a place in Lufinus's collection of treatises on the complaint. Astruc de Morb. Gall. Haller. Bib. Med.

BETHENNABRIS, in *Ancient Geography*, a town of Peræa, into which the Jews, who fled from Gadara after it was taken by Vespasian, retired, and which was forced by the tribune Placidus, before his complete reduction of Peræa.

BETHER, MOUNTAINS OF, are mentioned in the Song of Solomon, ch. viii. 14. Some suppose Bether to be Bethoron, called Bether by Eusebius, and Bethara by Josephus. Bether was taken by the emperor Adrian, in the rebellion of Barchochebas. (See BARCHOCHÉBAS.) Others will have it to be Betharis, between Cæsarea and Diospolis; and others again Bether, mentioned in the LXX. (Jof. xv. 60.) among the cities of Judah. Calmet supposes it to be Upper Bethoron, or Bethora, between Diospolis and Cæsarea. Eusebius speaks of Betharim near Diospolis, and when he mentions Bether, which was taken by Adrian, he says, it was in the neighbourhood of Jerusalem. Ec. Hist. l. iv. c. 6.

BETHESDA, the name of a pool at Jerusalem, of which we have an account in the Gospel by St. John, ch. v. 1—7. It was called in the Greek *καλυμβήθρα προβατικῆς*, and in the vulgate "Piscina probatica," because, as some have supposed, the sheep of the sacrifices, called in Greek *προβατα*, were washed in it; or, according to others, because the blood of the sacrifices ran into it. But neither of these suppositions is satisfactorily proved. The sheep were probably washed as soon as they were bought in the adjoining market, from which they were driven into this pool, which always contained a sufficient quantity of water for this purpose. The latter supposition could not possibly have been realized; since, in that case, the blood must first have descended, and afterwards ascended to this pool, as there was a drain or ditch between the pool and the temple, and a bridge over it for passing into the temple. Hence Dr. Pococke, who adopted the idea of the blood's running into the pool, was obliged to seek for lower ground on the other side of the temple, and to place it in a situation where it did not exist, as any one may satisfy himself by adverting to the plan of the temple at Jerusalem. The situation of the sheep-gate, near which this pool, or bath, stood, was on the south-east wall of Jerusalem, and therefore a great part of the city lay between that and the temple, as the accurate Dr. Lightfoot has shewn in his "Harmony of the Evangelists," p. 666. The appellation "Bethesda" has therefore been erroneously derived from *בית השפון*, *domus effusionis*, the sink-house, or drain.

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The etymology, therefore, of those who derive "Bethesda" from בֵּית הַמֵּרְיָה, the *house of mercy*, is much more just and appropriate; because it expressed the kind design with which this bath was contracted, and the salutary purposes to which it was applied. The history informs us, that this pool had five porches, porticoes, or cloysters, which might very reasonably have been the case, notwithstanding its oblong figure, one being on each hand of the entrance in the middle of one side, and three on the other sides. Dr. Lightfoot suggests, that the basin itself might be in the form of a pentagon, and that these cloysters might correspond to its five sides. Mr. Maundrell (*Journey*, p. 107.) who took a view of this pool, in 1696, informs us, that it is 120 paces long, 40 broad, and 8 deep; but without water; and that at the west end he found some old arches, then decayed up, which, though only three in number, were supposed to be the five porches, in which sat the lame, halt, and blind. This pool, he adds, is contiguous, on one side, to St. Stephen's gate, and on the other to the area of the temple. In these porticoes diseased and debilitated persons lay, "waiting for the moving of the water;" for at the time of a certain feast, which some have supposed to be the passover, and others the pentecost, or rather, according to the season, i. e. occasionally, at certain intervals of time, "an angel descended into the pool, and troubled the water; whosoever then first, after the troubling of the water, stepped in, was made whole of whatever disease he had." Some have supposed that the miraculous cure, recorded in this history, was restricted to the season of the particular feast mentioned in the first verse of the chapter; and thus they account for the silence of Philo and Josephus with regard to this miracle. But those, who imagine that these waters had a sanative quality on other occasions, think the silence of these Jewish writers to be of little importance; as they have omitted the mention of other more important occurrences in our Lord's history, which they had an opportunity of knowing; such as the variety and multitude of signal miracles which he performed in the course of his ministry. The majority of writers have regarded the cures wrought at this place as a standing miracle among the Jews, and yet they have been surprised that Josephus, in particular, should omit to mention a fact so honourable to his nation. Others have, therefore, conceived, that the miraculous healing quality of these waters was a peculiar honour conferred on the personal appearance of the Son of God upon earth. To this purpose Dr. Doddridge (in loc.) after Calvin, observes, that God, to add the greater lustre to his Son's miracles, as well as to shew that his ancient people were not entirely forgotten by him, had been pleased of late to perform some supernatural cures at this place. With respect to the descent of the angel into the pool, and the effect produced by his stirring the water, different hypotheses have been proposed. Grotius thinks, that the angel is said to have descended, not because he was ever seen to do so, but because the Jews were persuaded that God brought such things to pass by the ministrations of angels; so that from the violent motion of the water, and the effect produced by it, the presence of an angel was reasonably supposed. Dr. Hammond (in loc.) supposes, that the blood of the great number of sacrifices, washed in this pool, communicated a salutary efficacy to the water, upon its being stirred up by an angel, or messenger, deputed for this purpose by the high-priest; which hypothesis Dr. Doddridge represents to be a unphilosophical, as it is unsupported by history and antiquity. Mr. Fleming (*Christology*, vol. i. p. 13—15.) in order to avoid the apparent difficulties of the literal interpretation, rejects the latter part of the *third* and the whole of the *fourth* verse, as a spurious addition of some

ignorant monk in the 5th or 6th century; because that part is wanting in the Cambridge, or Beza's MS. and is written by a later hand in the margin of that in the French king's library, highly extolled by Lamy in his "Harmony." But this passage is found in all the other most celebrated MSS., in the Syriac version, and in the other versions of the Polyglott. Kuster's observations, relating to the genuineness of this text, in the preface to his edition of Mill's New Testament, deserve to be considered. But with regard to the subject in dispute, it should be recollected, that the *fourth* verse, which none question, implies, that the water, after being troubled, had a miraculous virtue, which extended only to the first that went in, and cured his disease, whatever might be its nature. Dr. Doddridge suggests the following solution of this difficulty; the greatest, as he acknowledges, that occurs in the history of the evangelists, and with respect to which none of the numerous writers who have replied to Mr. Woolston had given him satisfaction. He supposes this pool might be remarkable for some miserably attending the water; and this circumstance, together with its being so near the temple, where a bath was so much needed for religious purposes, may account for the stately cloysters erected around it. Some time before this passover, an extraordinary commotion had been probably observed in the water; and Providence so ordered it, that the next person who accidentally bathed here, being under some great disorder, experienced an immediate and unexpected cure. The like phenomenon, in some other desperate case, was probably observed in a second commotion. These commotions and cures might happen periodically, perhaps every sabbath, for some weeks or months. This the Jews would naturally ascribe to some angelic power, as they did afterwards the voice from heaven, (*John* xii. 29.) though no angel appeared. On account of their ingratitude to Christ for this miracle, and those wrought at the former passover, and in the intermediate space, this celestial visitant probably returned no more; and therefore, it may be observed, that though the evangelist speaks of the pool as still at Jerusalem, when he wrote, yet he mentions the descent of the angel, as a thing which had been, but not as still continuing. This may account for the silence of Josephus, who was not born when it happened; and who, if he heard the report of it, would oppose speculation and hypothesis to fact, and recur to some indigested and unmeaning harangues on the unknown force of imagination; or if he secretly suspected it to be true, his dread of the marvellous, and his fear of disgusting his Pagan readers with it, might as well lead him to suppress this, as to disguise the passage through the Red Sea, and the Divine Voice from mount Sinai, in so mean and foolish a manner, as it is known he does. Besides, the relation which this fact bore to the history of Jesus, would make him peculiarly cautious in treating upon it, as it would have been difficult to handle it at once with decency and safety. The ingenious and learned bishop Pearce, in his excellent "Vindication of Christ's Miracles," p. 68, &c. agrees with Dr. Doddridge in the most material circumstances of his hypothesis.

BETH-GANUL, the *house of the camel*, or of the *camel*, a city of the Moabites, in the tribe of Ruben. *Jer.* xlvi. 27.

BETH-JESHIMOTH, the *house of desolation*, or, of *desolation*, or, of *devotion*, a city of Reuben (*Josh.* xiii. 20.) afterwards possessed by the Moabites. *Ezek.* xxv. 9.

BETH-LEBAOTH, the *house of leprosy*, a city of Simeon, (*Josh.* xix. 6.) sometimes called *Lebath*. *John.* xv. 32.

BETHLEHEM, the *house of bread*, a city of Judah, (*Josh.* xvii. 7.) generally called "Bethlehem of Judah,"

BETHLEHEM.

to distinguish it from another of the same name in Zebulun. It is seated on the declivity of a hill, 6 miles south from Jerusalem, according to Eusebius and Jerom. It is likewise called "Ephrath," (Gen. xlviii. 7. Mic. v. 2.) This city was not very considerable either for its extent or riches; but it has acquired peculiar distinction on account of its having been the place of our Saviour's nativity. It was also the city of David's nativity. In and near this city travellers are shewn the place where our Saviour was born, which is said to have been a cave south of the city, and belonging to the inn, or caravanserai, whither Joseph and Mary retired. Jerom informs us, that Adrian, in order to erase the remembrance of the place where Christ was born, planted over the cave a grove of tall trees in honour of Adonis, so that when the festivals of this infamous deity were celebrated, the holy grotto echoed with the lamentations made in commemoration of Venus's lover. Here is also seen a large church built by St. Helena, in the form of a cross, and so lofty as to command an extensive prospect of the adjacent country. The roof is elevated, flat, and composed of cedar within, and leaded without. The nave is supported on both sides by two rows of marble pillars, each made of one piece, and 11 in a row, forming as it were five naves, separated from each other by those rows of pillars, on each of which is the picture of some saint. Over the pillars the wall is covered with mosaic work, on a gold ground. The marble which formerly overlaid the walls has been removed by the Turks for adorning their mosques. The three upper ends of the cross terminate in three semicircles, having in each an altar. Over the chancel is a stately cupola, covered on the outside with lead, and within adorned with mosaic work. Adjoining to the church is the monastery of the Franciscans. The gardens are defended with strong walls; and through the chapel is a passage to a square cave, in which they say the Innocents were buried. Beyond this are passages to the tombs of St. Jerom, St. Paula, and Eustochium, and of Eusebius of Cremona; and beyond these is a grotto or cell, called the school of St. Jerom, where he is said to have lodged when he translated the Bible. At the end of another vault or chapel, 12 feet wide and 40 long, whose floor is paved and sides lined with white marble, and roof adorned with mosaic work, now much decayed, is an arched cavity, with an altar, having over it the picture of the nativity, and under it a vault, in the middle of which is a star formed of many coloured stones, marking the place where they say our Saviour was born; and near this is the manger where they pretend he was laid, which is hewn out of a rock, and new flagged with white marble. See MOUNT CALVARY, and JERUSALEM.

Bethlehem is now called *Bait-el-labam*; which see. The country in which it is situated is happy with respect to soil, air, and water. With the latter it is supplied by a low aqueduct, or stone channel, which formerly passed to Jerusalem. The "fons signatus" is an exuberant spring: it is received successively by three large cisterns, one of which is well preserved. In coming from the cisterns, and at a small distance, is seen what is termed the "deliciæ Solomonis," a beautiful rivulet, which flows murmuring down the valley, and waters in its course some gardens of excellent soil. The brinks of this brook are adorned with a variety of herbage. The convent at this place contains, under the same roof, the different tenets of Latins, Armenians, and Greeks. Brown's *Travels in Africa*, &c. p. 363.

We shall here observe, that no inconsiderable pains and ingenuity have been exercised to reconcile the quotation of the evangelist Matthew, ch. ii. 6. relating to Bethlehem, with the original text of the prophet Micah, ch. v. 2. The dif-

ficulty may be obviated, says an ingenious writer, or at least the appearance of inconsistency removed, by a proper translation of the latter text. "*And thou, Bethlehem Ephrath, art little in being among the thousands of Judah; for out of thee will come forth unto me a ruler over Israel. That is, thou hast but little honour in being among the thousands of Judah, compared with that which will accrue to thee from giving birth to the Messiah.*" Thus the LXX seem to have understood it. Forms of speech similar to this, *ἑδραμὸς ἰλαχίστη*, by no means the least for the greatest, are not uncommon. (See Homer. *Il. A.* 277. Callim. *Hym. Di.* 33. *Hym. Ap.* 31. Eurip. *Androm.* 81, &c.) This mode of interpretation is confirmed by Lightfoot from the Chaldee paraphrast; and seems to be preferable to that of St. Jerom, or of Dr. Poocke. The former, who has been followed by some others, is of opinion, that Matthew produced the passage in Micah historically, not as it was written by the prophet, but as it had been proposed by the priests to Herod, so that they should be accused of false reading, if that were the case. The latter, in his notes on the *Porta Mosis* of Maimonides, thinks, that *יְעִי*, in Micah, rendered *little* in the English translation, has the contrary signification to its usual one of *mean* or *little*, viz. that of *noble* or *illustrious*, and for countenancing this conjecture he cites Jer. xlviii. 4. and the Chaldee paraphrase upon that passage. Grotius, Olearius, and others, have proposed that the Hebrew text and the Greek LXX version should be read and translated by way of interrogation. Heb. "*Art thou, Bethlehem Ephrath, the least among the thousands of Judah? No: out of thee shall he come forth to me, &c. i. e. I will raise up him, &c.* Greek LXX. *Art thou, Bethlehem, the house of Ephrath, the least to be among the thousands of Judah? No: out of thee, &c.*" The learned bishop Pearce has adopted this mode of translation; and in favour of it he urges, that the Hebrew word *יְעִי*, in Micah, rendered *little*, may be rendered *the least*, as it actually is in Judges, vi. 15. 1 Sam. ix. 21. Jerem. xlix. 26. and l. 45. He also observes, that both in the Hebrew and in the Greek of the O. and N. Test. it is not unusual for a sentence to be understood by way of interrogation, though there is no mark placed at the beginning of the sentence, used in either of the languages for a mark of interrogation. To this purpose he refers for the Hebrew to 2 Sam. xviii. 29. 1 Kings, xxi. 7. Job ii. 10. xli. 1. Zech. viii. 6. and for the Greek to 2 Sam. xviii. 29. Matt. xi. 3. Mark xiv. 61. He adds further, that when words are thus used interrogatively, there is often at the end of them an answer of *Yes*, or *No*, to be supplied in the sense, though it is not expressed in the words. This is very common with those who write in the Hebrew language, or with those, who, being Hebrews, write in Greek. In the N. T. the word, *No*, is to be supplied in 1 Cor. x. 19, 20. The same mode of speaking is found in 1 Cor. xii. 31. Acts viii. 31. and an instance, where *Yes* is to be supplied, is to be found in 1 Cor. ix. 20: From these remarks the learned prelate concludes, that, if this be the case, an interrogation with a *No* to be supplied as an answer to it, is the same as a negative not put in interrogation; or, in other words, to ask whether any thing is *the least*, and to answer *No*, as the Hebrew text and LXX version do, is the same as to affirm, that it is *not the least*, as Matthew does. Either of the above interpretations will effectually supersede the perplexity of St. Jerom, and the objections of Dr. Middleton, in his "*Works*," vol. ii. p. 59. See Wakefield's "*New Translation of the Gospel of St. Matthew*," p. 26. "*Pearce's Commentary*," vol. i. p. 10.

BETHLEHEM, a town of the tribe of Zebulun, (Josh. xix. 15.) of obscure and unknown situation.

BETHLEHEM,

BETHLEHEM, in *Geography*, a town of the Netherlands, in Brabant. N. lat. $51^{\circ} 2'$. E. long. $4^{\circ} 40'$.

BETHLEHEM. See **BELEM**.

BETHLEHEM, a town of America, in Albany county, New York, fruitful in pastures, and affording large quantities of excellent butter. By the late census of 1796, 388 of the inhabitants are electors.—Also, a township in Berkshire county, Massachusetts, containing 261 inhabitants. It lies about 10 miles S. of E. from Stockbridge, and 130 from Boston, and borders on the Tyringham and Loudon.—Also, a township in Hunterdon county, New Jersey, situate at the head of the south branch of Rariton river, and containing 1335 inhabitants, including 31 slaves.—Also, a township in Litchfield county, Connecticut, joining Litchfield county on the north, and Woodbury on the south.—Also, a post town in Northampton county, Pennsylvania, which is a celebrated settlement of the United Brethren of the Protestant episcopal church, as they term themselves. It is situate on Lehigh river, a western branch of the Delaware, 53 miles northerly from Philadelphia, and 18 southerly from the Wind Gap. The town stands partly on the lower banks of the Manakes, a fine creek, which affords trout, and other fish, in a healthful and pleasant situation, and in summer is much frequented by gentry from different parts. In 1787, there were 60 dwelling-houses of stone, well built, and 600 inhabitants. Besides the meeting-house, this place has three other public buildings, which are spacious; one for the single brethren, one for the single sisters, and the other for the widows. In a house adjoining the church is a school for females, and since 1787, a boarding-school for young ladies, under the direction of the minister of the place, who also superintends the boys' school, kept in a separate house. Both these schools are in high repute, and much frequented. At the lower part of the town there is an hydraulic machine of simple construction, that raises the water from a spring to a reservoir, at the height of 100 feet, whence it is conducted by pipes into the several streets of the town. In this town are also a store, with a general assortment of goods, a large tan-yard, a grist-mill, a fulling-mill, an oil-mill, and a saw-mill, and on the banks of the Lehigh, a brewery. N. lat. $40^{\circ} 37'$. W. long. $75^{\circ} 14'$.

BETHLEHEM, *Star of*, in *Botany*. See **ORNITHOGALUM**.

BETHLEHEMITES, or **BETHLEMITES**, in *Church History*, a sort of monks introduced into England in the year 1257, habited like the Dominicans, except that, on their breast, they wore a star with five rays, in memory of the star or comet which appeared over Bethlehem at the nativity of our Saviour. They were celled at Cambridge, and had only one house in England.

There is also an order of Bethlehemites still subsisting in Peru, who have convents at Lima; one called of the incurables, the other of our Lady of mount Carmel. These Bethlehemites came originally from the city of Guatimala in Mexico, where they were instituted by the venerable Peter Joseph of Betanear, a native of the town of Chafna, or Villa Fuerte, on the island of Teneriff, in 1626, for the service of the poor. After his death, which happened in 1667, his congregation was approved of by a bull of Clement X. in 1672, and in 1674. Innocent XI. in 1687, created it into a community of regulars. Before this time it had passed from Guatimala to Mexico, and from thence, in 1671, to Lima. In the city of St. Miguel de Piura, they took possession of the hospital of St. Ann, in 1678, and of that of St. Sebastian, in Truxillo, in 1680. Their probity and diligence in discharging these trusts induced other places to select them as directors of their hospitals, and among the rest, the city of Quito. The fathers of their order go bare-footed,

and wear a habit of dark brown colour, nearly resembling that of the capuchins, whose order they also imitate, in not shaving their beards. On one side of their cloak is an image of our Lady of Bethlehem. Every sixth year they meet to choose a general, which ceremony is performed alternately at Mexico and Lima.

The Bethlehemites, though outwardly of great simplicity, pass for the most refined politicians; in so much as to be called the quintessence of the Carmelites and Jesuits. They are all friars. For their almoner they choose a secular priest, whom they hire, and who has no vote in the chapter.

BETHLEM, GABOR, in *Biography*, prince of Transylvania, was a descendant of a family of rank, but very small property, and attached to the reformed religion. By his valour he obtained the favour of Gabriel Battori; but having ingratiated himself with the Porte, in a visit to Constantinople, he obtained a force which enabled him to expel Battori, and to establish himself as prince or waiwode, in 1613. He was afterwards led by ambition to extend his dominions, and under the advantage of an alliance with Frederic, the elector palatine, and newly declared king of Bohemia, he made an irruption into Upper Hungary, in 1619. Having reduced this country, he received the submission of Lower Hungary, and in his march towards Vienna he took Presburg, and was acknowledged prince of Hungary. The assistance which was afforded him by the oppressed protestants, induced him to establish liberty of conscience throughout Hungary. At an assembly of the states, he was declared king; but in consequence of a treaty concluded between him and the emperor, he renounced the title and dignity of king of Hungary, and was made in return prince of the empire, with the possession of two duchies in Silesia, and several castles and districts in Hungary. His restless disposition however led him to violate the treaty, and, in 1624, he overran Hungary, till he was defeated by the imperial general, and obliged to take refuge in Cassovia. Upon this a treaty of peace was negotiated, by which he renounced all pretensions to Hungary, and all connections with the enemies of the house of Austria, and was invested with several lordships in Silesia, and with authority over Transylvania during life. After this period he remained quiet; and falling into a dropsy, died in 1629. He left legacies both to the emperor and grand seignor. Gaber married the daughter of John Sigismund, elector of Brandenburg. Mod. Univ. Hist. vol. xxvii. p. 2, &c.

BETH-MAON, the *house of habitation*, or, of *iniquity*, in *Ancient Geography*, a city of the Moabites, in the tribe of Reuben. Jer. xlviii. 23.

BETH-MARCIABOTH, the *house of chariots*, or, of *bitternes's extinct*, a city in the tribe of Simeon.

BETH-MAUS, a village of Galilee, between Saphris and Tiberias, distant, according to Josephus, 4 stadia from the latter. Lightfoot supposes it to be the Beth-maon of the Talmud.

BETH-NIMRAH, the *house of the leopard*, or, of *rebellion*, or, of *bitternes's*, a city in the tribe of Gad. Numb. xxxii. 36.

BETHOANNABA, or **BETH-HANNABAH**, a town, according to Eusebius, 4 miles east from Diospolis. The name preserves some remains of the word Nob, where the tabernacle continued for some time, in the reign of Saul. 1 Sam. xxi. 1. According to Jerom, Nob was not far from Diospolis.

BETHIOGLA, the *house of the f. fl or d m e*, the name of two places: one fixed by Eusebius, 8 miles from Gaza; the other by Jerom, 2 miles from Jordan. The Bethogla of Eusebius is probably part of the tribe of Judah. Josh. xv. 6. The Bethogla of Jerom belong to that of Benjamin. Josh. xviii. 21.

BETHOME, or **BETHORA**, was otherwise called *Julias*, and was the birth-place of the prophet Joel. The inhabitants of Bethome rebelled against Alexander Jannæus. The town was taken, and they were sent captives to Jerusalem.

BETHONEA, or **BETH-ONAEA**, was situated 15 miles east from Caesarea, and was famous, according to Eusebius and Jerom, for its beneficial hot baths.

BETHORON, a town of Samaria. The Scriptures mention two cities of this name, the *Upper* and *Lower*, both belonging to the tribe of Ephraim, (Josh. xvi. 3, 5.) and given by this tribe to the Levites, (Josh. xxi. 22.) They were both built by Sherah, grand-daughter of Ephraim (1 Chron. vii. 24) and restored by Solomon after they had fallen to decay (1 Kings ix. 17. 2 Chron. viii. 5). Their distance from one another was almost the whole breadth of the tribe of Ephraim; the *Upper* being in the north, and the *Lower* in the south of that tribe. The former was situated in the road from Constantinople to Antioch, and the same with *Betaron* of Antonine's itinerary; or *Betoro*, placed between Caesarea and Diospolis. The latter was situated on a mountain, on the public road to Lydda and Caesarea, distant 100 stadia, or about 12 miles from Jerusalem; and hence it has been allotted by some to the tribe of Benjamin. Jerom says, that Paula passed through both the Bethorons in her way from Naplouse to Jerusalem. See **BITHER**.

BETH-PALATH, or **BETH-PELETH**, *the house of deliverance*, or *of expulsion*, a city in the most southern part of the tribe of Judah. Josh. xv. 27. Nehem. xi. 26. This city was surrendered to the tribe of Simeon.

BETH-PAZZEZ, *the house of division*, a city in the tribe of Issachar. Josh. xix. 21.

BETH-PEOR, or **BETH-PHAGOR**, *the temple of Peor*, a city of Moab given to the tribe of Reuben, (Deut. iv. 46.) where the idol Baal-Peor was worshipped. Numb. xxv. 3. It was situated on the other side of Jordan, opposite to mount Peor, or Phagor.

BETHPHAGE, a village at the foot of mount Olivet, between Bethany and Jerusalem, and about 15 furlongs from the latter. See **BETHANY**.

BETHSAIDA, a city of the half tribe of Manasseh, near the desert of the same name. It was situated, according to Pliny, on the east, or on the Arabian shore of the lake of Gennesareth, in Batanea, and the lower Gaulonites, according to Josephus, at the beginning of the mountainous country. It was a place of fishing, according to Bochart, and a place of hunting, says Dr. Lightfoot, so called because it stood near Naphtali, where were many deer. Gen. xlix. 21. It was raised by Philip, the brother of Herod the tetrarch, from the rank of a village to the honour of a city, and called *Julias*, in honour of the emperor's daughter. It seems to have been different from Betharamphtha, called also Bethsaida Julias. See **BETHARAMPHTHA**. This latter Bethsaida, which was on the western shore of the lake of Gennesareth (Mark vi. 45. viii. 22.) was one of the cities against which Christ denounced a woe (Matt. xi. 21.) on account of its impotence and infidelity, after the mighty works which he had performed in it. It was also the city where three apostles dwelt, viz. Philip, Andrew, and Peter. John i. 45.

BETH-SHALISHA, or **BAAL-SALISA**, a town of Palestine, in the canton of Thamna, 15 miles north of Diospolis, according to Eusebius, and south-east of Antipatris.

BETHSAN, or **BETHSEAN**, a town of Samaria in the half tribe of Manasseh, upon the borders of Galilee, on this side Jordan, and about half a league from it. It was the capital of a district of the same name, extending to Peræa. In

2 Maccabees xii. 29, it is placed 600 stadia, or 75 miles from Jerusalem. Josephus says, that it was the largest town of the Decapolis, and that it was 120 stadia, or 15 miles from Tiberias. It was upon the walls of this city that the Philistines, after the battle of Gilboa, hung the bodies of Saul and Jonathan, which were removed in the night by the inhabitants of Jabesh-Gilead, and honourably interred, under a grove of oaks near the city. (1 Sam. xxxi. 10, &c.) In process of time it was called *Scythopolis*, which name it derived from the Scythians, who, in the reign of Josiah, king of Judah, about 635 years before Christ, made an irruption into Palestine, and left a colony at Bethsan. Steph. Byz. and Pliny call it *Nysa*. Bryant (Anal. Myth. vol. ii. p. 415.) deduces its name Bethsan, from beth, house, or temple, and san, or shan, an ancient denomination of the sun, under which he was worshipped; and he supposes, that he had a temple in this city, to the walls of which the body of Saul was fastened. Images of the sun, under the appellation of Zanes, were peculiar to Sparta. This city, according to him, was built by the Cuthite Ophitæ, or Hivites, some of whom settled in that part of Canaan, called Galilee. As Ophitæ, they worshipped the sun under the figure of a serpent, and they were supposed to be Heliadæ, or offspring of the sun. The serpent they styled san or shan; but as the Hebrew *shan* signified also a tooth, the Grecians instead of saying that the Sparti had their origin from the serpent deity, the sun, made them take their rise from the teeth of a serpent.

BETH-SHEMESH, *the house of the sun*, or *of service*, a Levitical city in the tribe of Dan, or of Judah, for it is assigned to the one and to the other; distant, according to Eusebius, 10 miles from Eleutheropolis, in the way to Nicopolis, or Emmaus. 1 Sam. vi. 12. Josh. xiv. 41. 1 Kings iv. 5.—Also, a city of the tribe of Issachar. Josh. xix. 38.—Also, a city of the tribe of Naphtali. Josh. xix. 38. Judg. i. 33.

BETH-SUR, or **BETH-ZUR**, *the house of the rock*, or *of the band*, a city with a strong fortress, seated on a high rock, in the tribe of Judah (Josh. xv. 38.) distant, according to Eusebius, 20 miles from Jerusalem, on the road to Hebron. It was fortified by Rehoboam, to keep the Danites in awe. (2 Chron. xi. 7.) When it was besieged by Lysias, under Antiochus, the son of Antiochus Epiphanes, with an army of 60,000 foot, and 5000 horse, Judas Maccabæus came with 10,000 men to its succour, and obliged Lysias to raise the siege, and defeated his army. B. C. 165. 1 Maccab. iv. 28. vi. 7. Bryant derives the name of this city from beth, temple, and sur, a name given to the sun, under which appellation he had temples and worship.

BETH-TAPPUA, *the apple or orchard house*, a city of Judah (Josh. xv. 53.) said, by Eusebius, to be the last city of Palestine in the way to Egypt; 14 miles from Raphia.

BETHUL, or **BETHUEL**, a city of Galilee, belonging to the tribe of Simeon, (Josh. xix. 4.) probably the same with *Bethelia*, represented by Sozomen in his history, as belonging to the inhabitants of Gaza, well-peopled, and adorned with several temples remarkable for their structure and antiquity; particularly a pantheon, or temple, dedicated to all the gods, seated on an eminence made of earth, which commanded the whole city. Jerom, speaking of Bethelia, says, that from thence to Pelusium was a short journey of five days. Among the bishops of Palestine, we find one of Bethelia. Reland, l. i. c. 35. p. 208. This was probably the same with *Bethulin*, celebrated on account of its siege by Holofernes, at which he was killed by Judith. Judith, vi. 7.

BETHUNE, in *Biography*. See SULLY.

BETHEUNE, in *Geography*, a town of France, and principal place of a district, in the department of the Prants of Cédais, seated on a rock in the little river Bièvre. The number of inhabitants in the town is estimated at 5000, and in the canton at 15,956. Its territory contains 125 kilometres, and 17 communes. It formerly belonged to the counts of Flanders, but being taken by Gaston, duke of Orleans, in 1645, it was united to France by the peace of the Pyrenees, and the fortifications were repaired under the direction of M. Vauban. In 1710, it was captured by the allied army, under Prince Eugene and the duke of Marlborough, and restored to France in 1713, at the peace of Utrecht. This city and the castle are together of a triangular figure; but the castle itself is an irregular building. The houses are mean, and the streets are ill paved, but it contains several churches and convents, and a large handsome square. In the marshy lands near the city, several canals are cut for the convenience of whitening linen. N. lat. 50° 32'. E. long. 2° 48'.

BETHUNES, a river of France, in Upper Normandy, in the county of Caude.

BETHURIA, in *Ancient Geography*, a town of Asia, in Assyria Proper.

BETHULIA, in *Geography*, a town of Poland, in Sarmatia, 10 miles S. S. E. of Reszenie.

BETHUQA, a town of Africa, in the kingdom of Congo.

BETITLO, a town of European Turkey, in the Morea, 22 miles S. W. of Missina.

BETLIS, a town of Asia, in Kurdistan, situated between two high mountains, at a cannon shot's distance from each other; the residence of a bey, who is subject neither to the king of Persia nor the Turkish emperor, and who commands an army of 20,000 or 25,000 horsemen, besides infantry. It lies on the road from Tauris to Aleppo, and the passage is so narrow, that the prince can stop caravans whenever he pleases. The castle is on an eminence between the mountains, resembling a sugar-loaf, and so steep that it can only be ascended by winding round it. The people is and near the town are shepherds, and are ready to take up arms at the command of their prince. It is distant about 110 miles E. of Diarbekir, and 100 N. of Mosul. N. lat. 37° 20'. E. long. 42° 40'.

BETOLA, a town of Italy, 16 miles S. of Piacenza.

BETON, in *Architecture*. See CONCRETE, CONCRETE.

BETONICA, *Beton*, corrupted from *Betonis*, which is derived from the Vettore, an ancient people of Spain, in *Betonis*. Linn. gen. 179. Reich. 776. Schreb. 973. Tournef. 96. Juss. 114. Smith, Flor. Brit. 267. Curt. and Ordet. *Phytologia* var. *sp. 1*. Nat. Ord. *Urticaceae*, or *Labiata*. Gen. Char. Cor. 5-parted, tubular, cylindrical, five-toothed, with 5-partite lobes; upper lip 2-lobed, imbricate; tube bell-shaped; middle division broader, roundish, or a quarter. Stam. filament 5-toothed, the length of the throat; two longer, reaching to the upper lip; anthers roundish. *Petal.* germ four-parted; lobes, four, filiform, and five of the lobes; stigma bilobed. *Per.* none; calyx fostering the seeds round the stem. *Seed* four, ovate.

Ess. Char. Cor. awned. Cor. upper lip ascending, flattened; tube cylindrical.

Species, 1. *B. officinalis*, wood betony. Linn. Sp. p. 810. Hudb. 271. Wain. 530. R. H. 229. Sibth. 785. Curt. Bot. Bot. 2. t. 3. Pl. Dan. t. 726. Woodw. 50; pl. t. 241. Varetos, *B.* B. alba. Bauh. pin. 235. Hall. s. Light. t. 2. *B. micrantha* a helvetic. Tournef. Hall. s. Light. t. 2. Mor. f. 4. Park. 614. f. 3. Ran. Hort. 550. "Spike interrupted; helmet of the corolla entire; middle

division of the lower lip emarginate; calyxes fringed."

The common wood betony has an upright stem, a foot high or more, not branched, or very little in its wild state. hairy, channelled, the corners rounded; root-leaves on long petioles, oblong-heart-shaped, obtuse, wrinkled, crenate, with few hairs, but dotted with small hollow points; the edge ciliate; stem-leaves sessile, lanceolate, serrate; bracts numerous, lanceolate, ciliate, shorter than the calyx; flowers in spikes, composed of several whorls; calyx coloured, sessile, almost upright, villous within, having long hairs between the five long-pointed segments; the two upper teeth recurved; corolla purple, varying to flesh and rarely white; tube downy, longer than the calyx, upper lip commonly entire, sometimes cloven at the end, lower scalloped or crenulate; filaments villous; anthers blackish. A native of woods, heaths, and pastures, among hedges; perennial, flowering in July and August. The dried leaves, by their rough hairs, excite sneezing; and it has accordingly been made an ingredient in the sternutatory powders. But Dr. Callen observes, that this, as well as marjoram, seems to be only useful, by diffusing and giving an agreeable odour to the other essences. Sheep eat it, but goats refuse it. This plant dyes wool of a very fine dark yellow colour. The leaves and tops of the betony have an agreeable but weak smell; to the taste they discover a slight warmth, accompanied with some degree of astringency and bitterness. They yield very little essential oil. This, like many other plants formerly in great medical estimation, is at this time almost entirely disregarded. Antonius Musa, physician to the emperor Augustus, filled a whole volume with an enumeration of its virtues, stating it as a remedy for no less than 47 disorders; and hence in Italy arose the proverbial compliments, "tu hai piu di vertu che non ha betonica," i. e. you have more virtues than betony; and "vende la tunica et compra la betonica," i. e. sell your coat and buy betony. Simon Paulli also ascribes to it powers, which may be considered as rather miraculous than natural, and which did not seem to require contradiction, from the experiments of Alton. Modern writers, however, do not allow the betony to possess any considerable efficacy, and it is omitted in the catalogues of the British dispensatories. Scopoli indeed says, that he experienced its cephalic and corroborant effects; but its sensible qualities shew it to be more inert than most of the other verticillatae. The roots and leaves are said to be very different in quality from the other parts of the plant; and to be nauseous, bitter, purgative, and astringent. Both this plant and eyebright enter into the composition of Rowley's British herb tobacco and snuff. The variety *B.* is not uncommon with a white flower, in subalpine pasture. Gerard remarked it near Hampstead; and Mr. Miller says, that he often found it in Kent. The small iron-tanaceous variety *B.* is not unfrequent with a spike, nearly globular; the leaves and flowers are smaller; but all these differences are owing to situation.

2. *B. orientalis*, oriental betony. "Spike entire, middle division of the lip of the corolla quite entire." The flowers are larger, and of a lighter purple than those of the common sort. It was first discovered by Tournefort in the Levant, and was cultivated in Kew garden by Mr. Miller in 1739. 3. *B. alpestris*, fox-tail betony. *Sideritis alpestris*. Scop. Carn. n. 711. t. 28. *Hormium alpinum* lotum, *betonica spica*. Rai. hist. 547.—*minus allua*, &c. Bauh. pin. 239. prodr. 114. "Spike leafy at the base, helmet of the corolla bilobed." The leaves are altogether heart-shaped, hirsute, and serrate; the flowers small like elder; the corolla are pale yellow; the filaments linguiform; and the germs smooth and shining. A native of the mountains of Savoy, Piedmont, Austria, Carniola, Silesia, and Provence; cultivated

vated, in 1759, in Kew garden, by Mr. Miller. 4. *B. hirsuta*, hairy betony. *B. Alpina*. Miller. Dict. n. 3. *B. Monierii*. Obf. 146. *B. Alpina incana purpurea*. Barr. ic. 340. *B. fol. hirsut. flor. purpur. amplifsimis*. Mentz. pug. zanon. t. 30. p. 46. "Spikes leafy at the base, helmet of the corolla entire." Resembling the foregoing, but more stout and hairy, with a shorter, thicker spike; a native of the Alps, Apennines, and Pyrenées, and cultivated in Kew garden by Mr. Miller, in 1739. 5. *B. heraclea*. "Spike with woolly calyxes, teeth filiform; leaves lanceolate naked." A native of the Levant. 6. *B. sriida*, Danish betony. Ait. Hort. Kew. 2. 291. *B. Danica*. Miller. Dict. n. 2. "Spike oblong; helmet of the corolla entire, middle division of the lower lip notch-waved; calyxes hairy." A native of Denmark, cultivated by Mr. Miller in Kew garden, in 1759. 7. *B. incana*, hoary betony. Mill. Dict. n. 5. Ait. Hort. Kew. 2. 229. "Spike interrupted; helmet of the corolla bifid, middle division of the lower lip notched; tube tomentose bent in." A native of Italy; cultivated in Kew garden by Mr. Miller in 1759. All the species of this genus are herbaceous, fibrous-rooted, hardy, perennial plants. The stems are simple, or but little branched. The flowers are in whorls, forming a terminating spike.

Propagation and Culture. All the sorts may be propagated by seeds, or parting the roots; they require a shady situation and a moist stiff soil. The best time for transplanting and separating the roots is in autumn, but the seeds should be sown in the spring upon a shady border; and they will need no other care besides keeping them from weeds, and thinning them when they are too close. Martyn's Miller. Woodville Med. Bot. vol. ii. p. 79.

BETONICA Aquatica. See SCROPHULARIA.

BETONICA Pauli. See VERONICA.

BETONIM, in *Ancient Geography*, a city of Gad, towards the north of this tribe, bordering on Manasseh. Josh. xiii. 26.

BETO-POULO, in *Geography*, a small island in the Grecian Archipelago. N. lat. 37° 2'. E. long. 23° 33'.

BETOWKY, a town of Poland, in Samogitia, 16 miles west of Rofieme.

BETSCHKOW, a town of Bohemia, in the circle of Czaflau, 9 miles N. W. of Czaflau.

BETSE, or *BETSETEK*, a town of Hungary, in the county of Beth, seated on the Theis, near its influx into the Danube.

BETROTHMENT, in *Law*, a mutual promise or compact between two parties for a future marriage. The word imports as much as giving one's troth; that is, true faith, or promise. Betrothment amounts to the same with what is called by civilians and canonists *sponsalia*, or *esponsals*; sometimes *desponsation*; and by the French *fiançailles*. Betrothment is either solemn, made in the face of the church, or private, made before witnesses out of the church. *To betroth by giving arrha*, or earnest, is called, by *Middle Age Writers*, *jubbarrare*. In Russia, the betrothing is performed with ecclesiastical rites, generally eight days previous to the marriage, and is indissoluble. During this interval, the bride is only visited by the bridegroom, and the girls of her acquaintance, who amuse her with singing. On the last evening, the young women bring the bride into the hot bath, where they plait and tie up her hair, singing at the same time ballads descriptive of her future happiness. Among the ancient Jews, the betrothing was performed, either by a writing, or by a piece of silver given to the bride, or by cohabitation and consummation. This latter engagement, according to the Rabbins, was allowed by the law (Deut. xxiv. 1.), but it has been wisely forbidden by the ancients, on account of the abuses that might happen, and for preventing clandestine

marriages. After the marriage was contracted, the young people had the liberty of seeing each other, which was not allowed them before. If during this time the bride should trespass against that fidelity she owed to her bridegroom, she was treated as an adulteress. (Seld. Uxor. Heb. l. ii. c. 1.) The nuns of the Annunciada hold an annual feast, in honour of the desponsation, or betrothment of the Virgin Mary to Joseph.

BETTA, in *Geography*, a town of Asiatic Turkey, 70 miles S.S.W. of Erzerum.

BETTEMBOURG, the chief place of the canton, in the district of Luxemburg, and department of Forêts; containing 812 persons: the number in the canton amounts to 10,139. The territory comprehends 290 kilometres, and 12 communes.

BETTERTON, THOMAS, in *Biography*, a famous actor, the English Roscius of his time, was the son of an under cook in the household of king Charles I., born in 1635, and after a tolerably liberal education, apprenticed to a bookfeller. This bookfeller, being the publisher of fir William d'Avenant, introduced Betterton into an acquaintance with him, and by this means he was brought upon the stage, under his patronage, about the year 1656 or 1657. After the restoration, he engaged in the company called the Duke's company, formed in virtue of a patent granted to fir William d'Avenant, which acted at the theatre in Lincoln's-inn fields. Betterton, whose talents had attracted notice, was sent to Paris, by command of Charles I., that he might acquaint himself with the French stage, and contribute on his return to the improvement of the English theatre. A new theatre was accordingly built for d'Avenant's company, in Dorset gardens, and the exhibitions conducted in it were attended with great success. In 1670, Betterton married a Mrs. Sanderfon, who excelled as an actress on the same stage, and who contributed, in concurrence with his own exertions, to procure for them not only a comfortable subsistence, but such a surplus as might have served to maintain them in their advanced age. After the coalition of the two companies above mentioned, which took place about the year 1685 or 1686, the merit of Betterton shone with unrivalled lustre; and he acquired the honour of being at the head of his profession. From the account which Cibber has given of his dramatic talents, it appears that no actor entered with a more discriminating judgment into his part, or possessed a greater command over his audience. The leading style of his acting was the grave, dignified, and forcible. His voice, person, and aspect concurred in giving more spirit to terror than to the softer passions; and Cibber adds, in bearing ample testimony to his merit; "I never heard a line in tragedy come from Betterton, wherein my judgment, my ears, and my imagination were not fully satisfied." His powers, however, seem to have been restricted to a particular walk in tragedy; and Othello, Hamlet Brutus, and Hotspur, are enumerated among his striking parts, "and in these the range is from calm dignity to fiery impetuosity."

With respect to his private character, we are told that it was, like his theatrical, manly, decent, and elevated. Having acquired a moderate property, he embarked it, by the advice of a friend, in a commercial project, in which it was lost; and yet that friend's daughter, when she became an orphan, was maintained by him as if she had been his own. In consequence of some disputes which occurred, he was compelled by stage-tyranny, to quit the company, with which he had been long engaged; and a new play-house was opened by his efforts in Lincoln's-inn-fields, in 1695. The growing infirmities of advanced age made it necessary for him to withdraw from the stage, and to acquiesce, which he did with self-possession and serenity of mind, in the narrow circumstances of

his declining life. In 1709, a benefit was allowed him; and on this occasion two eminent actresses, Mrs. Bracegirdle and Mrs. Barry, who had quitted the stage, assisted him by their appearance before the public, and Mr. Rowe contributed an excellent epilogue. In April 1710, he performed again at his own benefit; but the means to which he had recourse for repelling the gout from his feet for this purpose, proved fatal to him on the 28th of that month. He was buried in Westminster abbey; and sir Richard Steele devoted a paper of the *Tatler* (N 167.) to record the event, and to honour his memory. His veneration for Shakespeare resembled that of his great successor, Mr. Garrick; and, like him, he derived his principal renown from an exhibition of the characters of that famous dramatic writer. The few pieces which Betterton wrote for the stage, owe their chief excellence to his accurate and expressive knowledge of theatrical effect. His widow, with whom he had lived in uninterrupted harmony, did not survive him more than six months; nor, indeed, did she live long enough to enjoy the benefit of that pension which was settled upon her by queen Anne just before her death. We shall close this article with the relation of an anecdote recorded by Motraye in his *Travels*. When Betterton was one day at dinner with the archbishop of Canterbury, his grace expressed to him his astonishment, that the representation of fables on the stage should make a greater impression upon the mind than that of truth in the sermons of the clergy; to which the actor, having obtained leave to reply, said "May it please your grace, It is because the clergy, in reading their sermons, pronounce them as if they were reading fables: and we, in acting our parts, and using in them a proper gesture, represent them like matters of fact." *Biog. Brit.*

BETTINGEN, in *Geography*, a town of Germany, in the circle of Westphalia, and county of Blankenheim, three miles north of Geroldstein.

BETTINI, DOMENICO, in *Biography*, a painter, was born at Florence in 1644, and studied at Rome the works of Mario da Fiori, whose paintings he industriously copied, and whose style and manner he acquired. He painted fruit, flowers, insects, animals, and still life; his objects were well disposed, and skilfully grouped, and had a strong character of truth and nature. This artist died in 1705. *Pilkington.*

BETTON, in *Geography*, a town of France, in the department of the Ille and Villaine, and chief place of a canton in the district of Rennes; $1\frac{1}{4}$ league north of Rennes.

BETTS, JOHN, in *Biography*, born at Winchester, where he received the rudiments of his education, was elected one of the scholars of Christ-Church Oxford, in 1642. Being of the king's party, he was ejected the house, in that season of confusion and trouble, but permitted, after a time, to return, and was made doctor in medicine, in 1654. Coming to London, he was in much request, particularly by those of the Romish church, of which he was a member. He was also elected one of the fellows of the college of physicians; and on the restoration of king Charles II. was made one of his physicians. Betts published, in 1669, "De ortu et natura sanguinis," which was censured by Dr. Thompson in his *True Way of preserving the blood in its integrity*. He also published an account of the dissection of Thomas Parr, who lived to the great age of 152 years and 9 months. This account was afterwards inserted in the works of Dr. Harvey, who is supposed to have drawn it up. *Wood's Athen. Ox.*

BETTYAR, in *Geography*, a town of Hindoostan, and the capital of a province, in the country of Bahar, 80 miles N.N.W. of Patna, and 124 N.E. of Benares.

BETULA, ALDER, and BIRCH, in *Botany*. *Lin. Gen.* n. 1052. *Reich.* 1147. *Schreb.* 1419. *Tournef.* 350. *Juss.* 409. *Gertn.* t. 90. *Clas and Order, morocchia:trandria.* *Nat. Ord. amentacee.* *Gen. Ch. * Male flowers* in a cylindrical ament. *Cal.* ament imbricate on every side, loose, cylindrical, consisting of three-flowered scales, in each of which are two very minute scales, placed at the sides; three equal stamules fixed to the disk of each scale of the calyx. *Perianth* in each one-leaved, small, entire, three or four-parted; divisions ovate, obtuse. *Cor.* none. *Stam.* filaments to each four (or three, or two), very small; anthers twin. ** Female flowers* in an ament of the same plant. *Cal.* ament cylindrical or roundish, imbricate; with two-flowered scales. *C r.* none. *Pyl.* germ proper, ovate, compressed, very small, two-seeded; styles two, setaceous; stigmas simple. *Per.* none; ament under each side cherishing the seeds of two florets. *Seeds* solitary, ovate. *Obf. Betula T.* has the fruits in cylindrical aments; scales three-forked; seeds with a double lateral wing. *Alnus T.* has them in a roundish strobile; scales roundish; seeds angular, without wings.

Ess. Char. Male. Cal. one-leaved, three-cleft, three-flowered. *Cor.* four-parted. *Fem. Cal.* one-leaved, subtrifid, two-flowered. *Seed,* with a winged membrane on each side.

Species, 1. B. alba, common birch-tree. *Lin. Spec.* 1393. *Hudf. Angl.* 416. *Wither.* 1065. *Ger.* 1295. *Emac.* 1478. *Park.* 1408. *Raii hist.* 1440. *Hunt. Evelyn.* 218. *Varieties, 2. B. pendula*, weeping-birch. *3. B. alba dalecarlica.* *Lin. Suppl.* 416. "Leaves ovate, acuminate, ferrate." The common birch-tree is known at first sight by the silvery colour of its bark, epidermis, or thin outer covering of the bark; the smallness of the leaves in comparison with other timber-trees; and the lightness and airiness of its whole appearance. The branches are alternate, very flexible, covered with a reddish brown or russet, and smooth bark, generally dotted with white; the leaves alternate, bright green, smooth, shining beneath, with veins crossing like the meshes of a net; the petioles about half an inch long, grooved above, and having at the base ovate green glands; the male aments or catkins, which have their scales tipped with brown, appear in autumn at the ends of the twigs, abide in winter, and unfold their flowers, when the female catkins appear in spring at the ends of the shorter branches, on pedicels near a quarter of an inch long; the blossom is egg-shaped, concave, and green; the germs, two or more, are compressed; and the styles and stigmas are reddish. A native of Europe, from Lapland to the subalpine parts of Italy; and of Asia, chiefly in mountainous situations; found with us in woods and moist hedges, and flowering in April and May.

Evelyn observes, that although the timber of birch is the worst of any, it has its various uses; as for the farmer's ox-yokes, for hoops, small serews, paniers, brooms, wands, bavin-bands and wythes for faggots, and formerly for arrows, bolts, and shafts. It served also for dishes, bowls, ladles, and other domestic utensils. In New England, he says, our Northern Americans made canoes, boxes, buckets, baskets, kettles, dishes, &c. of this wood, which they curiously joined with threads made of cedar-roots; and out of an extractance from the bole, boiled, beaten, and dried in an oven, they made excellent spunk or touchwood, and balls for playing. They also constructed of it pinnaces, which they ribbed with white cedar, and covered with large flakes of birch-bark, sewed with threads of spruce roots, and pitched; to which use it was anciently applied even in Britain. It served also for fuel; birch-trees having been dug in many of the moors of the west riding of Yorkshire, which burn and flame like fir and candle-wood; and *Pliny* says (*N. H. l. xvi.*

c. 18.) that the Gauls extracted a kind of bitumen out of birch. The inner white cuticle and silken bark, which strips off of itself almost yearly, was anciently used for writing tables, before the invention of paper; and with the outward, thicker, and coarser part are covered divers houses in Russia, Poland, and other northern tracts, instead of slates and tile; and in Sweden, the poor have even ground the bark to mingle with their bread corn. From the accounts of more modern writers we learn, that the wood of birch; which is very white, is used for women's shoe-heels and pattens, and for packing-cases. It is planted along with hazle to make charcoal for forges; and in the northern parts of Lancashire, and in the vicinity of London, besoms are made with its twigs, for home consumption, and also for exportation. The twigs smeared with birdlime are also used by the fowlers; and in Norway they are given to horses, when fodder is scarce. The bark is serviceable in dyeing wool yellow, and in fixing fugacious colours; for which purpose it should be used dry, and trees of 18 or 20 years growth should be disbarked at the time when the sap is flowing. The Highlanders of Scotland use the bark for tanning leather, and for making ropes; and they sometimes burn the outer rind instead of candles. In Norway it is dried, ground, and mixed with meal, and boiled up with other food for swine, who thrive much upon it. The outer bark, as it escapes putrefaction in the dampest places, is employed for covering the roofs of houses, used on a layer of turf three or four inches thick. The inner bark is applied by the Norwegians for tanning hides, for fishing-nets, and for sails. With the fragments dexterously braided the Laplanders make shoes and baskets, and they use large pieces of it for outer garments to keep off the rain. In Kamtschatka, they convert it into hats and drinking cups. The wood was formerly used by the Scots Highlanders for their arrows, but it is now employed by the hoop-benders and wheelwrights, and for a variety of rustic implements. The turner uses it for trenchers, bowls, ladles, &c.; and that which is of a proper size serves for gates, rails, &c. In France it is generally used for wooden shoes. It also affords good fuel, and some of the best charcoal; and the soot is a good lamp-black for printer's ink. The small branches serve the Highlanders for hurdles, and for side-fences to their houses. Moxa is made of the yellow fungous excrescences of the wood, which sometimes swell out from the fissures. The leaves afford good fodder to horses, kine, sheep, and goats. The seeds are the favourite food of the fishkin; and the tree supplies a variety of insects with food.

The vernal sap of the birch-tree possesses a saccharine quality, and has been used both in a fermented and unfermented state, as a wholesome diuretic wine. It was formerly in great repute against all nephritic disorders; but has been discarded from the modern practice. Van Helmont extols a drink prepared with this juice, daucus-seeds, and brook-lime. Mr. Boyle says (Work, Abr. vol. i. p. 51. vol. iii. p. 338.), that he has seen extraordinary medicinal effects of the juice itself, even when other remedies failed; and accordingly he provided himself with a quantity of it every spring. He says, it may be easily preserved by pouring a little oil on the top of it, or by distillation; but the best way is to impregnate it with the fumes of sulphur. The juice has been used for wine, and also for brewing, being in the latter case employed in lieu of water; and it is said Phil. Trans. N. 46. p. 963., that a barrel of malt will afford as much, and as good ale, as four with common water. In order to obtain this juice, let holes be bored in the bodies of the larger trees, about the beginning of March, while the sap is rising, and before the leaves shoot out, and in these holes fix sockets of elder sticks, cleared of their pith, placing

vessels under them to receive the liquor. A large tree may be tapped in four or five places at a time; and from several trees may be drawn in this way several gallons of juice in a day. If a sufficient quantity be not obtained in the day, what has been gained may be reserved by bottling it up closely till more be procured; but the sooner it is boiled the better. It has been observed, that in the space of 12 or 14 days as much juice may be obtained from one tree, as will outweigh the whole tree, body, and roots. And Evelyn, in his "Sylva," (Hunter's edition, p. 234.) informs us, that a great difference is found between the efficacy of that liquor which distils from the bole, or parts of the tree nearer the roots, and that part which flows from the higher branches; the former being more crude and watery, and the latter more pure and refined. When the sap is obtained, boil it as long as any scum arises, and well skim it during the operation. To every gallon of liquor add four pounds of sugar, and boil it afterwards half an hour, well skimming it; then put it into an open tub to cool, and when cold turn it into a cask. When it has done working, hung it up close, and keep it three months; then either bottle it off, or draw it out of the cask, when it is a year old.

The birch, independently of the uses to which its various parts have been applied, merits culture in parks and ornamental woods for the sake of variety; its straight stem, smooth and white bark, and neat foliage, exhibit a picturesque appearance, when properly placed here and there in the openings, so as to shew the foliage and hanging down of the twigs, or within to display its silvery bark through the gloom: and, besides, its fragrant smell after rain, jolly entitles it to a place in the wilderness. Moreover, the birch-tree deserves cultivation, because it will grow to advantage upon barren land, where better trees will not thrive. It will flourish in moist spongy land, in dry gravel and sand, where the surface is shallow; and upon ground, producing only moss, these trees have succeeded so well, as to be fit for cutting in ten years after planting, and to yield a considerable profit at a small expence. Of this species there are several varieties. In the variety β , the twigs of young trees are erect, but being slender and pliant, they are apt to become pendent with age; and hence proceeds a variety no less beautiful than the weeping willow. γ , is a remarkable variety found in Dalecarlia, and described as having leaves almost palmate, with the segments toothed. Other varieties of a trifling nature, with slight differences in the shape of the leaves, are mentioned by Linnæus in his Flora suecica.

2. *B. nigra*, black Virginia birch-tree. Lin. Spec. 1394. Reich. 4. 126. Gærtn. fruct. 2. 54. t. 90. Gron. Virg. 188. 146. Raii Dendr. 12. n. 2. Ait. Hort. Kew. 3. 336. "Leaves rhomb-ovate, acute, doubly serrate, pubescent underneath, entire at the base; scales of the strobiles villose, segments linear, equal." This species being of foreign growth, is propagated for wilderness and ornamental plantations; but as it now begins to be more common, it is to be hoped that it will soon make a figure among our forest trees. It is equally hardy with our common birch, and attains to a much greater magnitude, as it grows to upwards of 60 feet in height. The branches are spotted, and more sparingly set on the trees than those of the common sort. The leaves have their larger serratures more deep and remote, besides several very small, fine, crowded ones; they are broader, grow on long foot-stalks, and add a dignity to the appearance of the tree. The twigs are pubescent, and the petioles villose. A native of Virginia and Canada; and introduced into Kew gardens in 1736, by Peter Collinson, Esq.

It is very desirable in pleasure-grounds, as it is the first tree in the spring which presents us with leaves, which are of a light

light and lively green. Its white bark makes a beautiful variety, when intermixed with other trees. It is said to be the most useful tree in North America for building both of houses and boats; and will grow fast in any soil or situation, whether wet or dry; and it may therefore be planted in places where few other trees will thrive, and much deserves cultivation. There are several varieties of this species, differing in the colour, size of the leaves, and shoots; such as the broad-leaved Virginian birch, the poplar-leaved-Virginian birch, the paper birch, brown birch, &c.

3. *B. lenta*, Canada birch. Lin. Spec. 1394. Reich. 4. 126. Groen. Virg. 115. 146. "Leaves cordate, oblong, acuminate, serrate." The leaves are smooth, very finely and sharply serrate. The female catkins are ovate, sessile, with acuminate entire scales. This species grows to more than 60 feet in height. The liquor flowing from its wounds is used by the inhabitants of Kamtschatka without previous fermentation; with the wood, and also with the bark, which is very light, tough, and durable, they construct sledges and canoes; and they convert the latter into food by stripping it off when green, and cutting it into long narrow pieces, like vermicelli, drying it, and stewing it with their caviar. It was cultivated by Mr. Miller in Kew garden in 1759. The varieties differ in colour, and are distinguished by the names of dusky Canada birch, white paper birch, poplar-leaved Canada birch, low growing Canada birch, &c.

4. *B. nana*, smooth dwarf birch. Lin. Spec. 1394. Reich. 4. 127. Hudf. Angl. 416. Wither. 2. 207. Hall. Helv. n. 1629. Fl. Dan. t. 91. Pallas Ross. 63. t. 40. D.—G. Fl. Lapp t. 4. Lightf. Scot. 575. t. 25. "Leaves orbiculate, crenate, or circular, feoloped." An upright shrub, seldom rising above two or three feet high; with a hard, stiff trunk, and hewy, roughish bark, resembling that of the *ulmus campestris*; branches expanding, straight, scattered, tapering, woolly, somewhat gummy at the end; leaves rather broader than they are long, commonly three from each bud, but frequently single and alternate, generally entire at the base, scollops often pointed; catkins about half an inch long; styles purple. A native of the northern parts of Europe, and of the Alps; grows on mountains and wet heaths in Scotland; and flowers in May. Here it is planted for the sake of variety, but is of no use; however, Linnaeus says, that it is very serviceable in the economy of the Laplanders, affording them in summer, when they live on the mountains, fuel for their fires, which they are obliged to keep constantly in their houses to defend them from the frost; and, covered with the bark of the remainder, forming their beds. The seeds are the food of the ptarmigan, which supplies a considerable part of their subsistence. The moxa is also prepared from it, which they count as an efficacious remedy in all painful diseases. The leaves, according to Linnaeus, dye a fair yellow than that afforded by the *B. alba*.

5. *B. pumila*, America, or hairy dwarf birch. Lin. Syst. 849. Reich. 4. 127. Mant. 124. Jacq. Hort. 2. 122. B. rana. Kalm. n. 2. 263. "Leaves obovate, crenate." Resembling the foregoing. A native of North America, and introduced into Kew garden, in 1762, by Mr. James Gordon.

6. *B. alba*, alder. Lin. Spec. 1394. Reich. 4. 127. Hudf. Angl. 416. Wither. 2. 206. Lightf. Scot. 576. Pallas Ross. 64. A. Hort. Kew. 3. 334. Alnus. Lin. Lap. 340. Hort. C. 5. 441. Gært. fruct. 2. 51. t. 90. Hall. Helv. n. 1630. Hort. Lvelv. n. 240. Groen. 1294. t. 11. 477. Park. 1409. Panh. t. 149. Cum. epit. 68. Varietas, 1. *glaberrima*, common alder, "leaves undivided." 2. *laciniata*, cleft-leaved alder. Ait. Hort. Kew. 3. 8. 10. 2. Duham. Arb. 42. 1. 4. "L. v. pinnatifid." "Peduncles branched; leaves 101. Lin.

wedge-form, very obtuse, glutinous; axils of the veins villose underneath." The common alder, which appears generally as a shrub, sometimes grows to the height of 35 or 40 feet. The bark is blackish, and in old trees full of clefts; the wood is red and brittle; the leaves are of a dark green colour, and roundish figure, crenate, smooth, viscid to the touch; the petioles grooved above and near an inch long, with lanceolate blunt stipules at their base; the male catkins are cylindrical, appear in autumn, and continue to the spring; the females are of a short conical form, like a small fir cone. Many botanists have separated the alder from the birch; but Linnaeus, in his latter works, has joined them in the same genus, Gærtner preserves them distinct, alleging that they differ not only in the fruit, but in the flower. A native of Europe, from Lapland to Gibraltar; and of Asia from the White sea to mount Caucasus, in wet and boggy grounds, and on the banks of rivers; flowering with us in February, March, and April. The varieties of this tree are the long-leaved American alder, the white alder, the black alder, and the dwarf alder. The last with a round serrate leaf, grows naturally on the Alps and Apennines; it is a very humble shrub, seldom rising more than a foot high, with its branches always trailing on the ground. The first, or long-leaved alder from America, grows to 30 feet in height, and deserves a place in all plantations. The branches are slender, smooth, numerous, and dark brown or purple; the leaves are long, and free from the clamminess of the common sort; and sometimes continue on the tree even in December, so as to give it the appearance of an ever-green.

The wood of the alder is valuable for piles, pumps, sluices, and in general for all works intended to be constantly under water. It is said to have been used under the Rialto at Venice; and we are told that the morasses about Ravenna were piled with this timber, in order to serve as the foundations of buildings. For this purpose it has been much cultivated in Flanders and Holland. It serves also for many domestic and rural uses, as for cart-wheels, spinning-wheels, milk-vessels, bowls, spoons, small trays, trenchers, and other turnery ware, troughs, handles of tools, clogs, pattens, and wooden heels. The roots and knots furnish a beautiful veined wood for cabinets; and the Scots Highlanders often make chairs of it, which are very handsome, and of the colour of mahogany. The wood that has lain in hogs is black like ebony. It is generally planted for coppice wood, to be cut down every ninth or tenth year for poles. The branches make good charcoal.

The bark is used by tanners and leather-dressers, and also by fishermen for staining their nets. This and also the young shoots dye yellow, and with a little copperas a yellowish grey, useful in the demi-tints and shadows of flesh in tapestry. The shoots cut in March dye a cinnamon colour, and a fine tawny, when dried and powdered. The fresh wood yields a dye of the colour of rappee-fruit. The catkins dye green. The bark is used as a basis for blacks; an ounce of it dried and powdered, and boiled in three quarters of a pint of water, with an equal quantity of log-wood, with solution of copper, tin, and bismuth, six grains of each, and two drops of solution of iron vitriol, will dye a strong deep "l'olive de Paris." The leaves have been sometimes employed in tanning leather. The Laplanders chew the bark, and dye their leathern garments red with their saliva. The whole tree is very astringent.

The alder is used for hedges by the side of streams and ditches, and in all wet and morassy soils, and keeps up the bank; but if it be planted in a low meadow, it is said that the ground about it will become boggy; whereas, if it be planted, the root, of which penetrate a great way, and run

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near the surface, the ground will become firm and dry. The growth of grass is not materially obstructed by the shade of alder. In the highlands of Scotland, near Dunderdonald, Mr. Pennant says, the boughs cut in the summer spread over the fields, and left during the winter to rot, are found to answer the purpose of a manure. In March the ground is cleared of the undecayed parts, and then ploughed. The fresh gathered leaves are covered with a glutinous liquor, which some people strew upon their floors to destroy fleas; the fleas entangling themselves in the tenacious liquor, as birds do in bird-lime. This tree affords food to many kinds of moths, and other insects. Horses, cows, goats, and sheep, eat it; but swine refuse it. The tongues of horses who feed upon it are turned black; and some persons suppose that it is not wholesome for them.

7. *B. incana*, hoary alder. Linn. Syst. 849. Suppl. 417. Hall. Helv. n. 1631. Villars Dauph. 2. 790. Pallas Rofs. 64. Du Roy Harbec. 1. 109. Gmelin. Sib. 1. 171. n. 24. 2. *B. alnus incana*. Lin. Spec. 1394. Reich. 4. 127. *B. viridis*. Villars Dauph. 2. 789. *Alnus folio incano*. Bauh. pin. 428. Raii hist. 1410. *A. incana et hirsuta*. Bauh. Hist. 1. P. 2. p. 154. Varieties. α . *B. glauca*, glaucous-leaved alder. "Leaves glaucous beneath; petioles red." β . *B. angulata*, elm-leaved alder. "Leaves green beneath; petioles green." "Peduncles branched; leaves roundish, elliptic, acute, pubescent underneath; axils of the veins naked; stipules lanceolate." This species is totally distinct from the common alder, both in the structure of its parts, and its economical uses. It never attains the size of that, and is commonly shrubby; the trunk is scarcely thicker than a man's arm; the wood is white, and of a closer texture. A native of the Alpine and Subalpine parts of Switzerland, Dauphiné, in eastern Siberia, in the islands beyond Kamtschatka, &c. Introduced into the Kew garden, in 1780, by Mr. John Bush. The varieties of the hoary alder are the cut-leaved, the dwarf Alpine, the long-leaved, and the rose-flowered, with petal-like bractes produced from the male catkin.

8. *B. populifolia*, poplar-leaved birch. Ait. Hort. Kew. 3. 336. "Leaves deltoid, drawn out to a long point, unequally ferrate, very smooth; the scales of the strobiles having roundish side lobes; petioles smooth."

9. *B. papyracea*, paper birch. Ait. Hort. Kew. 3. 337. "Leaves ovate, acuminate, doubly ferrate; veins hirsute underneath. Both these last species are natives of North America. Cultivated in 1750 by Archibald, duke of Argyle.

10. *B. excelsa*, tall birch. Ait. Hort. Kew. 3. 337. "Leaves ovate, acute, ferrate; scales of the strobiles having the side lobes rounded; petioles pubescent, shorter than the peduncle." A native of North America. Introduced into Kew garden, about the year 1767, by Mr. James Gordon.

11. *B. oblongata*, Turkey alder. Ait. Hort. Kew. 3. 338. Miller. Dict. ed. 7. n. 2. *A. fol. oblongo viridi*. Bauh. pin. 428. Varieties. α . *foliis oblongis*, oblong-leaved Turkey alder. β . *foliis ellipticis*, oval-leaved Turkey alder. "Peduncles branched; leaves oval, obtusifish, glutinous; the axils of the veins naked underneath." Common in Austria and Hungary, whence Mr. Miller received the seeds. Cultivated by him in Kew garden in 1759.

12. *B. ferrulata*, notch leaved alder. Ait. Hort. Kew. 3. 338. "Peduncles branched; leaves obovate, acute; veins and their axils villose underneath; stipules oval, obtuse." A native of Pennsylvania. Cultivated in Kew garden in 1759 by Peter Collinson, esq.

13. *B. crispa*, curled-leaved alder. Ait. Hort. Kew. 3. 339. "Peduncles branched; leaves ovate, acute, somewhat waved; veins hairy underneath; axils naked; stipules round-

ish-ovate." A native of Newfoundland and Hudson's bay. Introduced into Kew garden, in 1782, by the Hudson's bay company.

14. *B. dawrica*. Pallas it. 3. 224. t. kk. f. 4. ab. fl. rofs. 60. t. 39. Gmel. Sib. 1. 167. & 2. "Leaves ovate, acuminate, ferrate, hairy on the nerve." Scarcely distinguishable, when young, from the common birch, except by the leaves, not growing so tall, and the trunk not exceeding a foot in diameter; bark gray, cleft longitudinally, and dividing into brown scales, as if burnt; branches more subdivided and upright; leaves harder, commonly smaller, on shorter petioles; stipules lanceolate, gray, subpubescent, deciduous; male catkins at the end of the twigs of the preceding year, two or three together, larger than those of the common birch; females from the same twigs lateral, thicker, with larger, and more rounded scales; the seed larger, surrounded by a narrower membrane; differing from the black American birch by having smaller stipules, and leaves less frequently and never doubly ferrate. The wood is hard, yellower than that of the common sort, and in old trees marbled with brown and gray towards the middle; tougher, and therefore more fit for cart-timber and the use of the wheelwright; also employed in making charcoal. A native of Dauria.

15. *B. fruticosa*. Pallas it. 3. App. 758. n. 133. t. kk. f. 1, 2, 3. fl. rofs. 6. 2. t. 40. A. B. C. Gmel. Sib. 1. 167. var. 3. t. 36. f. 2. "Leaves rhomboid-ovate, equally ferrate, smooth." Always shrubby, rising with several stems from the same root, in boggy places not an inch thick, nor higher than a man's stature, but on mountains attaining the thickness of the human arm, and growing to a much loftier height; much branched from top to bottom, and of a very different habit from the common birch; the cuticle ash-coloured with transverse stripes; the wood not so white, and waved transversely; the twigs almost covered with little resinous dots found more or less in the other species; buds more copious and always alternate; two leaves commonly from the same bud, softer than those of the common sort, and decaying sooner; having three seeds to each scale, of the same size and form with those of the *B. nana*. Abundant in marshes and on rocky mountains, and in the cold subalpine regions of eastern Siberia, especially towards the lake Baikal.

Propagation and Culture. The birch-tree may be cultivated either by young plants procured from the woods where they naturally grow, or by seeds carefully gathered in autumn, as soon as the scales begin to open, otherwise they will drop and be lost. As these seeds are small, they should not be buried above a quarter of an inch deep in the ground. Mr. Miller recommends autumn as the best season for sowing them; but Mr. Boutecher directs to spread the seeds thin on a floor till dry, to mix them with loose sand, and to keep them in an airy place till the beginning of March, when they should be sown on fresh light land, trenched or dug the preceding autumn, made very loose, raked fine, and divided into beds three feet and a half wide. It is needless to throw any earth over them; but in dry and frosty weather, a small quantity of pease haulm may be thrown over them for three or four weeks, till the seeds begin to vegetate. The ground should then be kept clean, and three or four gentle waterings may be given at noon in April, and repeated to the middle of June in mild evenings. In the following March they may be removed into the nursery, and planted in rows two feet and a half distant, and ten, or twelve, or eighteen inches asunder. Here they may remain two years, or, in cases where they make little progress, three years; cutting after the second year's growth such as are least thriving or crooked, close to the ground in March. Mr. Miller recommends

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to sow the seeds in the shade, alleging that they will thus thrive better than when exposed to the full sun. In all places where are large trees, their seeds fall, and the plants spring up without any previous care. If these wild plants are taken up without any injury to the roots, they may be transplanted into any ground, with little or no preparation; where the land will admit of the plough, it will be best prepared by a crop of corn. In the spots where they are to stand, it will be sufficient to loose the soil with a spade or mattock; and they may then be set into holes capable of receiving their roots, which should be covered with earth attached closely to them. After they have taken root, they require no other care, besides being kept clear of weeds, which may be cut down two or three times in a summer for the first two years; and afterwards the plants will be strong enough to keep the weeds down, so that they can receive no injury from them. These plants may be set any time from the middle of October till the middle of March, when the ground is free from frost; but in dry land autumn is the best season, and for a moist soil the spring is preferable. The distance at which they should be placed is six feet square, that they may soon cover the ground, and that by standing close, they may draw each other up; for in situations that are much exposed, if they are not pretty close, they will not thrive well. If the plants take kindly to the ground, they will be fit for cutting in about ten years; and afterwards they may be cut every seventh or eighth year, if they are merely designed for timber-making; but if they are intended for hoops, they should be cut sooner than every twelfth year.

As the birch is a native of Britain, it suits itself to all sorts of soil. It will thrive extremely well on barren land, whether it be wet or dry, sandy or stony, marshy or boggy. It sows itself, and will come up in places where hardly any other tree will grow. It may be cultivated at a moderate expence; and being easily disposed of to the broom-makers, hoop-bender, turner, and for purposes of husbandry, it will yield a considerable profit.

The second and third species, or the American sorts of birch, may be propagated by seed in the same manner as the first, and are equally hardy. Seeds sown in beds of fine mould, and covered about a quarter of an inch deep, will generally grow. They should be constantly weeded and watered in dry weather; and at the age of one or two years, according to their strength, they should be planted in rows in the nursery, in the usual manner. In summer, weeding should be observed, and in winter, digging between the rows; and when they are about three or four feet high, they will be of a good size for being transplanted into the wilderness-quarters. As these American sorts grow with greater vigour than the common sort, and thrive on the most barren ground, they may be cultivated in England to great advantage. The varieties of the different species may be propagated by layers. For this purpose a sufficient number of plants should be procured, and set on a spot of double dug ground, at the distance of three yards from each other. In the following year, if they have made so young shoots, they should be headed to within half a foot of the ground, to form the stool, when all the shoots vigorously the following summer; and in autumn, the young shoots should be splashed round the stool, and the top part of the layers near their ends. They should then be taken root, and become good plants in the following winter; and fresh twigs will have sprung up from the stools to be ready for the same operation. The layers should be headed up, and the operation performed afresh. If the plants designed for stools, have made good shoots the first year, they should not be headed down, but splashed near the ground, and all the young twigs layered. An immediate

crop may thus be raised; whilst young shoots will spring out in great plenty below the splashed part, for the purpose of layering in the succeeding year. This work may be repeated every autumn or winter; when some of the strongest layers may be planted out, if they are immediately wanted; whilst the other may be removed into the nursery, in order to become stronger plants, before they are removed to their destined habitations. Cuttings also, if set in a moist shady border in the beginning of October, will frequently grow; but as this is not a sure method, and as these trees are so easily propagated by layers, it hardly deserves to be practised.

In Sweden, the budding and leafing of the birch-tree is considered as a directory for sowing barley. See FOLIATION.

The fourth and fifth species, being of no use with us, are not cultivated, except in botanic gardens.

The sixth species, or alder-tree, delights in a very moist soil, where few other trees will thrive, and greatly improves such lands. It may be propagated by layers, cuttings, or truncheons about three feet long. The best time for planting truncheons, which is the less eligible, though perhaps the least expence method, is in February or the beginning of March. These should be sharpened at one end, and the ground loosened with an iron crow, that when they are thrust in, the bark may not be torn off. They must be planted at least two feet deep, that they may not be disturbed by strong winds, and set at the distance of three feet. The plantations should at first be cleared of all weeds; and after every fall, in the following winter, the stools ought to be looked over, and all the weak side-branches taken off. This will strengthen those which are already the strongest, and will enable them to shoot up more vigorously for poles. Many of the truncheons will not grow; and Hunter, in his edition of Evelyn's Sylva, says, that he has never seen a coppice, raised in this way, so luxuriant and beautiful, as when raised from regular plant. If the alder be raised by layers, this operation must be performed in October, and in the following October they will have taken sufficient root for transplantation. They should then be set at least one foot and a half deep in the ground, and their tops should be cut off to about nine inches above the surface, which will occasion their shooting out many branches. The method of raising these trees by seeds, is practised abroad, and, says Hunter, (*ubi supra*) is greatly to be commended. If these trees are designed for coppices, they should be placed at the distance of six feet square, or they may be planted at first a yard square, and at the end of seven years, when they are felled for poles, every other stool may be taken away; and if the small lateral shoots be taken off in the spring, it will very much strengthen the upright poles, provided a few small shoots be left at certain distees upon the body to detain the sap for the increase of its bulk. In planting alders for coppices, Hunter (*ubi supra*) says, it is much better to raise them from young trees than from truncheons. To obtain these in sufficient quantity, plant suckers, taken out of the meadows where the alder-trees grow, on a prepared piece of ground, and afterwards head them down for stools; by the shoots in the succeeding autumn, and in twelve months they will have taken root, when they should be removed and planted in rows, and in one or two years they may be transplanted where they are to remain. If the coppice is situated upon boggy or watery ground, they may be removed from the nursery, and planted three feet asunder, in holes previously prepared for receiving them. Here they may stand for six or seven years, when every other tree should be taken away, and the rest cut down for stools. Every ninth or tenth year will afford a fall of these trees for

poles; which should be taken off smooth and fine, so that the stool may not be damaged, or hindered from producing a fresh crop.

These trees will thrive exceedingly on the sides of brooks, and may be cut for poles every fifth or sixth year. They may be also planted for hedges in moist ground, and trained into such as are very close and thick, to the height of twenty feet and upwards. The banks of rivers may be secured by planting truncheons very close, and cross-wise. As the leaves are large and of a deep green colour; these trees, if the beauty of aquatic plantations be regarded, should be preferred to others usually planted in swampy grounds.

The seventh species, or hoary alder, growing naturally in dry sandy soils, may perhaps be cultivated with the birch, where land is of little value, as an underwood, and may be propagated either by layers or cuttings, as well as by seeds, where they can be obtained. Martyn's Miller. Hunter's Evelyn's Silva, p. 225. 240. Withering's Bot. Arr. vol. ii. p. 206.

BETULA Americana. See *BURSERIA*.

BETULÆ, in *Entomology*, a species of *CURCULIO*, entirely of a golden-green colour in one sex, and blue in the other, with a spine on each side of the anterior part of the thorax of the latter. A native of Europe. Linnæus. *Donov. Brit. Inf. &c.*

BETULÆ, a species of *CRYPTOCEPHALUS*, that inhabits Berlin. The colour is black; thorax somewhat orbicular and hairy; wing-cases brownish with obscure streaks. Herbit.

BETULÆ, a species of *ATTELATUS*, of a black colour, with legs formed for leaping. Linn. *Fn. Suec.* This is *Curculio exscoriato-niger* of Degeer.

BETULÆ, a species of *CIMEX* (*Acanthia membranaceus*), that lives on the white alder in the north of Europe. The thorax is denticulated; head mucicated; anterior part of the wing-cases dilated. Linn. Degeer, &c.

BETULÆ, a species of *PAPILIO* (*Pleb. Rur.*), found in Europe. The wings are somewhat tailed, brown, yellowish beneath; posterior ones with two white streaks. Fabricius. *Donov. Brit. Inf. &c.* The larva is green, with pale oblique lines, and white on the sides; pupa glossy, and ferruginous. Feeds on the alder. The male distinguished by a fulvous spot on the upper wings.

BETULÆ, a species of *TENTHREDO*, with the body red; thorax, vent, and eyes black; wings behind brown. Linn. *Fn. Suec.* This is *tenthredo ferruginea* of Degeer. Inhabits Europe.

BETULÆ, a species of *COCCUS*, found on the white alder. It is round, and of a bay colour. Gmel. &c.

BETULEIUS, SIXTUS, in *Biography*, whose true name was *Birch*, was born at Memmingen, in the year 1500, and obtained the reputation of an able grammarian, as well as a good Latin poet and philosopher. He taught the belles lettres and philosophy; and became principal of the college of Augsburgh, where he died June 16th 155. He published several works in prose; and his dramatic pieces of Joseph, Susannah, and Judith, have been esteemed.

BETULINUS, in *Ornithology*, a species of *TETRAO*, described by Scopoli. The tail is black, varied with transverse rufous spots; rump whitish, fasciated with black. Scop. *Ann. Latham.* This is the *urogallus minor* of Aldrovandus; and *birch grouse* of Latham. The body is varied with black and rufous; bill and legs black; breast greyish; quill-feathers white at the tip; eyebrows not red.

BETULUS, in *Botany*. See *CARPINUS*.

BETUWE, BETAW, or BATAVIA, in *Geography*, a tract of land, in the duchy of Guelderland, in the United Netherlands, situated betwixt the Rhine and the Waal, and

forming part of the "Insula Batavorum," where the Batavians settled on their migration out of Germany. It has been divided into two bailliages, viz. the eastern or upper, and the western or lower Betuwe. The former, by a change in the course of the Rhine, has been separated from Betuwe, and removed into the duchy of Cleve, where the fortifications of the Schenken-Schanze, erected in 1586, by general Martin Schenk, have been gradually washed away by the water. The bailliage of lower Betuwe comprehends a number of villages that lie on the Rhine. See *BATAVI*.

BETWEEN DECKS, in *Sea Language*, denotes the space contained between any two decks of a ship.

BETWHA, in *Geography*, a river of Hindoostan, which runs into the Junnah, 25 miles south-east of Calpy. This river, from its source south of Bopal, to its confluence with the Junnah, describes a course of 340 miles in a north-easterly direction.

BETZ, the principal place of a canton, in the district of Senlis and department of the Oise, containing 352 persons; the number of the canton being 9364. Its territory comprehends 22½ kilometres, and 29 communes.

BETZALEEL, JEHUDAH, or Leo Pragensis, in *Biography*, a Jewish doctor of Prague, in Bohemia, flourished about the middle of the 16th century, and was chief of the Moravian academies, and judge of the nation in that country. He left several learned works, among which is that entitled "The Redemption and Eternity of Israel," in which he assures the Jews of the certainty of the Messiah's advent, and of his settling them in a state of permanent prosperity.

BETZANDORFF, in *Geography*, a small town or borough of Germany, in the old mark of Brandenburg.

BETZDORF, the principal place of a canton, in the district of Luxembourg, and department of Forêts, containing 1082 inhabitants; those of the canton being 8101. Its territory comprehends 212½ kilometres and 7 communes.

BETZKO, a town of Hungary, 18 miles west of Tolpoltzan.

BETZIRVAN, or BARSAN, a town of Persia, in the province of Aiderbeitzan; 100 miles north-east of Tauris.

BEVAGNA, the ancient *Mevania*, a small town of Italy, in the duchy of Spoleto, seated on the river Tina, or Timia.

BEVECUM, a town of Brabant, 8 miles south-east of Louvain. N. lat. 50° 45'. E. long. 4° 50'.

BEVEL, in *Masonry*, and among *Joiners*, a kind of square, one leg whereof is frequently straight, and the other crooked, according to the sweep of an arch or vault; being also moveable on a point, or centre, so that it may be set to any angle. The make and use of the bevel are pretty much the same as those of the common square or mitre, except that these latter are fixed; the first at an angle of ninety degrees, and the second at forty-five; whereas the bevel, being moveable, may, in some measure, supply the office of both, and yet, which it is chiefly intended for, supply the deficiencies of both, serving to set off or transfer angles, either greater or less than ninety or forty-five degrees.

Bricklayers have also a bevel, by which they cut the under sides of the bricks of arches straight or circular, to such oblique angles as the arches require, and also for other uses.

BEVEL, Graduated, is that which has about the centre of one of its arms a semicircle graven, and divided into 180 degrees, whose diameter stands square with the sides of the same arm; so that the end of the other arm, being divided at right angles, almost to the centre, shews by its motion the number of degrees contained in the angle to be measured. This is also called *recipiangle*, and *pantameter*.

BEVEL angle is used among the workmen, to denote any other angle beside those of ninety or forty-five degrees.

B E V E L.

The *simple Bevel* (see *Plate II. Geometry, fig. 35.*) consists of two rulers movable on a common centre, like a carpenter's rule, with a contrivance to keep them fixed, at any required angle. The centre C must move on a very fine axis, so as to lie in a line with the fiducial edges CB, CD of the rulers, and project as little as possible before them. The fiducial edges of the legs represent the sides of any given angle, and their intersection or centre C, its angular point. A pin, fixed in the lower ruler, and passing through a semicircular groove in the upper, serves, by a nut A, which screws upon it, to fix the rulers, or legs, when they are placed at the desired angle.

The use of this instrument may be illustrated in the following examples:

1. Let three points, A, B, C, be in the circumference of a circle, which is too large to be described by a pair of compasses; and let it be required to find any other number of points in the same circumference. Bring the centre of the bevel to B (*fig. 36.*), the middle point of the three given ones A, B, and C, and holding it there, open or shut the instrument till the fiducial edges of the legs lie upon the other two points, and fix them there by means of the screw A (*fig. 35.*): this operation is called *setting* the bevel to the given points. Then removing the centre of the bevel to any part between B and A or C, the legs being at the same time kept upon A and C, that centre will describe, or be always found in, the arc which passes through the given points, and will thus ascertain as many others as may be required between the limits of A and C. In order to find points without those limits, proceed in the following manner: the bevel being *set*, bring the centre to C, and mark the distance CB upon the left leg; remove the centre to B, and mark the distance BA upon the same leg; then placing the centre on A, bring the right leg upon B, and the first mark will fall upon *a*, a point in the circumference of the circle, passing through A, B, and C, whose distance from A is equal to the distance BC. Removing the centre of the bevel to the point *a* last found, and bringing the right leg to A, the second mark will find another point *a''* in the same circumference, whose distance *aa''* is equal to AB. By proceeding in this manner, any number of points may be found, whose distances on the circumference are alternately BC and BA. In the same manner, by making similar marks on the right leg, points on the other side, as *c'* and *c''* are found, whose distances *Cc'*, *Cc''*, are equal to BA, BC respectively. Intermediate points between any of the above are given by the bevel in the same manner with those between the original points.

2. Three points, A, B, and C, being given, to draw a line from any one of them, tending to the centre of the circle, which passes through them all. Set the bevel to the three given points A, B, and C (*fig. 37.*); lay the centre on A, and the right leg to the point C, and the other leg will give the tangent AG'. Draw AD perpendicular to AG' for the line required. For BAE being = BCA, the angle EAC is the supplement to the angle ABC, or that to which the bevel is set; hence, when one leg is applied to C, and the centre brought to A, the direction of the other leg must be in that of the tangent G'E.

3. Three points being given as before, let it be required to draw from a fourth given point D, a line tending to the centre of a circle passing through the first three points. On D (*fig. 38.*), with the radius DA describe an arc AK; set the bevel to the three given points A, B, and C, and bring its centre, always keeping the legs on A and C, to fall on the arc AK, as at H; on A and H severally, with any convenient radius, strike two arcs, crossing each other at I; and the required line DI will pass through the points

I and D. For a line drawn from A to H will be a common chord to the circles AHK and ABC; and the line ID bisecting it at right angles, must pass through both their centres.

4. Three points being given as before, together with a fourth point, to find two other points, such, that a circle passing through them and the fourth point, shall be concentric to that passing through three given points. Draw Ac and Cc tending to the centre, by a former problem; let the bevel to the three given points A, B, and C; bring the centre of the bevel to D, and move it upon that point till its legs cut off equal parts AN, CQ, of the lines Ac and Cc; and N and Q will be the points required. For, supposing lines drawn from A to C, and from N to Q, the segments ABC and NDQ will be similar ones; and consequently, the angles contained in them will be equal.

5. Two lines tending to a distant point being given, and also a point in one of them; to find two other points (one of which must be in the other given line), such, that a circle passing through these three points may have its centre at the point of intersection of the given lines. Draw EH (*fig. 39.*) at right angles to AB, and make FH = FE; let the bevel to the angle GDO, and keeping its legs on the points H and E, bring its centre to the line AB, which will give the point I.

An improved bevel is exhibited in *fig. 40.* by which the arcs of circles of any radius, without the limits attainable by a common pair of compasses, may be described. It consists of a ruler AB, composed of two pieces rivetted together near C, the centre or axis, and of a triangular part CFED. The axis is a hollow socket fixed to the triangular part, about which another socket, fixed to the arm CB of the ruler AB, turns. These sockets are open in the front for part of their length upwards, as represented in the section at I, which shews the point of a tracer, or pin, fitted for sliding in the socket. The triangular part is furnished with a graduated arc DE, by which the vernier at B, the angle DCB may be determined to a minute. In this arc is a groove, by means of which, as well as by the nut and screw at B, or some similar contrivance, the ruler AB may be fixed in any required position. A scale of radii is put on the arm CB, by which the instrument may be set to describe arcs of given circles, not less than 20 inches in diameter. In order to set the instrument to any given radius, the number expressing it in inches on CB, is brought to cut a fine line drawn on CD, parallel and near to the fiducial edge of it, and the arms are fastened in that position by the screw at B. Two heavy pieces of lead or brass G, G', made in form of the sector of a circle, the angular parts being of steel, and wrought to a true upright edge, as shewn at H, are used with this instrument, whose arms are made to bear against those edges when the arcs are drawn. The under sides of these sectors are furnished with five short points to prevent them from sliding. The fiducial edges of the arms CA and CD, are each divided from the centre C into 200 equal parts. This instrument might be furnished with small castors, like the pentagraph; but little buttons, fixed on its under side, near A, E, and D, will enable it to slide with sufficient ease.

The use of this instrument may be exemplified in the following problems:

1. To describe an arc, which shall pass through three given points.—Place the sectors G, G', with their angular edges over the two extreme points; apply the arms of the bevel to them, and bring at the same time its centre C, that is, the point of the tracer, or pen, put into the socket, to the third point, and there fix the arm CB; then, bringing the tracer to the left-hand sector, slide the bevel, keeping the

arms constantly bearing against the two sectors; till it comes to the right-hand sector, by which the required arc will be described by the motion of its centre C. If the arc be wanted in some part of the drawing *without* the given points, find by case 1. under *simple bevel*, other points in those parts where the arc is required; and thus a given arc may be lengthened as far as is necessary.

2. To describe an arc of a given radius, not less than 10 inches.—Fix the arm CB so that the part of its edge, corresponding to the given radius, always reckoned in inches, may lie over the fine line drawn on CD for that purpose; being the centre to the point through which the arc is required to pass, and dispose the bevel in the direction in which it is intended to be drawn; place the sectors G, G, exactly to the divisions 100 in each arm, and strike the arc as above described.

3. The bevel being set to strike arcs of a given radius, as in the last instance, let it be required to draw other arcs, whose radii shall have a given proportion to that of the first arc. Suppose the bevel to be set for describing arcs of 50 inches radius, and it be required to draw arcs of 60 inches radius, with the bevel so set. Say, as 50 is to 60, so is the constant number 100 to 120, the number on the arms CA and CD, to which the sectors must be placed, in order to describe arcs of 60 inches radius. When it is said that the bevel is set to draw arcs of a particular radius, it is always understood that the sectors G, G, are to be placed at N° 100 on CA and CD, when those arcs are drawn.

4. An arc ACB (*fig. 41.*) being given, let it be required to draw other arcs concentric to it, which shall pass through given points, e. g. P. Through the extremities A and B of the given arc, draw lines Ap, Bp, tending to its centre, by case 3. under *simple bevel*. Take the nearest distance of the given point P from the arc, and set it from A to P, and from B to P. Hold the centre of the bevel on C, any point near the middle of the given arc, and bring its arms to pass through A and B at the same time, and fix them there. Place the sectors to the points P and P, and with the bevel, set as before directed, draw an arc, which will pass through P the given point, and be concentric to the given arc ACB.

5. Through a given point A (*fig. 42.*) in the given line, to strike an arc of a given radius, and whose centre shall lie in that line, produced if necessary. Set the bevel to the given radius, by case 2. Through A, at right angles to AB, draw CD; lay the centre of the bevel, set as above, on A, and the arm CA on the line AC, and draw a line AE along the edge CD of the other arm. Divide the angle DAE into two equal parts by the line AF, and place the bevel so that, its centre being at A, the arm CD shall lie on AF; while in this situation, place the sectors at N° 100 in each arm, and then strike the arc.

6. An arc being given, to find the length of its radius.—Place the centre of the bevel on the middle of the arc, and open or shut the arms till N° 100 on CA and CD, fall upon the arc on each side of the centre; the radius will be found on CB (in inches) at that point of it, where it is cut by the line drawn on CD. If the extent of the arc be not equal to that between the two Nos. 100, make use of the N° 50, in which case the radius found on CB, will be double of that sought; or the arc may be lengthened by prop. 1. till it be of a sufficient extent to admit the two Nos. 100. Adams's Geometrical and Graphical Essays, by Jones, 1757.

BEVELAND, in *Geography*, the name of two islands, formed by the separate branches of the Scheldt, belonging to the state of Zealand; the one, called *North Beveland*, is about 2 leagues long, and $1\frac{1}{2}$ broad; it is south of Schoonen island, and on the south side of the channel of the east Scheldt, that here runs into the sea; the other, called *South*

Beveland, or *Zuid*, is near 8 leagues long, and $2\frac{1}{2}$ wide, and comprehends the town of Goes and several villages; it divides the east from the west Scheldt, and the two points of its west end approach to the channels opposite to the ports of Armpuyd and Flushing. Both these islands have suffered much from inundations.

BEVELLING, in *Ship Building*, the art of hewing timber with a proper and regular curve, according to a mould which is laid on one side of its surface.

In order to hew any piece of timber to its proper bevel, it will be very expedient to make one side fair, and out of wadding; a term used to signify that the side of the timber should be a plane. Now if this side be uppermost, and placed horizontally, or upon a level; it is plain, if the timber is to be hewed square, it may be done by a plummet and line; but if the timber is not hewn square, the line will not touch both the upper and lower edge of the piece, or if a square be applied to it, there will be wood wanting either at the upper or lower side. This is called *within* or *without* a square. When the wood is deficient at the under side, it is called *under-bevelling*; and when it is deficient in the upper side, it is called *standing bevelling*; and this deficiency will be more or less according to the depth of the piece: so that before the proper bevellings of the timbers are found, it will be sometimes very convenient to assign the breadth of the timber; nay, in most cases, it will be absolutely necessary, especially afore and abaft: though the breadth of two timbers, or the timber and room, which includes the two timbers, and the space betwixt them, may be taken without any sensible error, as far as the square body goes. For as one line represents the moulding side of two timbers, the fore-side of the one being supposed to unite with the aft side of the other, the two may be considered as one entire piece of timber. For further observations on this subject, and particular instructions with respect to the mode of bevelling by ribband lines, and by water-lines, see Murray's Treatise on Ship-building, p. 166, &c. See SHIP.

BEVENSEN, commonly called *Bahnfen*, a town of Germany, in the principality of Luneburgh-Zell, seated on the Elmenau, not far from Medingen.

BEVER, a river of Germany, which runs into the Weser near Beverungen, in the circle of Westphalia.

BEVER Head, a cape on the south-east coast of Nova Scotia. N. lat. $44^{\circ} 42'$. W. long. $62^{\circ} 20'$.

BEVERA, a river of Italy, which passes by Sospello, in the county of Nice, and runs into the Roia, two miles north of Vintimiglia.

BEVERAGE, in a general sense, signifies *drink*. Hence *nectar* is said to be the beverage of the gods. In *Writers of the Middle Age*, *beverage*, *beveragium*, or *biberagium*, denotes money given to an artificer or other person, to drink, over and above his hire or wages. Du Cange.

BEVEREN, in *Geography*, a town of France, in the department of the Escaut, and chief place of a canton in the district of Termonde. The place contains 4927 and the canton 15,749 inhabitants; the territory includes 167 $\frac{1}{2}$ kilometres and eight communes.

BEVERGERN, a small town of Germany, in the circle of Westphalia, and bishopric of Munster, situate in the midst of a morals, and having near it a salt spring; 21 miles north of Munster.

BEVERIDGE, WILLIAM, in *Biography*, a learned and pious prelate of the English church, was born at Barrow in Leicestershire, in 1638, and admitted in 1653 into St. John's college Cambridge, where he took his degrees of bachelor of arts in 1656, of master of arts in 1660, and of doctor of divinity in 1679. At the university he distinguished himself by his application to the learned languages, and particularly to oriental

oriental literature, in which he so much excelled, that at the age of 18 he wrote a treatise on the excellency and use of the oriental tongues, with a Syriac grammar. He was no less distinguished at college by his early piety and exemplary sobriety and integrity. Having taken orders in 1661, he was collated by Dr. Sheldon, bishop of London, to the vicarage of Ealing in Middlesex, which he resigned in 1672, upon being chosen rector of St. Peter's Cornhill, by the lord mayor and aldermen of London. In this situation, such were his zeal and assiduity in the discharge of the duties of his office, not only in the pulpit but out of it, and such was the success that attended his labours, that he was denominated "the great reviver and restorer of primitive piety." His singular merit recommended him to the favour of his diocesan, bishop Henchman, who, in 1674, collated him to one of the prebends of St. Paul's; and in 1681, bishop Compton promoted him to the archdeaconry of Colchester, every parish of which he visited in person. In 1684, he was installed prebendary of Canterbury, and he also became chaplain to king William and queen Mary. Declining to accept the see of Bath and Wells, which was offered to him in 1691, he was consecrated, in 1704, bishop of St. Asaph. In this elevated station he prosecuted, with his accustomed zeal and diligence, every practicable measure for advancing the honour and interest of religion, both among the clergy and laity; recommending to the former the "duty of catechising and instructing the people committed to their charge, in the principles of the Christian religion, to the end that they might know what they were to do, in order to salvation," and furnishing them with a plain and easy "Exposition upon the Church Catechism." After having possessed this new dignity for between three and four years, he died March 5th, 1708, in the 71st year of his age, and was buried in St. Paul's cathedral. He left the greatest part of his estate to the societies for propagating the gospel, and for promoting Christian knowledge. Of his numerous works, those published by himself were, 1. "De Linguarum Orientalium, præsertim Hebræicæ, Chaldaicæ, Syriacæ, Arabicæ, et Samaritanæ, præstantiâ et usu, cum Grammaticâ Syriacâ tribus libris traditâ," Lond. 1658, 8vo.; 2. "Institutionum Chronologicarum libri duo, unâ cum totidem Arithmetices Chronologicæ libellis," Lond. 1669, 4to., 1705, 4to., and 1721, 8vo.; 3. "Συνοδικα, five Παιδικα Canonum S. S. Apostolorum, et Conciliorum ab Ecclesiâ Græca receptorum; necnon Canonicarum S. S. Patrum Epistoliarum: unâ cum Scholiis Antiquiorum singulis eorum annexis, et scriptis aliis hæc spectantibus; quorum plurima et Bibliothecæ Bodlianiæ aliarumque MSS. codicibus nunc primum edita; reliqua cum iisdem MSS. summâ fide et diligentia collata, &c.," Oxon. 2 vols. fol. 1672; 4. "Codex Canonum Ecclesiæ primitivæ vindicatus et illustratus," Lond. 1679, 4to. (See CANONS.) 5. "The Church Catechism explained, for the use of the diocess of St. Asaph," Lond. 1704, 4to.; several times reprinted in a smaller volume. After his death, several of the bishop's works, not intended by himself for publication, and in various respects injurious to his memory, were published by his executor. These consist of devotional tracts, among which are his "Private Thoughts upon Religion," a great number of sermons, a system of divinity, or "The Sure Theological," an "Exposition of the 39 articles, &c." In his "Private Thoughts" the bishop has incurred animadversion; particularly with respect to his meditation upon the Trinity, in which he unsparingly adopts the famous maxim of Tertullian, "credo, quia impossibile est." The theology of bishop Beveridge was Calvinistical; his extensive learning has been universally allowed; his devotion inclined to mysticism; and as a reader and writer, he has been extravagantly extolled by his admirers and panegyrists, and no less severely censured

ed by others, for the quaintness and puerility of his style, the fallaciousness and inconclusiveness of his reasoning, and his avowed opposition to rational sentiments of religion. These reflections, however, result from a perusal of his posthumous writings, the publication of which has been ascribed to avarice or want of judgment on the part of his executor. All have concurred in allowing him the praise of the strictest integrity, of sincere piety, of exemplary clarity, and of great zeal for religion. Biog. Brit. Gen. Dict.

BEVERLACKE, in *Geography*, a river of Germany, which runs into the Aland, 3 miles south of Seelhausen, in the old mark of Brandenburg.

BEVERLAND, ADRIAN, in *Biography*, a man of genius and learning, who prostituted his talents in the composition of several obnoxious books, was a native of Middleburgh in Zealand, about the middle of the 17th century, and studied polite literature under Vossius; and for this purpose he visited Oxford in 1672. Devoting himself to the study of the law, he became a doctor and a counsellor; and as a philologist, he made himself known to the learned world. But the subjects of his selection, both for study and discussion, were principally of the impure and loose kind; and of his licentious taste, he gave some specimens in his work, entitled "De jure stolatæ virginitatis, lucubratiõ academica," Leyd. 1680, 4to.; and in a treatise "De prostibulis veterum," (on the brothels of the ancients), part of which was inserted by Isaac Vossius in his commentary upon Catullus; but which he was dissuaded by his friends from publishing. Before this time, viz. in 1678, he had rendered himself obnoxious by his book on original sin, entitled "Peccatum originale xxi' εἰρηστικῆ νουσηπιου φιλολογικῆ problematicos elucubratiõ a 'Themidis alumno, &c.;" in which work he revived the notion of Cornelius Agrippa, that Adam's sin consisted entirely in the commerce with his wife, and that original sin is nothing but the inclination of the sexes to each other. This book was condemned to be burnt by the magistrates at the Hague, and the author was committed to prison, whence he was not liberated without paying a pecuniary fine, and taking an oath that he would never write again upon such subjects. He then removed to Utrecht, where his debauched manners exposed him to fresh odium, and obliged him to withdraw to Leyden. Here he wrote a bitter satire against the magistrates and professors under the title of "Vox clamantis in deserto;" and at length finding himself insecure in Holland, he sought an asylum in England, where Isaac Vossius is said to have procured for him a pension upon the ecclesiastical revenues, which he expended in the purchase of scarce books and medals, and of obscene pictures and prints, till he was reclaimed from his culpable mode of life by an acquaintance with the learned and worthy Dr. Edward Bernard. In token of his regret on account of his past conduct, and of the sincerity of his reformation, he wrote a treatise "De Fomicatione cavenda admonitiõ, &c." published, probably, first at London in 1690, with a dedicatory epistle to Dr. Bernard, and afterwards in 1698, 8vo.; in which, notwithstanding his pretended, or real reformation, some other five passages occur. After the death of Vossius, he fell into a state of poverty, and into a state of mental derangement; and probably died after the year 1712, when he was buried three in England, under an appellation that does not seem to be celebrated together to immortalize him, he died. Gen. Dict.

BEVERLEY, or BEVERLY, in *Geography*, is a large corporate borough, and principal town in the county of York; situated on the east bank of the river Hull, which is rendered navigable, by means of a short canal, up to the town. This place appears to have been of some note previous to the time

of Bede, whose preceptor, John of Beverley, archbishop of York, founded and erected a monastery here, to which he retired, and wherein he died in 721. King Athelstan having made a vow, before he proceeded against the Scots, instituted a college of secular canons, on his return to this town in 930, and also granted the freemen many immunities and privileges, which were allowed and confirmed by Henry I. and most of the succeeding monarchs to queen Elizabeth. By the last charter, which contains the heads of those previously granted, the government of the town is vested in a mayor, recorder, aldermen, and other subordinate officers. Though within eight miles of Hull, this town preserves great respectability and commercial consequence, from its fairs, markets, and trade. The sessions for the east riding of Yorkshire are held here in a handsome hall, called the Hallgarth, which contains a register office for deeds and wills, that relate to any lands in this part of the county. Beverley has sent two members to parliament from the 26th of Edward I., except a few intermissions in the reigns of Edwards II. and III.

Here were formerly four churches, but only two remain; one of which is a large handsome edifice, and is called the Minster. King Edward VI. and queen Elizabeth granted certain revenues for the support and repairs of this edifice; but those revenues being improperly applied, a Mr. Moyser, M. P. for the town, procured a brief for the repair of it in 1708. His own contributions, with those from his friends, amounted to 1500l.; which, with 800l. raised by the brief, were placed in the funds, and by the rise of the South sea stock, in the year 1720, he was enabled to complete the reparation and adornment of the church in his life-time. King George I. not only encouraged this work by a liberal donation of money, but gave the stone of the dissolved monastery of St. Mary's in York towards the building; sir Michael Warton also gave 500l. and bequeathed 4000l. more as a perpetual fund towards keeping it in repair. The east window contains some fine painted glass; and the screen between the nave and choir is much admired for its ornamental workmanship. The north wall of the great cross-aisle was at one period inclined from its perpendicular, but Mr. Thornton of York invented a machine, which, by means of screws, &c. restored it to its original position. The ancient fabric was consumed by fire in September 1788. Here are several monuments for the Piercys, earls of Northumberland, who built a private chapel in the choir.

The principal trade of Beverley consists in making of malt, oatmeal, and in the tanning of leather. The cloathing trade was, at a former period, an object of much consequence here, but at the time of Leland it was falling fast to decay. Connected with the borough, are four large common fields, containing nearly 1000 acres, in which every burghers or freeman is allowed to pasture a certain number of cattle. In one of these fields is a mineral spa, which has proved serviceable in some cutaneous disorders. There are seven alms-houses in the town, and legacies left for erecting two more. Here is also a free-school, whose scholars are allowed two fellowships in St. John's college Cambridge, also three scholarships and three exhibitions. Beverley is 183 miles north from London. It has weekly markets on Wednesdays and Saturdays; five fairs in the year; and five annual great markets for hogs, &c. This town consists of three parishes, called St. Martin's, St. Nicholas's, and St. Mary's; and according to the official population report in 1800, included 1220 houses, and 5401 inhabitants.

BEVERLY, JOHN OF, in *Biography*, archbishop of York in the eighth century, was born at Harpham in Northumberland, and having embraced the monastic life, he became afterwards abbot of the monastery of St. Hilda. He was instructed in the learned languages by Theodore, archbishop

of Canterbury, and was justly esteemed one of the best scholars of his time. Some say that he studied at Oxford, and took there the degree of master of arts; but as no degrees were then conferred in this university, this fact has been disputed. By Alfred, king of Northumberland, to whom his merit recommended him, he was advanced, in 685, to the see of Haguftald, or Hexham, and in 687, translated to that of York. Beverley was tutor to the venerable Bede, and intimate with Acca and other famous Saxon doctors, several of whom he engaged in writing comments upon the Scriptures. In 704, he founded a college for secular priests at Beverley, which, in honour of his memory, was endowed by our kings, and particularly by Athelstane, with considerable immunities, so that it became an asylum, or sanctuary, for debtors and persons suspected of capital crimes. After he had governed the see of York 34 years, being tired with the tumults and confusions of the church, he divested himself of the episcopal character, and retired to Beverley, and four years after died in *the odour of sanctity*, on the 7th of May 721; and the day of his death was appointed a festival by a synod held at London in 1416. Bede, and other monkish writers, ascribe to him several miracles. Between three and four hundred years after his death, his body was taken up by Alfric, archbishop of York, and richly enshrined. He was the author of several homilies, and other religious pieces. *Biog. Brit.*

BEVERLY, in *Geography*, a township, and post-town of America, in Essex county, Massachusetts, separated from Salem by a handsome bridge, and distant about 20 miles east of north from Boston, and 22 south-west from Newbury port. It has two parishes, containing 3290 inhabitants. Those of the parish next the harbour are devoted to the fishery, and the other branches of navigation. In the other part of the town, which is chiefly agricultural, is a cotton manufactory. N. lat. 42° 31'. W. long. 7° 50'.

BEVERLY'S *Manor*, or *Irish tract*, is a tract of land, in Virginia, in N. lat. 38° 10', at the head of Massanutten's river, a western branch of the Shenandoah, which rises here by three branches, viz. Middle river, Lewis, and Christian creeks, and lying between the Blue and the North ridge.

BEVERN, a town of Germany, in the circle of Upper Saxony, and duchy of Brunswick, seated on the Weser, 20 miles west of Einbeck.

BEVERON, a river of Savoy, which runs into the Drance, 4 miles south-west of Evian.

BEVER'S, LITTLE, lies to the west of point de la Hune, on the southern coast of Newfoundland island, in North America, between cape de la Hune on the east, and cape Raye on the west, being the south-west point of the island.

BEVERSTADT, a town of Germany, in the circle of Lower Saxony, and duchy of Bremen, 24 miles north of Bremen.

BEVERSTONE, a village of Gloucestershire, England, is situated about two miles west of the town of Tetbury, and is noted for the stately remains of its ancient castle. This fortress is of uncertain foundation, but was undoubtedly a strong place prior to the conquest. Earls Godwin, Swane, and Harald here met under the pretence of assisting Edward the confessor against the Welsh in 1048. Maurice, lord Berkeley, or de Gaunt, fortified and repaired it, and in 1227 was prosecuted by the king for doing so, without royal permission. It was purchased by Thomas lord Berkely soon after the return of Edward III. from the battle of Poitiers. Many of the spoils and ransoms from that battle were appropriated to enlarge and beautify this castle, which was used as a mansion till the great rebellion, when it was strengthened, and held for the king, but besieged by, and surrendered to Col. Masie. Great part of the castle, with a dwelling-house within its walls, was soon afterwards destroyed

stroyed by fire. It was originally a square building, with a tower at each corner, one of which still remains, with fragments of walls, and the greater part of a chapel. This has a beautiful arched roof, and on the right side of the altar is a shrine of tabernacle work, with a lavatory, a closet in which is a confessional, and over it a prison. The moat surrounding the whole, was about 200 yard in circumference. At a short distance north of the castle, the parish church, which is a small plain building. Rudge's History of the County of Gloucester.

BEVERUNGEN, a town of Germany, in the circle of Westphalia, and bishopric of Paderborn, at the conflux of the Bever and the Weich, near which are springs of salt water, 26 miles south-east of Paderborn.

BEVERWYCK, JOHN VAN, or BEVEROVICIUS, in *Biography*, not more known and esteemed as a physician than as a magistrate, and member of the administration in his country, having attained to high honours in both those capacities, was born at Dordrecht in Holland, in 1594. Being of a distinguished family, he had the advantage of receiving instructions in classical literature from Gerard John Vossius, and afterwards of studying the different branches of medicine under the ablest masters in France and Italy. Returning to his own country, he took the degree of doctor in medicine at Padua, about the year 1624. His works are numerous. Those most deserving notice are, "Epistolica questio, de termino vite fatali an mobili, cum doctorum responsis;" 8vo. 1634, Dord. Whether there is a fixed term, beyond which life cannot be extended, he determines in the negative. "Montanus, Refutatio argumentorum, quibus medicine necessitatem impugnat;" 8vo. 1634, Dord.; in which he answers the cavils of the sieur Montagne against physicians, and shews the necessity of the art. "Idea Medicinæ veterum," 8vo. 1637, Leiden. A compendium of the practice of medicine, taken from the most valuable writers on the subject. "Epistolica questiones cum doctorum responsis." 8vo. 1644, Rotter. A collection of letters on subjects pertaining to medicine, to which are added, the Elogia of Medicine by Erasmus, Cardan, and Melancthon. His works, of which Haller has given a complete list, were published together in 4to. at Amsterdam, 1651. They have most of them passed through several editions. He died Jan. 19th 1647, and was honoured with an epitaph by his friend Heinsius. Haller Bib. Med. Gen. Biog.

BEVERWYCK, in *Geography*, a town of North Holland, with a small harbour in the Wyckenmeer, which is a continuation of the Yc, 3 leagues north of Haerlem.

BEUF, JOHN LE, in *Biography*, a learned and laborious French writer, was born at Auxerre in 1687, and educated at Paris. After his return to his native town, he was made canon of its cathedral in 1711, and during his residence there frequently attended the deputies of the clergy at Sens, to assist them in reforming the liturgies of that diocese. In 1721, he was engaged by the archbishop of Paris in the re-arrangement of the chant in the new breviary and missal of that city; and from this time he chiefly resided at Paris. He was admitted an associate of the academy of belles lettres and inscriptions in 1740, and twice obtained the prize of that academy, and for times that of the French academy at Soissons. He was one of the most indefatigable, intelligent, and satisfactory ecclesiastical antiquaries of France. The catalogue of his works from 1716 to 1741, fills 12 pages in folio in the Burgundy library; and his subsequent productions for the 14 volumes of his life, are nearly as numerous. His "Traité sur le chant ecclésiastique" is full of curious researches, and, perhaps, the safest guide on the subject which a musical labourer of the first age of the church can consult. This journey of learning died in 1760.

The best known of his numerous works, besides that al-

ready mentioned, are "A Collection of various writings, tending to illustrate the history of France," 2 vols. 12mo. 1738; "Dissertations on the ecclesiastical and civil history of Paris," 3 vols. 12mo; "Mémoire on the history of Auxerre," 2 vols. 4to. 1743; "History of the city and of all the diocese of Paris," 15 vols. 12mo.; more than 200 "Memoirs," or "Historical Dissertations," inserted in the journals of the times; and a variety of dissertations printed in the Memoirs of the Academy of Inscriptions. He also liberally communicated a number of original pieces, which he found in his assiduous research, to learned men engaged in different works. Nouv. Dict. Hist.

BEUF, *Riviere en*, in *Geography*, a river of America, that discharges itself easterlyward into Mississippi river, in N. lat. 39° 4'; about 48 miles by the course of the river, above the mouth of the Illinois, and 7 miles south from Riviere Oahaha.

BEUF, *Small Le.* See *Le Boruf*.

BEVIEUX, a village of Switzerland, in the government of Aigle, in that part of the Valais which belongs to the republic of Berne. Bevioux is distant about 5 miles from the small town of Bex, and is famous for its salt springs. Mr. Coxe informs us, that he went into the mountain about 3000 feet, almost horizontally. The gallery is 6 feet high, and 4 broad, and nicely hewn and hollowed in a black rock, veined in some places with white gypsum. The salt is procured from springs, which are found within a solid rock, perforated at a great expence; the richest source yields 28 pounds of salt per cent. and the poorest but half a pound. Near these springs are several warm sources, which contain a mixture of salt, but are so strongly impregnated with sulphur, as to flame when a lighted candle is put into the pipe through which they flow. No solid salt, except a few cubes, has been yet discovered: but the mountain is replete with its particles. Rocks of white gypsum, or alabaster, mixed with bluish clay, are common near the springs, in the same manner as may be observed in the pits of Northwich in Cheshire. After travelling in this subterraneous passage near three quarters of a mile, Mr. Coxe observed a great wheel, 35 feet in diameter, which raises the brine from the depth of about 70 feet. From this place is a shaft 300 feet high, which is cut through the mountain to the surface, for the purpose of introducing fresh air. He noticed two reservoirs hollowed in the solid rock for holding the brine; one was 160 feet square, and 9 deep. In process of time, the workmen pierced the rock 25 feet deeper, and cut a gallery 100 feet long, and they formed a third reservoir, containing 5500 cubic feet. The brine deposited in these reservoirs is conveyed by means of 2000 pipes, about a league to Bevioux, where the salt is extracted. The brine pits near Aigle contain only from two to one half per cent. and yield annually about a third as much as those of Bevioux, or about 5000 quintals. The salt is much whiter and heavier than that of Bex, and consequently bears a higher price. These, which are the only salt-works in Switzerland, scarcely yield a net yearly profit of more than 30000, and furnish only one-twelfth of the annual consumption of the canton. The remainder is procured chiefly from France, at a moderate price, stipulated by treaty. Coxe's Travels, vol. ii. p. 105.

BEUIL, in *Geography*, the chief place of a canton, in the district of Faucigny, and department of the Maritime Alps, containing 468 inhabitants; those of the canton amount to 2133. Its territory comprehends 225 kilowattres and 60000000.

BEVILLE, in *Heraldry*, denotes a thing broken, or open, as the case of a capstan's rule.—Thus he beareth argent a chief belevy, by the name of *Beverly*.

BEVIN, ELWAY, in *Biography*, among our ecclesiastical composers in the time of James I., justly deserves to be ranked

racked with the musical luminaries of that reign. He was a scholar of Tallis, which is discoverable by his works; but it is not quite so easy to discover how it could have been at the recommendation of his master, who died 1585, that he was sworn gentleman extraordinary of the chapel royal, in 1589, as has been said. His service in D minor, printed in Boyce's collection, has the true ancient cast of modulation, the *fer-rugo pretiosa* upon it, which gives a dignity to its effects, for which we can now hardly account. The accents, as usual with old masters, are often erroneously placed; but if that imperfection be removed, or regarded with indulgence, the composition must be allowed, in point of harmony and modulation, to be admirable. And there are some grand effects produced by pauses and long notes without changing or infringing the original measure, that afforded us very pleasing sensations. Elway Bevin was, indeed, a man of genius; and it is to be lamented that more of his compositions have not been preserved. Besides his appointment in the chapel royal, he was organist of Bristol cathedral, and the master of Dr. Child. But notwithstanding his abilities and great age, he was dismissed from all his employments, in 1636, on being discovered to adhere to the Romish communion.

In 1631, he published a work replete with harmonical erudition, entitled "A Briefe and short instruction of the art of musicke, to teach how to make discant of all proportions that are in use: very necessary for all such as are desirous to attaine to knowledge in the art; and may by practice, if they can sing, soone be able to compose three, foure and five parts: and also to compose all sorts of canons that are usual, by these directions of two or three parts in one, upon a plain-song;" by Elway Bevin. thin 4to. of 52 pages.

This work, however useless it may be deemed now, must have been of singular service to young students in times when canons were regarded as the greatest efforts of human intellect, and the solution of these enigmas was equally difficult with that of the most abstruse and complicated problems in Euclid. Micheli Romano published a similar work at Venice, 1615, and Valentini another at Rome, 1655. See MICHELI and VALENTINI.

BEVIO, in *Geography*, a small village of Swisserland, seated near the Julian Alps, upon the Little Rhine, in the high road leading to Coire. Bevio and Valmorara form one community, governed by 11 magistrates; though the number of voters, who appoint these magistrates, scarcely exceeds 40. The chief is called "Ministrale," and is confirmed every year, for which each voter receives a florin. About one-third of the merchandize from Como to Coire passes by Bevio; the greater part is sent by Splugen.

BEUNTERSHEIM, a town of Germany, in the circle of the Upper Rhine, and bishopric of Worms, 6 miles south of Worms.

BEURATH, a town of Bohemia, in the county of Glatz.

BEURERIA, and BEURRERIA, in *Botany*. See CALYCANTHUS and EHRETIA.

BEURRE, in *Geography*, a town of France, in the department of the Doubs, and chief place of a canton in the district of Besançon, 2 miles south of Besançon.

BEURRY, a town of France, in the department of the Meuse, and chief place of a canton in the district of Bar-le-Duc, $\frac{1}{2}$ league west of Bar-le-Duc.

BEURS, WILLIAM, in *Biography*, a painter, was born at Dort in 1656, and discovering a natural genius for drawing and designing, he was placed, at the age of 18, under the instruction of William Drilenburg. He painted in the style and manner of his master, almost equalling him in the freedom of his hand, and the clearness of his colouring, and surpassing him in the correctness of his design. Addicting himself to

a dissolute life, he obtained neither the reputation nor the wealth which his talents, diligently exercised, might have enabled him to acquire. He painted portraits, landscapes, and flowers. Pilkington.

BEUS, in *Ancient Geography*, a river of Macedonia, mentioned by Livy and Steph. Byz., near which was a town called BEV, *Beuc*, according to the latter.

BEUTHEN, or NIEDER BEUTHEN, in *Geography*, a town of Germany, in the circle of Upper Saxony, and principality of Carolath, on the Oder, containing two churches; 3 miles S. W. of Ziegenbruck.

BEUTHEN, *Nieder*, a town of Silesia on the Oder, in the duchy of Glogau. It has suffered much by war and fire; distant 13 miles W. N. W. from Ober Glogau. N. lat. $51^{\circ} 42'$. E. long. $15^{\circ} 51'$.

BEUTHEN, *Ober*, a town of Silesia, formerly belonging to the principality of Jagerndorf, but since to the principality of Oppeln. It had anciently a productive mine of silver; distant 40 miles E. S. E. from Oppeln. N. lat. $50^{\circ} 16'$. E. long. $18^{\circ} 53'$.

BEUTSCHEN, a town of Poland, in the palatinate of Posen, 44 miles west of Posen.

BEUVRON, a town of France, in the department of the Calvados, and chief place of a canton in the district of Pont l'Évêque, 12 miles south of Caen.—Also, a river of France, which runs into the Loire, 2 leagues below Blois.

BEUVRY, a town of France, in the department of the Straits of Calais, and chief place of a canton in the district of Bethune, half a league east of Bethune.

BEVY, among *Sporisimen*, is used to signify a brood of quails. Thus also we say, a *covey* of partridges, a *nide* of pheasants, and a *pack* of grouse. *Bevy* is sometimes used among foresters to express a herd of deer, though it is much less frequently used in this sense than in the former.

BEUZEVILLE, in *Geography*, a town of France, in the department of the Eure, and chief place of a canton in the district of Pont-Audemer; $2\frac{1}{2}$ leagues west of Pont-Audemer. It contains 2457 persons, and the population of the canton amounts to 12,254. Its territory includes $192\frac{1}{2}$ kilometres and 20 communes.

BEWCASTLE, a parish and village of Cumberland, England, is rendered interesting to the topographer and antiquary from the Roman relics that have been discovered within its limits, and from the singular obelisk in the churchyard. This parish is supposed to have included the Roman station where part of the Legio-*Secunda* Augusta was garri-fused to guard the workmen employed in erecting the famous Roman wall that separated England from Scotland. Many vestiges of ancient buildings are yet remaining; and numerous Roman coins, and some inscribed stones, have been found here. The obelisk, which has furnished a theme for much dissertation, contains various sculptured ornaments, with a Roman inscription, and some figures in basso-relievo. The church, with the castle, are included within an entrenchment. The latter, now in ruins, appears to have been of a squarish form, and was battered down by the parliament's forces in 1641. In this parish are two schools supported by subscription, whose masters have about ten pounds each per annum, with the privilege of a whittle gate. This was a peculiar custom, formerly very common in Cumberland, and the neighbouring counties, and now prevails in some villages. It is a privilege given to the master of applying to his pupils' parents in rotation, for provisions. Several thousand sheep and black cattle are fed on the hills and waste parish. Hutchinson's History of Cumberland.

BEWDLEY, a market and borough town of Worcestershire in England, is pleasantly situated on the banks of the river Severn, whose navigable stream has given prosperity to the place.

It was formerly included within the marshes of Wales, but by a statute of Henry VIII. was annexed to the county of Worcester. Leland describes this place as remarkable for the "wonderful height of the trees in the adjacent forest of Worcester," for its "beautiful situation," and for the palace of Tichen-hall, which Henry VII. built to be a place of retirement for prince Arthur. The ceremony of this prince's marriage in person, with Catharine of Arragon, by proxy, was performed here on the 19th of May, 1499. King Henry VI. gave all the stone for building the bridge across the Severn, which was erected by Edward IV. On the middle pier of this, stands a gate-house, part of which is for the corporation's prison.

The town is in the parish of Ribbesford, where there is an ancient walled house, in which was found the manuscript copy of the life of lord Herbert of Cherbury. Here is a chapel, which was built on the site of an ancient wood structure in 1748. A new set of stables was also erected in 1783; and the town partakes of the benefits of a free grammar school, which was founded in the latter part of queen Elizabeth's reign; almshouses, and a charity school. The manufacturers and trades of this town were formerly very considerable, but they are now principally confined to tanning, horrow-work, matting, and a few others. Bewdley seems to have been first incorporated by king Edward IV. whose charter grants the freemen great privileges and immunities by sea and land. These were confirmed by Henry VIII. and again by James I. This charter was surrendered in the time of Charles II.; but in the next reign another was granted, which on a trial in 1707, was determined to be void. A new one was therefore obtained from queen Anne, but this produced some litigation, which at length was determined in its favour. This empowers the bailiff and 12 capital burgessees to return one member to parliament. Here were formerly two weekly markets, on Wednesdays and Saturdays; but the latter is only continued: which, with three fairs, annually attract much company and trade to the town.

Bewdley is 129 miles N.W. from London. It contains 840 houses, and 3671 inhabitants. Nash's History of Worcester-shire.

BEWITS, in *Falconry*, denotes a piece of leather to which a hawk's bells are fastened, and buttoned to his legs.

BEX, in *Geography*, a small town of Switzerland, in the canton of Berne, about 4 miles S.S.E. of Aigle, and 5 miles from the salt-works at Bevioux. (See BEX, *supra*.) Between Aigle and Bex is a picturesque view of the castle of St. Triphon, on the summit of an insulated rock in the middle of the plain; it is quite surrounded with wood, and realises Milton's description of an enchanted hill,

"Bom'd high in turrets crown'd."

It is said to be built of marble, and probably of a beautiful black species in the vicinity. St. Triphon was a Phrygian, and is said to have suffered martyrdom at Nice in the year 251, under the persecution of the emperor Diocletian.

BEXUQUILLO, is the *Materia Medica* name given to the white *ipocucurbita*, which the Spaniards bring from Peru, and the Portuguese from the brown from Brazil.

BEY, or Beg, denotes a governor of a country, or town, in the Turkish empire.

The Turkish word is *be* or *led*, but they pronounce it *bye*; so that *beg* is *lord*, but is particularly applied to a *lord of a tower*, whom in the Turkish tongue they call *fangi-beg*, or *beg*; *fangi-beg*, which among them signifies a *castle-governor*, because the badge of his jurisdiction is a castle; and that of the province, because under him is a considerable number of fortified castles.

Each province in Turkey is divided into seven of these

fangiaks, or *lawyers*, each of which qualifies a bey; and these are all commanded by the governor of the province, whom they also call *beg-biler-beghi*, or *begler-beg*, i. e. *lord of the lords*, or *heys* of the province.

These beys are, in a great measure, the same that *bannerets* formerly were in England.

It has already been observed, under the article *BASHAW*, that when the military aristocracy of the Mamlouks in Egypt was abolished by Selim, sultan of the Ottomans in 1507, he established a form of government, which was calculated to preserve all the different members of the state in a condition of dependence upon himself. With this view, he appointed, besides a pacha, a divan, or council of regency, composed of the pacha and the chief of the seven military corps. At the time of this appointment it was agreed, that the 24 governors, or beys of the provinces, should be chosen from the Mamlouks; and to them were entrusted the care of restraining the Arabs; superintending the collection of the tributes, and the whole civil government of the country; but their authority was purely passive, and they were to be considered merely as the instruments of the determinations of the council. By this institution, which is still observed in some instances, it was ordained, that the pacha should be contented to share the power of the beys, and that the duration of his authority should depend on their collective will. The power of the pacha was very extensive; but it has been gradually diminished, and almost annihilated by the intrigues and ambition of the beys. His jurisdiction was rather civil than military. He was always president of the divan, which was held in the castle where he resided. But that council has, in later times, commonly assembled in the palace of one of the chief beys, except when a firman or mandate is received from Constantinople, when the beys are summoned to the castle to hear the commands of the Porte. The few who attend, as soon as the reading is finished, answer, as is usual, "Esmâna wa taâna," "we have heard, and we obey;" but on leaving the castle, their general voice is "Esmâna wa awfêna," "we have heard, and shall disobey." All these beys had been Mamlouks, or military slaves, who were not natives of Egypt, but imported when very young from Georgia, Circassia, and Mingrelia, and purchased for 50, or not more than 100 sequins. Many of these are descended from Christian parents, and have been slaves from their youth. Some few have been prisoners, taken from the Austrian and Russian, who have exchanged their religion for an establishment. When the supply obtained in this way proves insufficient, or many have been expended, black slaves from Nubia, and other interior parts of Africa, are substituted in the room of the others, and are found docile, are armed and accoutred like the rest. The Mamelotans in general, and the Egyptians in particular, treat their slaves with great kindness. A Cairo, when a slave is legally purchased in the market, if he feel discontented with his master, he has only to say, "carry me to the market," and the master is legally compelled to order him for sale. The child of a female slave, begotten by her master, is "ipso facto" free, and a slave may authorize a free person to purchase his emancipation. The Christian children, bought by the bey, and the principal inhabitants of Cairo, are educated with the same care as their own children, in every thing necessary to accord with the character of a Mamelotan lord. They are instructed in every necessary exercise of agility and dexterity, and they are generally distinguished by the degree and beauty of their persons. Some of them are excellent sailors; but many can neither read nor write. When their education is finished, they procure employment in the army; and after emancipation, their loyalty and service merit the most lively gratitude and

affection to the generous masters, to whom they owe their fortunes, and both their political and moral existence; nor do they ever quit them in the hour of danger. Thus it often happens, that a master, when he finds any of his slaves possessed of extraordinary talents, and tried fidelity, spares no pains or expence to raise him to a more considerable employment than that which he himself occupies; and thus he at length acquires sovereign power. In order to attain this power, it is necessary to be a Mamlouk, that is, the native of a foreign country, as even the children of slaves, who rise to offices of state, do not enjoy the right of succession. Hence it happens, that as the son of a bey is not honoured with any particular consideration, the women, perhaps, procure abortions. Of 18 beys, whose history was known to Mr. Browne, only two had any children living. Volney observes, that during 550 years Mamlouks have been in Egypt, and that not one of them has left subsisting issue; but all their children perish in the first or second descent. Hence he infers, that those who are transferred from the vicinity of mount Caucasus, to the banks of the Nile, are incapable, by the influence of the climate, of perpetuating their progeny. To this circumstance it is owing, that the Mamlouks are replaced by slaves brought from their original country. From the time of the Moguls, this commerce has been continued on the confines of the Cuban and the Phasis, in the same manner as it is carried on in Africa, by the wars among the numerous tribes, and by the misery of the inhabitants, who sell their own children for a subsistence.

Distinguished by favouritism or merit, the Mamlouk becomes a cashef, or kiaschef, and in time a bey. The chief cause of preference arises from political adherence to some powerful leader. The number of these beys has seldom or ever been complete; and the revenues of the vacant places were probably shared among the rest, who were actual occupants of their office. Each of these beys is nominally chosen by those that remain; but in fact appointed by one of the most powerful.

The "Yenk-tchery Aga," and several other officers, are enumerated among the 24 beys. Besides being governors of certain districts of Egypt, several of the beys receive other dignities from the Porte. Such are the "Scheik-el-belled," or governor of the city, which is an office merely civil, unaccompanied with any military power; the "Defterdar," or accountant-general; the "Emir el Hadj," or leader of the sacred caravan; and the "Emir el Said," or governor of the Upper Egypt; which last two offices are annual. These officers have also revenues allotted them by the Porte, ill-defined, and liable to much abuse. Of the other beys, each appoints all officers and governors within his district, putting into it some slave of his own, who is compelled to render an account of the receipts; of which a part is appropriated to support the grandeur of his master. An opulent bey may have from 600 to 1000 purses annually; the revenue of Murad Bey more than double that sum. The inferior beys may have 300 purses, or 15,000*l.* The revenues of the beys are raised by a land-tax and the produce of the customs, amounting together to near two millions sterling, of which but a small proportion reaches the coffers of the Porte. Every bey sits in judgment on cases of equity. These personages are very observant of their respective jurisdictions; and no bey will imprison a man liberated by another. Although sometimes too impetuous, they nevertheless display great acuteness and knowledge of characters. This government possesses at least every advantage of publicity, as every bey is a magistrate. But the justice of the rulers is ever liable to the omnipotent influence of gold. Each bey appoints his cas-

hefs, or lieutenants. These officers preside each over a town or village, collecting the revenues, and judging small causes; but an appeal lies to the bey. The beys and the cashefs are, from their ignorance, constrained to employ Copts as accountants in adjusting and receiving the revenues, that duty being of an intricate nature, and requiring great local knowledge. The authority of a cashef is as arbitrary as that of a bey.

The beys in Egypt have been gradually acquiring an increase of authority and influence, and reducing the power of the Ottoman Porte to a feeble and degraded state. To this several circumstances have contributed; such as the unrestrained traffic of slaves; the neglect of the affairs of this province on the part of the Ottoman Porte; the extension of the power of the divan, and the restraint of that of the pachas, and the consequent uncontrollable influence of the janizaries and Arabs. To which may be added the change that took place in the condition of the soldiers, by their becoming citizens, and by the marriages they contracted, and the change also introduced into their discipline; and, more especially, the permission granted to the chiefs of possessing distinct property, lands, and villages, dependent on the Mamlouk governors, whom it became necessary to conciliate, in order to prevent their oppression; and the ascendancy acquired from that moment by the beys over the soldiers, and increased by the great riches accruing from their governments. These riches they employed in multiplying their slaves; and, after emancipating them, advancing them in the army, and promoting them to various employments. By such means Ibrahim, one of the kiayas or veteran colonels of the janizaries, rendered himself, in 1746, master of Egypt; for he had so multiplied and advanced his freedmen, that, of the 24 beys, which should be their number, no less than eight were of his household. His influence was also the more certain, as the pacha always left vacancies in the number, in order to receive the emoluments. On the other hand, the largesses he bestowed on the officers and soldiers of his corps, attached them to his interest, and Rodvan, the most powerful of the Arab colonels, uniting with him, completed his power. The pacha became a phantom, and the orders of the sultan vanished before those of Ibrahim. At length, about the year 1766, Ali Bey gained a decided ascendancy over his rivals, and under the titles of "Emir Hadj," and "Scheik el Belled," rendered himself absolute master of the country. (See ALI BEY.) Mohammed Bey, surnamed "Aboudahab," or father of gold, from the luxury of his tent and caparisons, who succeeded him in 1773, during a reign of two years, displayed nothing but the ferocity of a robber, and the baseness of a traitor. Upon his death in 1776, Murad, a favourite of Mohammed, was advanced to the dignity of bey; but he had a formidable competitor in Ibrahim, who had been a slave of Ali Bey the Great. The two rivals, however, adopted conciliatory measures, and entered into an agreement to divide the authority, on condition that Ibrahim should retain the title of "Scheik el Belled. This union was a prudential measure, and necessary to their safety; for since the death of Ali Bey, the beys and cashefs, who owed their promotion to his house, repined at seeing all the authority transferred to a new faction; and after several intrigues and cabals, formed a confederacy, under the denomination of the house of Ali Bey. The chiefs of this confederacy were Hassan Bey, formerly governor of Djedda, and Ismael, the only remaining bey of those created by Ibrahim Kiaya; and they conducted their plot so well, as to oblige Murad and Ibrahim to abandon Cairo, and retire as exiles into the Said. These exiles, being reinforced by the refugees, returned, and compelled the confederates, Ismael and Hassan, to make their escape

escape into the Said. Ibrahim and Murad have since ruled Egypt, the former as "Scheik el Belled," and the latter as "Dester-dâr," though not without mutual jealousies and attempts to destroy each other. They, however, conspire together to recruit the number of the Mamlouks, and to collect treasure from all quarters. In the year 1791, Salah Aga, a slave of Murad Bey, was deputed, from the government of Egypt, to negotiate their peace with the Porte. He carried with him presents of horses, rich stuffs, &c. He was well received, and was afterwards appointed "Wakil el Sultan," i. e. agent or attorney to the sultan in Cairo. This office was probably given him to engage him in seconding the efforts of the court for disinfranchising the beys; but it was ineffectual. These had formerly experienced the evils of division, and were now united by common interest, grown rich, and well provided with slaves. It is said, that no tribute has since that time found its way to Constantinople. Ibrahim and Murad are considered as usurpers by the beys of Upper Egypt, who are favoured by the Porte. The most powerful house is that of Ibrahim, who has about 600 according to Volney, but about 1000, says Mr. Browne, Mamlouks. Next to him is Murad, who has not above 400 Mamlouks, says Volney; but according to Browne, they amounted, in 1796, to about 1700. He was originally a slave of Mohammed Bey, and succeeded in defeating and taking prisoner Ali Bey the Great. He is detested by the Porte. He is described by Sonnini, as handsome and martial in his appearance; his chin is covered with a bushy black beard; his thick eye-brows describe arches of ebony over his large eyes, which sparkle with vivacity and fire. A long scar in one of his cheeks adds to the fierce cast of his countenance. To great bravery, he joins singular address and extraordinary strength. He has been known, when riding by an ox, to cut off its head with one stroke of his scimitar. An intrepid warrior, capable of enduring the severest hardships, an excellent horseman, dexterous and powerful in the use of the sabre, courageous in adversity, bold in enterprise, cool in action, but terrible in onset. Murad, with instruction, might have become a great general. His proud deportment, and magnificent disposition, give him the dignified appearance of a sovereign; but injustice, ignorance, and cruelty, have rendered him a ferocious tyrant. Murad, says Mr. Browne, is one of those beys who can neither read nor write. Of the profusion of this bey, Sonnini has given the following account. In his camp were erected immense tents, divided into several apartments, for the accommodation of himself and his principal officers. The floors were covered with the most beautiful carpets, and the interior decorations consisted of the richest gold and silver stuffs that the manufactures of Lyons could afford. Nothing could equal the magnificence of his cavalry. Gold and silver ornaments, with the choicest embroidery on Morocco leather, glittered with a dazzling lustre in the rays of a burning sun; and the housings of the saddles, trimmed with a broad gold lace, were made of those handsome velvets, the small and delicate patterns of which display the elegant taste that prevails in the productions of the manufacturers of Lyons. His profusion is supplied by his rapacity. He is accustomed to have from the mint daily, for his pocket expences, 500 half mahbûbs, and his wife the same. This amounts to 1500 piastres, and is only a small part of his disbursements. He is married to the widow of his maker, the daughter of the celebrated Ali Bey. Next in power to Murad, is Mohammed Bey Elî, whose name imports that he was bought for 1000 patackes. His master was Murad Bey, just mentioned. He is represented as quick in apprehension, and impetuous in action. His power is great and increasing; he has 800 Mamlouks. Ibrahim Bey, "el Uah," a name derived from the second

military magistracy in the city of Cairo, is a young man about the same age with the last mentioned, of a sedate, but firm character, married to the daughter of the elder Ibrahim, and attached to his interests. He has 6 or 700 Mamlouks. Aiûb Bey, "al Zogheir," or junior, is another powerful leader, distinguished by his superior capacity, and on all occasions consulted by the rest. He has not many Mamlouks; he is prudent and economical, and rarely accused of extortion. Fâtme, now the aged daughter of the famous Ali, is held in much respect by all the beys. Even Murad, her husband, treats her with reverence. When a bey is appointed to a government, he never fails to pay a visit to this old lady, who lectures him on his duties, and will say to him, "Do not pillage the people; they were always spared by my father."

Of the systematic rapacity of the beys, the following instance is mentioned. Ibrahim Bey, at a festival occasioned by the marriage of his daughter to another powerful bey in 1792, invited to his house a famous singer, who had been employed, during the preceding day and night, in the exercise of her profession, and who had received considerable donations. She readily complied, expecting employment, and liberal recompence. The bey asked her "How many half sequins did you collect yesterday?" She replied, "about ten thousand." "Pay me eight thousand then," said the bey, "and I will give you a note of credit on Ibrahim Jeahari, my secretary." The money was paid, but the woman was turned out of the house without receiving any security whatever; and is said to have died of the disappointment. Volney's Travels through Syria and Egypt, vol. i. Sonnini's Travels in Upper and Lower Egypt, p. 424, &c. Browne's Travels in Africa, &c. p. 47, &c. See BASHAW, and MAMLOUK.

BEY of Tunis, denotes a *prince*, or *king* thereof; answering to what at Algiers is called the *dey*. He is chosen out of the army; each order, even the most inferior, having an equal right and title to that dignity with the highest.

In the kingdom of Algiers, each province is governed by a bey or vice-roy; who is appointed and removed at pleasure by the bey; but has a despotic power within his jurisdiction; and at the season for collecting the tribute from the Arabs, is assisted by a body of troops from Algiers.

The kingdom of Tunis is not divided into provinces, like that of Algiers, and governed by provincial beys, or vice-roys; but the whole is under the immediate inspection of the bey himself, who collects the tribute in person. For this purpose, he visits, with a flying camp, once every year, the principal parts of it; traversing, in the summer season, the fertile country in the neighbourhood of Keff and Baijah; and in the winter, the several districts betwixt Kairwan and the Jered.

BEYAH, in *Geography*, anciently called *Beypassa*, and the *Hyphasis*, or *Huphasis* of Alexander, a river of Hindoostan, that rises in the great chain of snowy mountains, extending from Sirinagur, to the north of Cashmere, or the ancient Imaus; and after traversing the Panjab, it joins the Setlege at Ferozpour; about 24 miles below the conflux, a separation again takes place, and four different streams are formed; the northernmost and most considerable of which recovers the name of Beyah, and is a deep and rapid river. The others are named Herari, Dond, and Noorney; and near Moultan they unite again, and bear the name of Setlege, until both the substance and the name are lost in the Indus, about 80 miles, or three days' sailing, by the course of the river, below the mouth of the Chinamb. Remond's Men. p. 102.

BEYENBERG, or BIENBERG, a town of Germany, in the

the circle of Westphalia, and duchy of Berg, on the Wipper, 3 miles north of Lennep.

BEYERLAND, an island belonging to Holland, situated on the Meuse, with a town of the same name; 4 leagues west of Dort.

BEYERN, a town of Germany, in the circle of Swabia, and county of Fustenberg, situated on the Danube, 4 leagues from Durlingen.

BEYHARTING, a town of Germany, in the circle of Bavaria, 24 miles E. S. E. of Munich.

BEYKE. See BEKI.

BEYLA, a town and district of Abyssinia, in Sennar, about 11 miles west of Teawa, and 31½ miles due south, in N. lat. 31° 42' 4". Between Teawa and Beyla there is no water. Imgededema, and a number of villages, were supplied with water from wells, and had large crops of Indian corn sown about their possessions. But the Arabs Daveina have destroyed these places, filled up their wells, burnt their crops, and exposed all the inhabitants to die by famine.

BEYMONT, or BEYWORT, a town of Germany, in the bishopric of Liege, 8 miles south of Liege.

BEYNAT, the chief place of a canton, in the district of Brives, and department of Correze, containing 1462 inhabitants; those of the canton being 5488. The territory comprehends 135 kilometres and 6 communes.

BEYS, GILLES, in *Biography*, a printer at Paris, in the 16th century, who first introduced into his editions the distinction suggested by Ramus in his grammar between *j* and *v* consonants, and the vowels *i* and *u*. He died in 1595.

BEYSZKER, (*Gesn. Thierb.*) in *Ichthyology*, a name of the *cobitis fissilis*. Gmelin.

BEZA, THEODORE, or THEODORE DE BEZE, in *Biography*, an eminent divine among the first reformers in Geneva, was born of parents nobly descended, in 1519, at Vezelai in Burgundy, and sent by his uncle, who was a counsellor in the parliament of Paris, to Orleans, in 1528, to be educated by Melehiour Wolmar, a protestant and an excellent teacher. Having continued seven years under his tuition, he commenced the study of the law at Orleans; but his taste led him to the cultivation of polite literature, and he composed several Latin poems, which were considered by the learned as a promising specimen of his talents. After taking a law-degree, he returned, in 1539, to Paris, where his parents, who had intended him for the ecclesiastical profession, had procured for him a valuable abbacy. Addicted to the delights of an easy and voluptuous life, he remained for some years at Paris; but under the influence of sentiments imbibed in his youth from his protestant preceptor, he determined sooner or later to break his fetters. A marriage contracted from conscientious motives rendered it necessary for him to resign his benefices, and hastened in the execution of his purpose by the reflections attending a severe illness, he and his female companion fled, in 1548, to Geneva. In the following year he accepted the offer of a Greek professorship at Laufanne, in the exercise of which he continued with reputation for nine or ten years. Here he read lectures in French on the New Testament, and published several books; one of which was a tragi-comedy, in French, entitled "Abraham's Sacrifice," which passed through several impressions. Having frequent opportunities of visiting Calvin at Geneva, he was induced by his persuasion to finish the version of the Psalms, which had been begun by Marot. During his residence at Laufanne, he published a treatise, "De Hereticis a Magistratu puniendis," in reply to a book written by Castalio, after the execution of Servetus; and in this treatise he maintained a doctrine no less dangerous in its tendency than inconsistent with his principles as a reformer and protestant, that it was the

duty of the civil magistrate to punish heresy. He also wrote on predestination, and the eucharist, in opposition to the Lutherans, and others, and in a style of raillery which a maturer judgment and after-reflection led him to correct. In 1558, he was selected as one of the deputies commissioned by the protestants, to engage the German princes in favour of their brethren imprisoned at Paris, and of the persecuted inhabitants of the vallies of Piedmont. In the following year he removed to Geneva, where he became the colleague of Calvin, both in the church and university, and where by his abilities, learning, and zeal, he co-operated with him in advancing the reformation. In 1561, he distinguished himself by his eloquence on behalf of the protestant party, at the conference of Poissy; although he gave offence by his declared opposition to the doctrine of the real presence. Continuing in France, he attended the prince of Condé as a minister, when the civil war broke out, and accompanied him to the battle of Dreux. Upon his return to Geneva, in 1563, he wrote several books in theological controversy, with an acrimony that cannot be justified by persons of moderation and candour. In 1571, he officiated as moderator in the national synod of Rochelle, and in the following year assisted in that of Nismes. In 1586, he held a disputation with Andreas, a Lutheran divine of Tubingen; and through the whole course of his life, the party to which he belonged availed itself, on many occasions, of his talents and reputation. Having lost his first wife in 1588, he soon married another. Although the infirmities of his advanced age required his withdrawing from the duties of public instruction, the ardour of his genius remained to the close of his life, and he wrote Latin verses a few years before his death, which happened in October 1605, after he had passed his 86th year. Of his singular natural talents and literary acquirements no doubt can be entertained; nor need we wonder that bigotted Catholics should have calumniated him whilst he lived, and reviled his memory after his death. He has indeed, by his enemies, been unjustly traduced as a hypocrite, and a person of lax morals; but charges of this kind are refuted by the uniform tenour of his life. His partial advocates, however, must regret that, as a disputant, he was violent, impetuous, and dogmatical, and deficient in candour and charity. His juvenile pieces, in Latin poetry, in which critics have detected many numerous deviations from classical purity, were first printed in 1548. Some of these, with corrections, together with others of a more serious cast, were printed by the Stephenses at Paris, in 1597, 4to. under the title of "Theod. Bezæ Poemata varia." His French works are of an inferior kind. His theological works are numerous. Of these, the most generally read, and the most highly esteemed, is his "Latin version of the New Testament," with critical and theological remarks. For an account of the MS. in his possession, see CAMBRIDGE MS. Gen. Dict.

BEZABA, in *Geography*, a river of Spain, which runs into Orïo, in the province of Guipuscoa.

BEZABDA, or GOZERTA, *Geziret ebn-Omar*, in *Ancient Geography*, a town of Asia, on the right bank of the Tigris, south-west of Tigranocerta, in the country called Zabdicana.

BEZANT, represents, in *Heraldry*, round flat pieces of gold. They were first borne by the soldiers of the holy wars, being the current coin of Byzantium (the modern Constantinople), with which the stipends of the army were discharged, and from whence they took their name. They are always emblazoned gold, but the foreign heralds make them both gold and silver.

BEZANTIE, is when the field is powdered with bezants, or when supporters, or crests, are strewed with them. The proper heraldic term is bezantie. When a

border is charged with eight bezants, that being the limited number, you need not express the number, but say, a border *solis bezantie*.

BEZANTLIER signifies the second branch of the horn of an hart or buck, that shoots from the main beam, and is the next above the brow-antler.

BEZARA, in *Ancient Geography*, a town of Galilee near the sea, south of Ptolemais.

BEZDELKINO, in *Geography*, a town of Siberia, 80 miles north of Balaganskoi.

BEZDZIEZ, a town of Lithuania, in the palatinate of Brzesc, 24 miles west of Pnisk.

BEZE, a town of France, situate near the source of a river of the same name, in the department of the Côte d'Or, and chief place of a canton, in the district of Is-sur-Tille, 2½ leagues E. S. E. of it.

BEZEK, or BEZAKA, in *Ancient Geography*, the place where Saul reviewed his army, before he marched against Jabesh-Gilead. 1 Sam. xi. 8. Eusebius mentions two cities of this name, near one another, 7 miles from Sichem, in the way to Scythopolis.

BEZENSTEIN, or PETZENSTEIN, in *Geography*, a town of Germany, in the circle of Bavaria, and territory of Nuremberg, 19 miles N. E. of Nuremberg.

BEZER, in *Ancient Geography*, a city beyond Jordan, over-against Jericho, in the wilderness, assigned by Moses to the tribe of Reuben, intended by Joshua to be a city of refuge, and given to the Levites of Gershom's family. Deut. iv. 47. Josh. xx. 8. The vulgate in both places denominates it *Ezer*. Eusebius confounds it with Bozra of Arabia, which lay much farther to the east. See BOSTRA.

BEZETH, a city of Palestine, on this side Jordan, in the vicinity of Jerusalem, which Bacchides surprised, and the inhabitants of which he threw into a pit; probably the same with Bezecath. 1 Maccab. vii. 19.

BLZETHA, or BETZETA, a division or part of Jerusalem, situated on a mountain, and encompassed with walls, being, as Josephus says, a new city attached to the old one, and called in Greek *Κατω πόλις*, Cainopolis. It lay north of Jerusalem and the temple.

BEZETZ, in *Geography*. See BESHETSK.

BEZILLN, a town of Transylvania, 12 miles N. N. E. of Sibiu.

BEZIERES, a city of France, and principal place of a department, in the department of the Hérault, situate on the left bank of the Orbe, not far from the grand canal. Before the revolution, it was the residence of a governor, and a see of a bishop, suffragan of Narbonne; its cathedral was small, but beautiful; it had beside a collegiate church, several religious houses, two hospitals, a college founded by the inhabitants in 1597, and an academy of sciences and belles lettres. It is surrounded by a wall, flanked with old towers, and decayed battlements. The number of inhabitants in both its sections is estimated at 14,211, and the population is small in proportion to its extent. The canton of the first section has 11,300, and that of the second 13,147 persons. The former canton has 9, and the latter 7 communes. The territorial extent of both comprehends 365 kilometres. The situation is beautiful, and it commands a view of several cities of the grand canal of La guedou. In the Not. I. 3. 11. it is called "Civitas Biterrensis, Biterra Septimanorum." In the 5th century it was ravaged by the Vandals; by the Saracens, in 720; by Charlemagne, in 737; and by the Moors, in 1209; when, in the course of a year, the Albigensians took it by assault, and put more than 50,000 of the inhabitants to the sword. Since this time it has not recovered its ancient lustre. It was re-annexed to the crown by S. Louis, in 1247.

Its territory is fertile in corn, oil, and wine. It has also mineral waters. N. lat. 43° 20' 41". E. long. 3° 12' 35".

BEZIRA. See BAIRA.
BEZOAR, BEZARD, primarily denotes an antidote, or counter-poison. The word is formed from the Persian *pā-zabar*, which denotes the same, *pā* signifying *again*; and *zabar*, *poison*.

BEZOAR, *Lapis Bezoardicus*, is a term applied in a general way to various substances found in the stomach, intestines, and other internal cavities of the bodies of quadrupeds.

The true bezoar, however, is a calculous concretion, usually formed in the stomach of some of those animals which ruminates, or chews the cud. There are two sorts of the bezoar stone; one is brought from the East Indies, and Persia, and thence known under the name of *Oriental* bezoar. The other kind comes from the Spanish West Indies, or South America, and is called *Occidental* bezoar. The Oriental is considered by far the more valuable kind, and is exceedingly scarce, even in India. The larger the stone the more highly it is esteemed; its price increasing, like that of the diamond, in proportion to its size. A stone of one ounce has been sold in India for 100 livres, and one of four ounces and a quarter for 2000 livres. The price of the smaller stones, in Germany, in the year 1600, was from 16 to 32 ducats the ounce; but it had then much declined. The larger bezoars had no regular price, being often enormously dear. As long as it retained its fancied reputation, as an antidote to every kind of poison, and as a cordial for the support of life under the most trying circumstances of disease, its price was advanced beyond its weight in gold, and it found a high place for many centuries among the most costly collections of precious stones. The size varied from that of a pea to a hen's egg, or even larger. Boetius relates, that in his time, the emperor Rodolph II. possessed one of the size of a goose's egg, which he ordered to be hollowed out into a cup, when the nucleus was found to be a small mass of herbs still strongly aromatic. The most anciently known bezoar stones were procured from the stomachs of goats feeding in the mountains of Persia, and those from the mountain goat were in such high request, that the emperor Shah-Abbas (who died in 1628,) claimed all above a certain standard as a royalty, and appointed collectors for the purpose. The Oriental bezoars passed through the hands of the Armenian and Persian merchants, and were formerly brought to Europe in considerable quantities. In the east, the most esteemed that were obtained from goats feeding in the mountains, as the aromatic herbs found there were supposed to add much to the virtues of the calculus.

Authors disagree with respect to the animal in which the genuine Oriental bezoar is found; some attribute it to a species of goat, others to the antelope genus. Most naturalists allow this substance to belong to the gazelle, (*Antilope Gazella*, Gmel.) Aldrovandus calls this species of antelope, *hircus bezoardicus*; Linnæus, *capra bezoardica*; and Pennant, the *leopard antelope*. Pallas, however, in his *Spicilegium Zoologiae*, gives the same name to the Egyptian antelope, (*Antilope Oryx*, Gmel.) Cuvier describes the Oriental bezoar as being found in the intestines of the *capra asperus* of the Linnæan system, and Gmelin ascribes it to the *capricorne* goat. By the account of Clavius, the animal furnishing this concretion would seem to be larger than the goat, and more resembling the Nylghau. There can be little question but that similar substances have been occasionally met with in each of these animals, and in several other species.

The bezoar stone, when genuine, varies much in its form; the depending upon the figure of the nucleus, upon which the calculous matter is deposited, there being generally some foreign

foreign body in the centre of the bezoar. The substances which usually serve for nuclei to these concretions are straw, hair, small pebbles, nuts, hard seeds, stones of fruit, &c. but the most frequent nucleus of the real oriental bezoar, is the pod of a fruit, much like that of the *Acacia vera Egyptiaca*: though it at first sight resembles a *caffia*, or tamarind stone. In some of the bezoar stones formed on this fruit, the outer membrane of the bean having perished, and the bean shrunk in drying, there remains a vacuity between it and the inner surface of the bezoar, so that it rattles within it, when shaken, in the manner of an *aites*, or *eagle stone*. It is of little moment what the figure or nature of the body may be, which is to serve the purpose of a nucleus, as it cannot, in the slightest degree, affect the quality of the calculous substance which is to be collected on its surface; any extraneous matter will suffice for this purpose, which may happen by any accident to be long enough detained in the stomach or intestines. The formation of bezoars appears to be effected in a manner similar to that observed in the production of the calculi of the urinary bladder of the human subject. We may presume that the bezoar is only formed when there is a tendency in the animal to generate an extraordinary quantity of calculous matter; for if it were otherwise, as that these substances were produced by any combination of the ordinary contents of the stomach and intestines, what animal, that is liable to such collections, could ever be without them? whereas, on the contrary, they are so scarce in the East Indies, that those which are brought into this country are supposed to be in general artificial compositions; nay, some have doubted if we ever meet with a genuine oriental bezoar in this country.

The season of the year also appears to influence their production. Camerarius remarks, that these bodies begin to form towards the month of November: and when the Parisian anatomists discovered a bezoar in the stomach of the *Chamois (Antelope Rupicapra)*, it was the month of December.

The number of bezoar stones varies, in different animals, from one to six; hence, it is said to be customary, previous to purchasing a bezoar animal, to reckon the number of stones it contains, which can be ascertained by feeling externally, and by this the price of the animal is regulated.

Velchius asserts, that the bezoar is only found in the first or second stomachs of ruminant animals, but the anatomists of the French academy state, that they met with it in the third stomach; and others have mentioned its being sometimes situated in the intestines.

All bezoars are made of concentric layers, or by stratum super stratum, after the manner of the common urinary calculus. This proves their formation to be gradual; and as this mode of increase cannot be easily imitated, it is probably one of the best marks for distinguishing the genuine bezoar from that which is counterfeited.

The Oriental bezoar is smooth and glossy on the surface, the colour a dark green or olive; on removing the outer coat, that which lies next it appears likewise smooth and shining; it is generally less than a walnut; it is most esteemed for its medicinal properties, and is the only sort retained by the London college. The Edinburgh college, in some of the former editions of their pharmacopœia, directed both this and the occidental bezoar, but they now seem to allow them to be used promiscuously, retaining in their catalogue only the name of *lapis bezoar*.

The imitations of this stone have been carried to such perfection, that as far as respects form, colour, or other external characters, the deception cannot well be detected. Mr. Neumann supposed that those which come nearest the genuine bezoar, are a composition of plaster of Paris, chalk, or

other earths stained of the proper colour by some vegetable tincture. Those which are palpably counterfeited, are composed chiefly of some resinous substance, and may be easily discovered by their liquefying in the fire, and being soluble in spirits of wine; he never could discover any mark of an animal nature in any of these. Chemical works, by Dr. Lewis, p. 533, &c.

The modes of trying if bezoar be genuine are, 1st. To immerse a portion of it, for some hours, in moderately warm water, when the water ought to remain untinged, and the stone undiminished in its weight: 2d. to apply to it a sharp red hot iron, which it should resist without frying or shrivelling: 3d. which is considered the most certain experiment, is to rub the bezoar over a paper which has been previously smeared with chalk or quicklime: if it leave a yellow tint on the former, or a green one on the latter, there is no doubt of its being genuine.

The *occidental bezoar* is uneven on the surface; of a dirty green colour; it is heavier and more brittle than the oriental, to which it is considered much inferior in value; it is of a looser texture, and when fractured, the layers appear thicker, and exhibit a number of striz curiously interwoven. It is also found of a much greater size; sometimes being as large as a goose's egg.

The occidental bezoar has been found in some of the camel tribe, especially the *guanaco*, *Camelus Huanaeus* and the *Vicuna (Camelus Vicugna)* which are inhabitants of South America.

This kind of bezoar, Mr. Neumann apprehends, is more likely to be an animal production than the other, because it yielded, on distillation, a small portion of volatile urinous matter. Chem. Works, p. 537.

The analysis of bezoar stones, as related by different chemists, is very contradictory, which has given rise to the opinion of the specimens which they submitted to experiment, being spurious. Those stones examined by Stare, as oriental bezoar, did not dissolve in acids. Those which Grew and Boyle made trial of, did. Those employed by Geoffroy (in some experiments related in the French Memoirs, 1710,) did not seem to be acted on by spirits of wine, whilst those specimens examined by Neumann, at Berlin, almost entirely dissolved in spirits. For an account of the analysis and chemical properties of the bezoar and similar substances; see CALCULUS.

In the early ages, when a knowledge of diseases was considered an occult and mysterious science, rare and unknown plants, or unusual, and what were considered wonderful animal productions, were chiefly employed in the way of medicines; at this period we accordingly find the bezoaric stone possessed great reputation as a remedy for many diseases; it owed, no doubt, much of its fame to the fabulous accounts which were related with respect to its origin.

It was not known to the Greeks. The first person who has mentioned it was *Avenzoar*, an Arabian physician. He describes it to be generated of the tears, or gum, of the eyes of flags, who, after eating serpents, were accustomed to run into the water up to the nose, where they stood till their eyes began to ooze a humour, which collecting under their eye-lids, gradually thickened and coagulated, and when it became quite hard was thrown off by the animal rubbing itself against the trees. Other stories concerning the history of the bezoar, equally wonderful and ludicrous, were credited, until the time of Garcias al Horto, physician to the Portuguese viceroy of the Indies, who gave the first true account of the origin of this substance. Kempfer afterwards gave a description of it with some new particulars.

The bezoar was first employed to prevent the fatal consequences of poison. This is expressed by the very name which

which is derived from the Persian word *badzcher*, or *bazcher*, an *antidote*, or from *paralar*, of which *pa* signifies *against*, and *alar*, a *poison*. Others derive the term bezoar from the Persian *pazar*, a goat.

It was afterwards given in vertiges, epilepsies, palpitations of the heart, jaundice, colic, and a great many other diseases; so that if its real virtues were answerable to its reputed ones, it was doubtless a *panacea*. Even later writers have bestowed extraordinary commendations on it, as a sudorific and alexipharmic; but there is every reason to doubt its possessing any such virtues. It is an earthy substance, devoid of taste or smell. The history of its formation proves that it is not digestible, or otherwise affected by the juices of the intestinal canal. If it can ever be employed as a medicine, it should be on account of its absorbent quality, which, however, it appears to possess but in a very slight degree. It has been administered to patients in the quantity of half a drachm, and in some instances a drachm has been taken, without producing any sensible effect: the dose has been generally stated at a few grains, which was probably on account of its scarcity and great price. While it retained its medical reputation, it was said to act as an antidote to every poison, vegetable or mineral, and to the bite or sting of all poisonous animals, in the dose of about 3 grains; but it would equally prove a counter-poison when taken regularly in the quantity of two grains daily, in a glass of wine, or especially of distilled water of *carduus benedictus*. To preserve an youthful constitution and vigour, an oriental's recipe is to take twice a year (purging being premised) ten grains of bezoar daily, for five successive days, with a cup of rose-water. Bezoartic productions are at present so little regarded for their medicinal properties, that few druggists now think it necessary to have them in their possession.

BEZOAR, *Equinum*, is the name given to the calculous concretions occasionally met with in horses. They appear to be formed in the same manner as the bezoar of the antelope or camel genus. They grow to a considerable size; have usually an irregular form, something between a compressed sphere and a rhomboidal figure; when divided, they exhibit the usual succession of strata, of which they are composed, but which are not so distinct as in the other bezoars; each layer is formed of excentric striz, which are in many places more evident than the division into strata; consequently the section of the bezoar gives the appearance of its having been made of radiated, rather than concentric layers. The surface of the calculus bears great resemblance to a piece of polished lime-stone.

BEZOAR, *German*, is called by some *cow's egg*, from the circumstance of its being occasionally found in the stomachs of cows, but the animal from which it is most commonly obtained is the chamois (*Antelope Rupicapra*).

The nucleus of the German bezoar is either the hair which the animal may have swallowed, when licking itself, or the fibres of undigested vegetables, which are rolled into a round smooth ball. The quantity of calculous substance which is collected upon this ball is in general very trifling, often being merely a thin pellicle.

The bezoar which was found in the chamois by the Parisian academicians, was made up of the woody fibres of the plants the animal had eaten; it was smooth and beset with mucus on the surface; and was broken at one end, exposing a cavity in the centre of the ball, which had formerly, no doubt, been occupied by some solid substance, such as a pellicle, or stone of some fruit.

German bezoars have been found, according to Bartholin, and others, in horses and sheep, in which last they are chiefly composed of wool, which these animals accidentally swallow.

From these species of bezoar having little, if any, calculous matter in their composition, they have been called by some writers, with propriety, *Agagrepilz*; which see, and BALLS.

Besides what have been already described, there are concretions found in the gall bladder of animals, to which the term *bezoar* has been applied; these appear to be no other than biliary calculi.

The *Hog* or *Boar* BEZOAR, called by the Dutch *Pedro de porco*, and by the Portuguese, who first brought it into Europe, *Pedro de vaparis*, is found in the gall bag of an East India boar; in form and magnitude it resembles a filbert, though more irregular; it is most commonly white, with a tinge of green; the surface is smooth and shining, and is valued at ten times its weight in gold.

The Indians attribute extraordinary medicinal powers to this bezoar. They call it *Mastica de sobo*, and prefer it to that obtained from the Gazelle; they consider it a sovereign remedy for the *mordoxé*, a disease to which they are liable, and which is not less dangerous than the plague in Europe. They allow it to have great efficacy also in malignant fevers, small-pox, and most diseases of women not with child, it being supposed to produce abortion in those who are pregnant, if they use it indifferently. When it is to be used as a medicine, it is infused in water or wine, until it has communicated a little bitterness to it. To facilitate the infusion, and at the same time preserve so precious a stone, they usually inclose it in a gold case, which is pierced with holes.

The *Porcupine* and *Monkey* BEZOARS, are also the biliary calculi of these animals. Tavernier asserts, that they are not taken from the gall bladder, but the heads of the ape and the porcupine, which is highly improbable, and contrary to general analysis; he calls them *Malacca stones*, and says that they are held in such estimation by the inhabitants of Malacca, that they never part with them, except as presents to ambassadors, or the greatest princes of the East.

According to Neumann, single stones, taken from the porcupine or monkey, have been sold for sixty and eighty pounds sterling.

It is not impossible but that those bezoars which are formed in the gall bladder may possess some power as medicines; perhaps also solutions might be employed with advantage in surgery, but their great reputation amongst the Indians seems to arise altogether from ignorance and superstition.

BEZOAR, *bovinum*, is a yellowish stone, found in the gall bags of the ox. It has been used by miniature-painters in several calls of yellow.

BEZOAR, in *Conchology*, a species of BUCCINUM, that inhabits China. This shell is subrotund and rugose: anterior part of the whorls lamellated; pillar perforated. Gmelin. The colour is dirty ochraceous, varied with brown: within yellow; coarse, decussated with wrinkles, or striz; tail folded, bent, rugose with imbricated scales: spire angular with straight sides: anterior part flattish, plaited, or dentated above.

BEZOARA, or BUZWARA, in *Geography*, a town with a fort in the peninsula of India, situate on the north side of the Kistna river, distant 403 geographical miles from Masulipatam. N. lat. 16° 33'. E. long. 80° 39'. In the town is a magnificent pagoda, and another stands on an eminence without it; which attract a great number of pilgrims, whose contributions are distributed in alms to the poor.

BEZOARDICS. The peculiar virtue of the bezoar being that of resisting and expelling poisons; the term *bezoardic* (now, however, nearly obsolete,) has come to be almost synonymous with *antidote*. Thus, when a bezoardic medicine is mentioned, it implies, with the older writers, either a

medicine into which bezoar enters, or one that resembles the bezoar in its supposed power of counteracting poisons, or afterwards, simply, a cordial. A few metallic preparations have had this appellation.

BEZOARDICA CAPRA, Syst. Nat. *Hircus bezoardicus*, Alér. *Animal bezoardicum*, Rej. *Bezoar Antelope*, Pennant, &c. names of the *Antelope Gazella*. Gmelin.

BEZOARDICA terra, a name used by some authors for a medical earth dug in the pope's territories, and more frequently called *TERRA noceriana*.

BEZOARDICUM MINERALF, or *Mineral Bezoar*, is a perfect oxyd of antimony, made by adding nitrous acid to the butter of antimony, and described under the article **ANTIMONY**.

BEZOARDICUM Foviale, is a mixed oxyd of antimony and tin, formed by fusing together these metals, distilling with corrosive sublimate to convert both metals of the alloy into a *butter*, or muriated oxyd, and adding nitrous acid to reduce them both to a perfect simple oxyd. It is entirely disused.

BEZOLA, in *Ichthyology*, the name of a kind of *Salmo*, called by Gesner *Albula cærulea*, and supposed to be in no respect different from *Salmo Lavaretus*.

BEZOUT, STEPHEN, in *Biography*, a celebrated mathematician of France, was born at Nemours, March 19, 1736, O. S. and notwithstanding opposition on the part of his father, devoted himself to the assiduous prosecution of the mathematical sciences, to which his taste strongly inclined him. In 1758, he was appointed adjunct mechanic to the Paris academy of sciences, after having communicated two memoirs on the integral calculus, and affording other proofs of his proficiency in the mathematics; in 1763, he was nominated examiner to the marine; associate to the academy in 1768; and, in the same year, member of the academy of marine affairs, and examiner of the pupils of the royal corps of artillery; and, in 1776, royal censor. His particular attention was directed to the solution of algebraic equations, and he had the honour of first discovering a method of resolving a particular class of equations of all degrees. In this work of investigating the roots of such equations, he was occasionally engaged from 1762 till 1779, when he published his treatise on the subject. To distinguished talents, and elaborate researches in the abstruser parts of mathematics, Bezout added an assiduous discharge of the duties of the public stations which he occupied, and a private character which was deservedly esteemed. The following anecdote furnishes a pleasing specimen of his regard to justice in the exercise of his office, and at the same time of the benignity and consideration of his temper. When two of his pupils were confined by the small-pox, and incapable of attending for the purpose of an examination, the want of which would have delayed their advancement for a whole year, he ventured, though he had never had that disorder, to visit them in person, and to ascertain their proficiency, by which he was enabled to make a report in their favour. His constitution was at length impaired by his unremitting application, the fatigues of his various offices, and some personal chagrins; and he fell a sacrifice to a malignant fever, September 27, 1783, in the 54th year of his age. His publications were "A Course of Mathematics for the Use of the Marine, with a Treatise on Navigation," 6 vols. 8vo. Paris, 1764; a "Course of Mathematics for the Corps of Artillery," 4 vols. 8vo. 1770; "General Theory of Algebraic Equations," 4to. 1779; with a considerable number of Memoirs, chiefly mathematical, in the volumes of the French Academy. Montucla, Hist. des Mathem. vol. iii. p. 47. 298. Hutton's Math. Dict. Art. BEZOUT.

BEZOZZI, ALEXANDER and JEROM, brothers in the

service of the king of Sardinia, at Turin, the most celebrated performers of their time; the one on the hautbois, and the other on the bassoon. These kindred instruments were rendered famous all over Italy during the middle of the last century, not only by the exquisite performance, but by the amiably singular character of these two brothers. Their long and uninterrupted affection and residence together, were as remarkable as their performance.

The eldest, when we heard them in 1770, was 70, and the youngest 60. The *idem velle et idem nolle* were as perfectly in tune as their instruments: so that they had always lived together in the utmost harmony, carrying their similarity of taste to their very dress, which was the same in every particular, even to buckles and buttons. They had lived so long, and in such a cordial manner together, that it was taught, whenever one of them died, the other would not long survive him; which was exactly the case, both dying in 1780, within a few months of each other.

The composition of these exquisite performers generally consisted of select and detached passages, yet so highly polished, that like apophthegms or maxims in literature, each was not a fragment but a whole; their pieces being in a peculiar manner contrived to display the genius of their several instruments and powers of performance. The eldest played the hautbois, and the youngest the bassoon; but it is difficult to describe their peculiarities of expression. Their composition, when printed, gave but an imperfect idea of their sweetness and delicacy: there were such a perfect acquiescence and agreement together, that many of the passages seemed heart-felt sighs breathed through the same reed. No brilliancy of execution was aimed at; all were notes of meaning. The imitations were exact; the melody equally divided between the two instruments; each *forte*, *piano*, *crescendo*, *diminuendo*, and *appoggiatura* (see all these terms in their places), were observed with a minute exactness that could be attained only by a long residence and study together. The eldest brother had lost his under front-teeth, and complained of age; and it was natural to suppose that the performance of each had been better: however, to me (says Dr. Burney), who heard them now, for the first time, it was delightful! If there was any thing to lament in so exquisite a performance, it arose from the *equal perfection of the two parts*; which distracted the attention, except when in dialogue, so much as to render it impossible to listen to both, when both had dissimilar melodies equally pleasing.

They were born at Parma, and had been upwards of 40 years in the service of his Sardinian majesty, without ever quitting Italy, (except one short excursion to Paris, in 1755,) or even Turin, but for that journey, and another to visit the place of their nativity. They were men of a sober, regular, and moral character; in easy circumstances; had a town and country house, and in the former many good pictures by the first masters.

The Bezozzi family has furnished many admirable musicians to Italy, and other parts of Europe. Gæetano Bezozzi, a celebrated performer on the hautbois in the king of France's service, was born at Parma in 1727, entered into the service of the king of Naples in 1736, and into that of the king of France in 1765. We heard him perform a concerto at the *concert spirituel* at Paris in 1774, with great pleasure; and thought him superior to all whom we had then heard on the hautbois, except Fischer. His father, Joseph Bezozzi, had taught the celebrated brothers at Turin, Alexander and Jerom, his brothers, to play on the hautbois and bassoon. "M. Bezozzi of Paris," says Laherde, "in 1780, had during 25 years merited and enjoyed the highest reputation, as well as the esteem of all who knew him. His son

was then lately received into the king's band, and his brother, Anthony Beozzi, attached to the court of the king of Poland, had also a son in the service of that of Dresden, where we heard him perform in 1772, and found him a truly great performer. His *mezza di voce*, or swell, was prodigious; indeed he continued to augment the force of a tone so much, and so long, that it was hardly possible not to fear for his lungs. His taste and ear were exceedingly delicate and refined; and he seemed to possess a happy and peculiar faculty of tempering a continued tone to different bases, according to their several relations: upon the whole, his performance was so capital, that a hearer must be extremely fatigued not to receive from it a great degree of pleasure.

BLZZAMA, MARCELLA, in *Geography*, a town of Italy, in the kingdom of Naples, and country of Otranto, 10 miles N.E. of Tarento.

BHAGNAGUR, a name formerly given to Hydrabad, which see.

BHAKOR. See *BEHNER*.

BHARATA, a name given in the Sanskreet language to Hindoostan.

BHATGAN, a city of Asia, in the kingdom of Nepal; the capital of an independent kingdom. It contains about 12,000 families, extends towards the east to the distance of five or six days' journey, and borders upon another nation, also independent, called "Ciratas," who profess no religion. See *NEPAL*.

BHAVANI, the name of an ancient festival, annually celebrated on the first of May by the Gopas, and all other Hindus who keep horned cattle for use or profit. On this day, they visit gardens, erect a pole in the fields, and adorn it with peonies and garlands. Similar rites are performed by the same class of people in England, where it is known to be a relic of ancient superstition in that country. Hence it should seem, says colonel Pearse, that the religion of the East, and the old religion of Britain, had a strong affinity. *Astic Res.* vol. ii. p. 333.

BIHERAH, a place in Hindoostan, on the east side of the Behat river, where is a pass over it, a little to the N. of W. from Lashore, about 11 minutes north of its parallel, and distant from it 85½ geographical miles. N. lat. 32° 5'. E. long. 72° 12'.

BI, or BIRA, a river of Russia, which, by uniting with the Katcha, forms the river Ob.

BIA, in *Cochin*, a name given by the Siamese to a sort of little white shell, brought in vast numbers from the Malive Islands, and used throughout most part of the East Indies for small money. Nine of these are equal to the French denier; they are called *cori*, or cowries, and belong to the *CYPRÆA* genus of Linnæus.

BIABANA, in *Ancient Geography*, a town placed by Ptolemy in the interior part of Arabia Felix.

BIACULLATUS, in *Ichthyology*, a species of *BALISTE*, having two ventral spines. Bloch. *Genl. &c.* This is *piscis cornutus* of Willughby. It inhabits India, and is of an elongated form, white, cicercous above, and rough to the touch, being covered with very short, luscate, or bushy hairs. It is a native of the East Indies, and, from the structure of the mouth, is a voracious kind, feeding probably on marine worms and crabs. The Dutch call it *Pleom-sich*; and the French, *Balje à dix piquans*, in allusion to the two ventral spines, which constitute the specific character of the fish.

BIÆUM, from *βæz*, *apposition*, in *Rhetoric*, denote a kind of counter-argument, whereby something alleged for the adversary is retorted against him, and made to conclude a different way; for instance, "Occidisti, quia addidisti inter-

fecisti.—Immo quia addidisti interfecto non occidisti; nam si id esset, in fugam me coniecissim." "You killed the person, because you were found standing by his body." (*Bæum.*) "Rather I did not kill him, because I was found standing by his body; since, in the other case, I should have fled away."

BIÆUM, in the *Grecian Læva*, was an action brought against those who ravished women, or used violence to any man's person. Potter, *Archæol.* lib. i. c. 24.

BIÆUM also denotes a kind of saline or sea-wine, used by the ancient Greeks in various disorders. It was made of grapes gathered a little before ripe, and dried in the sun; then pressed, the juice put up in casks, and mixed with a large proportion of sea-water; though Dioscorides seems to describe it as made of grapes steeped in sea-water, and then pressed. Gorr. *Def. Med.* p. 75.

BIÆFAR, or BIAFRA, in *Geography*, a populous and powerful kingdom of Africa, situate west of Medina and east and south-east of Benin, from which it is separated by a chain of mountains; and extending beyond the fourth degree of north latitude, to the coast of the gulf of Guicena. It has a capital of the same name; and the bay on its coast is called the bight of Biafra. The natives of this country, the interior of which is little known, are idolaters, and much addicted to magic. They are said to be zealous in their worship, and to sacrifice their children to the devil. Biafra is also a small district of Africa, extending along the sea-coast, S.S.E. of the river Gambia, over-against the islands of Bislagos.

BIÆFORA, in the *Customs of the Middle Age*, a form of cry, or alarm to arms; on the hearing whereof, the inhabitants of towns or villages were to issue forth, and attend their prince. The word seems originally from Gascony; and the Italians even now, on a sudden insurrection of the people, commonly cry, *Via fora*, by an usual change of the letter B into V.

BIÆGIO, ST., in *Geography*, a town of Italy, in the kingdom of Naples, and province of Calabria Ultra, 3½ miles W.S.W. of Nicastro.—Also, a town in the same kingdom, in the county of Molise, 8 miles N.E. of Molise.

BIÆJOS, the name by which the inhabitants of the island of Borneo are distinguished. They are said to offer sacrifices of sweet-scented wood to one supreme beneficent deity, and these sentiments of piety are accompanied by laudable morals. See *BANJERMASSING* and *BORNEO*.

BIÆLA, a part of Prussian Silesia, in the circle of Zulz.—Also, a small town in the duchy of Lituania, belonging to Prussia, seated on the government of Johanneburg, which obtained its privileges in 1722.—Also, a town and river of Poland, which runs into the Vistula, S.W. of Cracow. N. lat. 49 52'. E. long. 19 20'.

BIÆLACERKIEW, a small town of Poland, in the Ukraine, seated on the Rofe, a river of the palatinate of Kiof, which discharges itself into the Dnieper; distant 60 miles S.S.W. from Kiof. Here the Tatars were entirely defeated in 1626.

BIÆLAGRODKO, a small town of Poland, in the palatinate of Kiof, seated on the Iupian, 14 miles S.W. of Kiof.

BIÆALLA, or BIAŁA, a town of Poland, in the palatinate of Brzeck or Białystok, 16 miles S.W. of Brzeck or Białystok. N. lat. 52° 10'. E. long. 23 25'.

BIÆALLISTOCK, or BIAŁYSTOK, a great and well-built town of Poland, in the palatinate of Podlachia, north of Bialle, in N. lat. 53°. E. long. 23 32'. The streets are broad, and the house, which are in general plastered, stand detached at uniform distances. The superior neatness

of this town is owing to the illustrious family of Braniski, whose palace adjoins the town, and who have contributed to ornament their place of residence. This palace is a large building, in the Italian taste, and, on account of its magnificence, generally called the Versailles of Poland. It was formerly only a royal hunting seat, but given by John Casimir, together with Ballistock, and other estates, to Czarniecki, a general highly distinguished by his victories over the Swedes, when Poland was nearly crushed by her enemies. Czarniecki left one daughter, who married Braniski, the father of the late great general, and conveyed the estate into that family.

BIALOBOKY, a town of Poland, in the palatinate of Lemberg, 48 miles S.W. of Lemberg.

BIANA, a town of Hindoostan, 20 leagues from Agra, which was formerly a large city, and included Agra among its dependencies. The town is still considerable, and contains many large stone houses. It was formerly the residence of a powerful rajah; but his principal city and fort were seated on the top of an adjoining hill, and the present town was only a suburb. The whole ridge of the hill is covered with the remains of large buildings, among which, the most remarkable is a fort, called "Bijey-Munder," containing a lofty pillar of stone, called "Bleemlat," or the Tealer or oilman's lat or staff. This pillar is conspicuous at a great distance. The town and district now belong to "Ramjath Sing," the rajah of Bhirtpoor. This place is famous for its excellent indigo. N. lat. 26° 20'. E. long. 77°.

BIANCA, LA, a town of Italy, in the kingdom of Naples, and province of Calabria Ultra, 12 miles N.E. of Bova.

BIANCA, Ital. for the note in music, which we denominate a *minim*: and the Fr. *une blanche*. This, though now almost the longest note in use, three or four hundred years ago, was the shortest. See **TIME-TABLE**, and **MUSICAL CHARACTERS**.

BIANCHI, FRANCISCO, called *Il Frari*, in *Biography*, an historical painter, was born at Modena, and was the disciple of the celebrated Antonio Correggio. His colouring was delicately fine, his attitudes graceful, and his invention very grand. His works possessed an astonishing beauty, and are prized as highly as even those of Correggio. He died in 150. Pilkington.

BIANCHI, PETER, a painter of the Roman school, was born in Rome in 1694, and united with his talents as a painter the accomplishments of literature. He painted historical subjects, portraits, rural and naval scenes, animals, plants, and flowers, in fresco, oil, and distemper. His reputation caused him to be employed in painting a picture in the church of St. Peter. He is said to have been a severe judge of his own performances, and to have destroyed many of his works after they were finished, because they did not please him. He died at Rome in 1739. *Encyclopedie*.

BIANCHI, JOHN BAPTIST, born at Turin, Sept. 12th, 1681, of an ancient and respectable family. After being educated with the greatest care, and under the ablest masters at home, he was sent early to the university, and made such progress in his studies, that at the age of 17 he was admitted doctor in medicine, and was soon after made physician to the hospital, a situation for which he was peculiarly qualified; for being fond of anatomical pursuits, he had here opportunity, from the number of subjects a large establishment of that kind necessarily furnished, of dissecting and examining the human body at every age, and labouring under every species of disease or deformity. He had the happiness also of finding his talents properly estimated by his brethren,

and his labours rewarded, as he was advanced to be public teacher of anatomy at Turin, where his sovereign built for him, in the year 1715, a spacious and convenient amphitheatre. He also read lectures in philosophy, in pharmacy, chemistry, and on the practice of medicine. These honours were not however entirely without alloy, as he had the mortification to find his doctrines censured by Morgagni, and by Haller, and even the existence of some parts he supposed he had discovered, disputed. The principal of his works are "Historia hepatica, seu de hepatis structura, usibus, et morbis," 1710, 8vo. Morgagni has published some severe strictures on this work, in his "Adverbia Anatomica." It has passed, however, through several editions, and in 1725, was republished in two vols. 4to. with figures "Ductus lacrymales novi, eorum usus, morbi, curationes," 4to. 1715, also censured by Morgagni. "Storia de monstro, di due corpi," 8vo. 1749, the most laboured and perfect, Haller says, of all his works. He wrote also an history of the generation of man, with figures, in which he attempts to delineate the fetus in its different stages, but the figures, Haller says, are principally factitious. Many of his dissertations are inserted by Mangeti in his "Theatrum Anatomicum." Haller. Bib. Anat. et Chirurg. Eloy. Dict. Hist.

BIANCHI, JOHN, born at Rimini, Jan. 3, 1693. After receiving a liberal education, he went to Bologna, where, in 1719, he was admitted doctor in medicine. Returning the following year to Rimini, he practiced medicine there with success for many years. He revived the academy of Lynxes, a philosophical society, collecting the members together at first at his own house. In gratitude for this, a medal was struck, with his figure on the face, and on the reverse, a lynx, with the motto "Linceis rellituis." His works are various, of which the principal are "A Treatise on the Cataract," 4to. 1720, in Italian. "Epistola anatomica, ad Josephum Putæum," 4to. 1726. "De monstris, et rebus monstrosis," 4to. 1749, and in 1751, an account of an imposture of the right hemisphere of the brain, occasioning paralysis on the opposite side of the body. Eloy. Dict. Hist.

BIANCHINI, FRANCIS, a mathematician and philosopher, was born at Verona, Dec. 13, 1662, and devoting himself to the church, became a doctor in theology, and distinguished by his unfeigned piety. But his principal celebrity was acquired by his literary and scientific performances. In early life he contributed to the establishment of the academy of the "Aletofoli," or the lovers of truth, and in the progress of his studies rendered it considerable service. His literary reputation attracted that notice to which the rank of his family also in some measure entitled him. Cardinal Ottoboni, afterwards pope Alexander VIII., appointed him his librarian; and he was promoted first to the dignity of canon in the church of Santa Maria della Rotunda, and also to that of St. Laurence, in Damasco. He was also secretary to the congregation for the reform of the calendar, to which office he was nominated by pope Clement XI. The senate created him one of the nobility of Rome, and after his death the citizens of Verona placed his bust in their cathedral. He died of the dropsy, March 2, 1729, with a character distinguished for the benevolence and candour of his manners, as well as for his piety and universal learning. Fontenelle honoured his memory with an eulogy, as one of the foreign members of the academy of sciences at Paris. His first work was "An Universal History," on a new plan, serving to give perspicuity to the chronological distribution. The first part of this work was published in 1697, under the title of "La Istoria Universale provata con monumenti et figurata con Simboli de gli Antichi." It extends, from the creation

creation of the world, to the destruction of the great Assyrian empire, and is held in high estimation for industry of research, and ingenuity of disquisition with regard to the genuine monuments of antiquity. The succeeding parts were never written. On occasion of the reform of the calendar, Bianchini wrote two learned and scientific treatises published in 1703, and entitled "De Calendario et Cyclo Cæsaris ac de canone Paschali Sancti Hippolyti Martyris, Dissertationes duæ." Of his astronomical skill and labour in tracing the meridian line, in the church of the Chartreux at Rome, he published an account in a dissertation "De nummo et gnomone Clementino." In 1727, he published "Camera ed Inscrizioni Sepolcrati di Libert, Servied Officiali della Casa di Augusto, &c." on occasion of the discovery of a subterraneous sepulchral building, in 1726, on the Appian way. His observations on Venus were published in 1728, under the title of "Hesperii et Phosphori Nova Phenomena, sive Observationes circa Planetam Veneris." The results of his observations on the rotation of Venus, and the position of its axes, though very interesting to astronomers at the time of their publication, have not, however, been confirmed by those of a later date, made by Herschel and Schroeter, with instruments of much greater power than any which were known in his time, and inserted in the Philosophical Transactions. The cause of this difference has not yet been ascertained, and deserves investigation. (See VENUS.) Bianchini was employed for eight years in preparatory measures for tracing a meridian line through the whole extent of Italy, but his death prevented the commencement of this enterprize. His edition of "Anastasius's Lives of the Popes," in 4 vols. folio, with notes, dissertations, prefaces, &c. displays much genius and erudition; but it is said to abound with typographical errors. He left an unedited dissertation in Latin, on the three kinds of musical instruments of the ancients, which was published at Rome 1742, in 4to., under the following title: "Francisci Bianchini Veronenfis utriusque signaturæ referendarii, & prelati domesticæ, de tribus generibus instrumentorum musicæ veterum organicæ dissertatio." In dividing ancient musical instruments into three classes, namely, wind instruments, stringed instruments, and instruments of percussion, the first class includes flutes, trumpets, horns, the syrinx, and hydraulicon; the second, the monochord, the lyra trichordis, tetrachordum, the seven-stringed lyre, the chelys, the cithara, psaltery, harp, &c.; the third class comprises the tympanum, cymbalum, erotalum, sitrum, and the tintinnabulum. Of all these, the author has given descriptions and representations well engraven on plates. Fontenelle Eloge des Academiciens. Nouv. Dict. Hist.

BIANDRATE, in *Geography*, a town of Piedmont, in the Novarese, 6 miles N.W. of Novara.

BIANDRONA, a town of Italy, in the duchy of Milan, 15 miles W.S.W. of Como.

BIANOR, in *Entomology*, a species of *PAPILIO*, nearly allied to *P. Paris*, and a native also of the East Indies. The wings are above and beneath of the same black colour, with five rufous lunules on the posterior pair. Fabricius, &c. It may be doubted whether this is a distinct species from *Paris*; perhaps only a sexual difference.

BIAR, a small town of Valencia, in Spain, seated on a river which runs into the Ebro, on the confines of New Castile. It is chiefly remarkable for its honey, which is distinguished by its whiteness and solidity, unaltered by any change of weather; distant two leagues east of Villena.

BIARCHUS, formed from *βία*, *annona*, *vitruoli*, and *αρχη*, chief, an officer in the court of the emperors of Con-

stantinople, intrusted with the care and inspection of the provisions of the soldiery. The biarchus was the same with what the Latins call *prefectus annonæ*. His function was called *biarchia*; by the Latins *prefectura rei cibaria*. He belonged to the *scholia agantium in rebus*. See AGENTES.

BLARMIA, in *Geography*, a name given by the Scandinavian navigators, in the middle ages, to the whole country between the White sea and the Ural. See PERMIA.

BLARUM, in *Botany*, a name by which the people of Egypt at this time call the root of the *nilufar*, or *jaba Ægyptia*, growing on the Nile.

BIAS, or BIASS, in a general sense, denotes the tendency or propensity of a thing towards one side more than the other; particularly the deviation of a body, or a plane, from its rectilinear course, or its level. See INCLINATION. It signifies also the inclination of a person's mind to one thing more than to another. The word is French, *biais*, which signifies the same.

BIAS of a *bocul*, is a piece of lead put into one side, to load and make it incline towards that side.

BIAS, in *Biography*, one of the seven wise men of Greece, was a native of Priene, in Ionia, and flourished in the reign of Alyattes II. king of Lydia, about 608, according to some, but according to Blair's tables, about 565 years before Christ. He was eminently distinguished not only by his wisdom, but by his generosity and public spirit, and for these qualities held in the highest veneration by his countrymen. Alyattes was obliged by a stratagem of his contrivance to raise the siege of his native town, when it was reduced to the utmost distress by famine. He first sent two fattened mules into the enemy's camp; and the king, observing with astonishment their good condition, sent deputies into the city under a pretence of offering terms of peace, but with a real intention of observing the state of the town and of the people. Bias, suspecting their design, ordered the granaries to be filled with large heaps of sand, and these heaps to be covered with corn; upon which, when the deputies returned, and reported the plenty of provision with which the city was furnished, the king no longer demurred, but concluded a treaty, and raised the siege. As an instance of his generosity, it is related of him, that when several young female captives were brought from Messene to Priene, he redeemed them, educated them as his own daughters, and then restored them with a dowry to their parents. As an evidence of the low estimation in which he held the gifts of fortune, compared with the endowments of the mind, it is said, that when Priene was once threatened with a siege, and the inhabitants were leaving it, loaded with their most valuable effects, Bias took no pains to preserve any part of his property, alleging as a reason of his conduct to one who expressed his surprise at it, "I carry all my treasures with me." The following maxims of wisdom are ascribed to him. "It is a proof of a weak and disordered mind to desire impossibilities." "The greatest infelicity is not to be able to endure misfortunes patiently." "Great minds alone can support a sudden reverse of fortune." "The most pleasant state is to be always gaining." "Be not unmindful of the miseries of others." "If you are handsome, do handsome things; if deformed, supply the defects of nature by your virtues." "Be slow in undertaking, but resolute in executing." "Praise not a worthy man for the sake of his wealth." "Whatever good you do, or do all the good you can, and ascribe the glory of it to the gods." "Lay in wisdom as the store for your journey from youth to old age, for it is the most certain possession." "Many men are dishonest; therefore love your friend with caution, for

he may hereafter become your enemy." Bias is asserted to have written more than 2000 verses concerning Ionia. His death was no less honourable than affecting; for he expired in the arms of a grandson, while he was pleading a cause for a friend. Diog. Laert. l. i. c. 82. Val. Max. l. iii. c. 2. vii. 2. Aul. Gell. l. v. c. 11. Cicer. de Amicit. c. 60. Plut. Conv. vii. Aristot. Rhet. l. ii. c. 13. Stobæus Serm. 28. Brucker's Phil. by Enf. vol. i. p. 136.

BIAS, in *Entomology*, a species of PAPILIO (*Pleb. Rur.*), that inhabits Cayenne. The wings are entire black, glossed with blue; beneath brown, with a white posterior margin. Fabricius.

BIASI, ST. in *Geography*, a town of Italy, in the kingdom of Naples, and province of Principato Citra, 15 miles W. N. W. of Policastro.

BIATHANATI, *βιθανάτι*, from *βίαι*, violence, and *θάνατος*, death; the fame with suicides, or those who kill themselves.

BIB, in *Ichthyology*, the English name of a fish of the GADUS tribe, called *luscus* by Linnæus.

BIBAN, in *Geography*, a town of Egypt, in Bahira, the residence of a kiaschef. Once a week, on Monday, a fair for camels and other cattle is held in the fields adjoining to this place.

BIBBONA, a town of Italy, in the duchy of Tuscany, 50 miles north of Arezzo.

BIBBS, BIBS, or BRACKETS, in *Naval Architecture*, are made of elm plank, and bolted to the hounds of masts, as supporters to the trestle trees. They are from three to five inches thick, and nine elevenths of the hounds in length, and in breadth six fifteenths their length. The after edge is first lined straight, and the upper part square from that, and the fore part tapered by a moulding to four or six inches of breadth at the lower ends. The after edge is fayed on the cheeks, and the upper part against the under side of the trestle trees on the fore side of the mast: viz. In the middle of the after edge, set up one inch and a half, and line straight from that to nothing at the lower end, which makes a butt in the middle; then place the bibbs on the mast, their thickness within the sides of the cheeks, and their upper parts to the outside of the trestle trees; then let one inch and a half be riced by the lower edge of the bibbs upon the cheeks, and the wood taken out to that depth, and the thickness of the bibbs, that they may bed firm therein; they are then bolted edgeways through the cheeks with four bolts driven from the fore side and clenched on a ring on the aft-side. The bolts are to be in diameter from one inch to seven eighths, or three quarters in small ships' masts, and only three in number. The lower end of the bibb is rounded off to the surface of the cheek, and the edges chamfered.

BIBEN, in *Geography*, a town of Persia, in the Irak Agemî, 140 miles east of Ispahan.

BIBEN, otherwise called *Pitschem*, and in Latin *Pedena*, or *Petina*, a town of Carniola, seated in a very fertile spot, on a high mountain; and the see of a bishop, to whose jurisdiction belong two towns and eleven villages, in which are fourteen parishes, suffragan to the prelate of Gorz.

BIBER, a town or village of Germany, in the circle of the lower Rhine, the electorate of Mentz, and prefecturate of Steinheim, 5 miles E. S. E. of Francfort on the Main. This is one of eleven villages which are possessed in common of a wood named the "Biber Mark." At Biber, all things relating to it are managed by the sheriffs of the Mark: and before the village, under a great lime-tree, lies the sheriff's bench, where the Mark court is fenced in, and transgressors are openly cited and punished.

BIBER, in *Zoology*, a name given by Ridinger, &c. to the *beaver*, *castor fiber*. Linnæus.

BIBER, HENRY JOHN FRANCIS, in *Biography*, vice-chapel-master to the archbishop of Salzburg, seems to have been the greatest performer on the violin of the 17th century. Baltzar from Lubeck, about the middle of that century, had so astonished the Oxonians by his execution on the violin, that according to Ant. Wood, Dr. Wilson, the music professor, after hearing him, stooped down to examine his feet, whether they were not cloven; that is, "whether he was a devil, or not, because his performance was beyond the faculties of man." But if we may now judge of his performance by his compositions that are still extant, it was very inferior to that of Biber, who published in 1681, solos for a violin and bafe, the most difficult and the most fanciful of any music of the same period. One of the solos is written on three separate staves, as if a score for two violins and a bafe; but the trebles are to be played in double stops. Others are played in different tunings of fourths and fifths, as for a treble viol. A second work by this musician, intitled *fidicium sacro profanum*, consists of twelve sonatas in four and five parts, to be played on three instruments; and a third, *harmonia artificioso ariosa*, published at Nuremberg, consisting of pieces in seven parts, to be played on three instruments. In this last work he is styled *Depifer*. In knowledge of the finger-board, double stops, and use of the bow, as well as composition, he seems to have surpassed all preceding violinists.

BIBERACH, in *Geography*, an imperial city of Germany, in the circle of Swabia, situate in a valley, watered by the Riefs, near the Danube. The magistrates and people are partly protestants and partly catholics; and the church, as well as the hospital, are common to both. The treaty of Westphalia requires that it should have as many catholics as Lutherans in the senate. It is governed, as to its offices, like the city of Augsburg. It has a large manufacture of fuslians. The number of houses is estimated at 900, of inhabitants at 6,600, and of burghers at 900. This city is very ancient, and was known in the year 751, under Pepin. By the plan of indemnities agreed upon by France and Russia, this imperial town was conceded to the margrave of Baden. N. lat. 48° 4'. E. long. 10° 2'.

BIBERSTEIN, a small town of Swisserland, in the canton of Bern, seated on the north-west side of the Aar. N. lat. 47° 17'. E. long. 7° 56'.—Also, a bailliwick, with a castle, in the circle of the Upper Rhine, and bishopric of Fulda, 8 miles east of Fulda.

BIBIENA, BERNARDO DA, *Cardinal*, whose proper name was *Dovizi*, or *Divizio*, was born of an obscure family at Bibiena, in the Cesentine, in 1470, and entered into the service of the family of Lorenzo di Medici. He attached himself to cardinal John, afterwards pope Leo X., whom he accompanied in his exile and served with affection and fidelity. At Rome he ingratiated himself with pope Julius II., by whom he was employed in some concerns of importance, and by whom his services were approved. On the death of Julius, he artfully persuaded the cardinals, that his master, though only 36 years of age, was not likely to live long, and by this artifice obtained his election. Leo was not insensible of his obligations, and made him his first treasurer, and in 1513, cardinal. In the direction of the works of the holy house of Loretto, in which he was employed, he encouraged men of literature, and engaged the best artists, particularly Raphael. Leo also deputed him as legate to the pontifical army against the duke of Urbino, then to the emperor Maximilian, and afterwards, in 1518, to Fran-
cis I.

ois I. King of France, for the purpose of forming a crusade against the Turks. On this occasion he was received with very marked distinction at Paris, though the event of the journey proved fatal to him. It has been generally supposed, that having a view to succeed Leo in the papal see, he had obtained the promise of Francis's support; and that Leo, being apprized of his ambition, took him off by poison; or perhaps, the displeasure of the pope might so much affect him as to occasion a fit of illness, which proved mortal in November 1520.

Bibiensia is distinguished in the history of literature as a polite writer, and particularly as the author of a celebrated comedy called "Calandra." This was the first comedy written in prose in the Italian language, or at least the first that obtained any considerable degree of popularity; and it is still esteemed as one of the best productions of the age, though the wit is not free from indelicacy, and many passages of it are copied from Plautus. It was represented in a very magnificent manner at Urbino, and afterwards at Rome. The actors were young men of rank, and the author is said to have taken great pains in training the courtiers to dramatic exercises, which were performed under the occasional inspection of Leo, in the chambers of the Vatican. Gen. B'og.

BIBIENI, FERDINANDO GALLI, a celebrated painter and architect, was born at Bologna in 1657; and losing his father when very young, was placed under the direction of Carlo Cignani, who, observing his taste for architecture, obtained for him the instruction of Paradossio, Aldrovandini, and Mauri, the best masters of that period for perspective and architecture. In consequence of the recommendation of Cignani, he was patronized by the prince of Parma, who employed him in executing a variety of decorations, and settled upon him an annual pension. For the dukes of Parma, he painted the scenes for *Hiero*, tyrant of Syracuse, in 1685; for *The Libris* in love with Alexander, 1693; for *Demosthenes*, 1694; for *Fractus*, 700; and for *Irrivali generis*, in 1701. From Parma he went to Milan, where, in 1704, he painted the scenes for *L'Anazzone Corsari*, and thence went to Vienna, and was appointed painter and architect to the emperor Charles VI., by whom he was highly honoured and rewarded. He was the inventor of those wonderful and magnificent scenes which still decorate many theatres in Italy; and published a book of instruction for the conduct of the theatre in general. He architected several palaces, and designed a great number of edifices; and he discovered and corrected the false form of machinery exhibited for the benefit of the students of Anatomy, exhibited at *La Favorita*, near Vienna.

He had a brother, Francis, of equal genius and fame, and two fine sons worthy of such a father. It was Ferdinando Bibieni a Gall, who, quitting mythology and fantastic forms, gave true representations of nature; rapidity of execution; intelligent disposition of light, and above all, that great help to nature, the leaving something to the spectator's imagination. Although he lost his sight by cataracts in his eyes, and obtained leave to return to Italy, where he composed two volumes of his architectural treatise for the instruction of young painters. He had several children, whom he educated to be concertists, and a considerable number of scholars. Bibieni died at Bologna, as some say, in 1741, and according to others, in 1743. His earl pictures exhibit a noble and elegant ordonnance, and an extremely beautiful tone of colour. His perspectives have a softening effect by judicious masses of light and shadow; and the vigour of imagination in his pictures, which he happily introduces in his compositions, add a richness and grandeur to all his performances.

BIBIENA, in *Geography*, a market-town of Italy, in the duchy of Tuscany, and district of Casentino.

BIBIG, a town of Egypt, two miles south of Feium.

BIBIO, in *Entomology*, one of the Fabrician genera of *ASPLIATA*, and which in the Linnaean system forms a section of the *MUSCA* genus. Fabricius defines the generic character of *Bibio* from the sucker, feelers, and antennae. The sucker consists of three bristles and a sheath of a single valve; feelers very short; antennae connected at the base, and pointed at the tip. Ent. Syst. See *MUSCA*.

BIBITORY MUSCLE. See *ABDUCTOR Oculi*.

BIBLE, a book by way of eminence so called, containing the Scriptures, i. e. the writings of the Old and New Testament; or the whole collection of those which are received among Christians as of divine authority.

The word Bible comes from the Greek *βιβλίον*, or *βιβλίον*, used to denote any book; but, by way of eminence, applied to the book of Scripture, which is "the book," or "book of books," as being superior in excellence to all other books. *βιβλίον* again comes from *βύβλος*, the Egyptian reed, from which the ancient paper was procured. See *BIBLUS*.

The word Bible seems to be used in the sense now specified by Chrysostom (In Col. H. 9. tom. xi. p. 39.): "I therefore exhort all of you to procure to yourselves Bibles." (*βιβλία*). If you have nothing else, take care to have the New Testament, particularly the Acts of the Apostles, and the Gospels for your constant instructors. And Jerom says (In Is. c. 29. tom. iii. p. 246.), "that the Scriptures being all written by one spirit, are one book." Augastine also informs us (Enarr. in Ps. il. n. 2. tom. iv.), "that some called all the canonical Scriptures one book, on account of their wonderful harmony and unity of design throughout." It is not improbable, that this mode of speaking gradually introduced the general use of the word "Bible" for the whole collection of the Scriptures, or the books of the Old and New Testament.

The Bible is known by various other appellations, as the "Sacred Books," the "Inspired Writing," "Holy Writ," "Sacred Text," &c. By the Jews the Bible, i. e. the Old Testament, is called "Mikra," that is, Lecture, or reading; by the Christians the Bible, comprehending the Old and New Testament, is usually denominated "Scripture," q. d. writing; sometimes also the "Book of God," the "Canon," "Rule of Faith," &c. These, and similar appellations, are derived from the opinion that has been entertained, in successive ages, of the divine original and authority of the Bible, and of its importance and utility as a rule of faith and directory of conduct. As it contains an authentic and connected history of the divine dispensations with regard to mankind; as it lays claim to divine inspiration; as its chief subject is religion; and as the doctrines it teaches, and the duties it inculcates, pertain to the conduct of men, as rational, moral, and accountable beings, and conduce by their natural influence, as well as by a divine constitution and promise, to their present and future happiness; the Bible deserves to be held in high estimation, and amply justifies the sentiments of veneration with which it has been regarded, and the peculiar and honourable appellation by which it has been denominated. See the sequel of this article.

The list of the books contained in the Bible, is called the canon of Scripture. See *CANON*. Those books that are contained in the catalogue to which the name of canon has been appropriated, are called canonical, by way of contradistinction from others called hetero-canonical, apocryphal, pseudo-apocryphal, &c., which either are not acknowledged as divine books, or are rejected as heretical and spurious. See *APOCRYPHAL*.

B I B L E.

The first canon or catalogue of the sacred books was made by the Jews; but the original author of it is not satisfactorily ascertained. It is certain, however that the five books of Moses, called the Pentateuch, were collected into one body within a short time after his death; since Deuteronomy, which is, as it were, the abridgment and recapitulation of the other four, was laid in the tabernacle near the ark, according to the order which he gave to the Levites (ch. xxxi. v. 24.) Hence it appears that the first canon of the sacred writings consisted only of the five books of Moses; for a further account of which, see PENTATEUCH. It does not appear that any other books were added to these, till the division of the ten tribes, as the Samaritans acknowledged no others. However, after the time of Moses, several prophets, and other writers divinely inspired, composed either the history of their own times, or prophetic books and divine writings, or psalms appropriated to the praise of God. But these books do not seem to have been collected into one body, or comprised under one and the same canon, before the Babylonish captivity. This was not done till after their return from the captivity, about which time the Jews had a certain number of books digested into a canon, which comprehended none of those books that were written since the time of Nehemiah. The book of Ecclesiasticus affords sufficient evidence, that the canon of the sacred books was completed when that tract was composed; for that author, in chap. xlix. having mentioned among the famous men and sacred writers, Isaiah, Jeremiah, Ezekiel, adds the twelve minor prophets, who follow those three in the Jewish canon; and from this circumstance we may infer, that the prophecies of these twelve were already collected and digested into one body. It is farther evident, that in the time of our Saviour the canon of the holy Scriptures was drawn up, since he cites the Law of Moses, the Prophets, and the Psalms, which are the three kinds of books of which that canon is composed, and which he often styles "the Scripture," or "the Holy Scripture." Matt. xxi. 42. xxii. 29. xxvi. 54. John, v. 39. This shews that they were distinguished from others, and formed a separate body. The person who compiled this canon is generally allowed to be Ezra. According to the invariable tradition of Jews and Christians, the honour is ascribed to him of having collected together and perfected a complete edition of the Holy Scriptures. The original of the Pentateuch had been carefully preserved in the side of the ark, and had been probably introduced with the ark into the temple at Jerusalem. After having been concealed in the dangerous days of the idolatrous kings of Judah, and particularly in the impious reigns of Manasseh and Amon, it was found in the days of Josiah, the succeeding prince, by Hilkiah the priest, in the temple. Prideaux says, that during the preceding reigns, the book of the Law was so destroyed and lost, that, besides this copy of it, there was then no other to be obtained. To this purpose he adds, that the surprize manifested by Hilkiah, on the discovery of it, and the grief expressed by Josiah when he heard it read, plainly shew that neither of them had seen it before. Upon this, the pious king ordered copies to be written out from this original, and to be dispersed among the people. 2 Kings, xxii. 8—13. 2 Chron. xxxiv. On the other hand, Dr. Kennicott supposes, that long before this time, there were several copies of the Law in Israel, during the separation of the ten tribes, and that there were some copies of it likewise among the tribes of Judah and Benjamin, particularly in the hands of the prophets, priests, and Levites; and that by the instruction and authority of these MSS., the various services in the temple were regulated, during the reigns of the good kings of Judah. He adds,

that the surprize expressed by Josiah and the people, at his reading the copy found by Hilkiah, may be accounted for by adverting to the history of the preceding reigns, and by recollecting what a very idolatrous king Manasseh had been for 55 years, and that he wanted neither power nor inclination to destroy the copies of the Law, if they had not been secreted by the servants of God. The Law, after being so long concealed, would be unknown almost to all the Jews; and thus the solemn reading of it by Josiah would awaken his own and the people's earnest attention; more especially, as the copy produced was probably the original written by Moses. From this time copies of the Law were extensively multiplied among the people; and though within a few years, the autograph, or original copy of the Law, was burnt with the city and temple by the Babylonians, yet many copies of the Law and the Prophets, and of all the other sacred writings, were circulated in the hands of private persons, who carried them with them into their captivity. It is certain that Daniel had a copy of the Holy Scriptures with him at Babylon; for he quotes the Law, and mentions the prophecies of Jeremiah. Dan. ix. 11. 13. ix. 2. It appears also, from the sixth chapter of Ezra, and from the ninth chapter of Nehemiah, that copies of the Law were dispersed among the people. It is unnecessary, therefore, to suppose, with some of the ancient fathers, such as Tertullian, Clemens Alexandrinus, Basil, &c. that Ezra restored the Scriptures by a divine revelation, after they had been lost and destroyed in the Babylonish captivity. For this opinion they had no other authority than the fabulous relation which occurs in the 14th chapter of the second apocryphal book of Esdras; a book too absurd for the Romanists themselves to admit into their canon. The whole which Ezra did may be comprized in the following particulars. He collected as many copies of the sacred writings as he could find, and compared them together, and out of them all, formed one complete copy, adjusted the various readings, corrected the errors of transcribers, and as some say, annexed the "Keri chetibs," which are found in the margins of the ancient MSS. He likewise made additions in several parts of the different books which appeared to be necessary for the illustration, correction, and completion of them. To this class of additions, we may refer the last chapter of Deuteronomy, which, as it gives an account of the death and burial of Moses, and of the succession of Joshua after him, could not have been written by Moses himself. Under the same head have also been included many other interpolations in the Bible, which create difficulties that can never be solved without allowing them; as in Gen. xii. 6. xxii. 14. xxxvi. 3. Exod. xvi. 35. Deut. ii. 12. iii. 11. 14. Prov. xxv. 1. The interpolations in these passages are ascribed by Prideaux to Ezra; and others which were afterwards added he attributes to Simon the Just. Ezra also changed the old names of several places that were become obsolete, putting instead of them the new names by which they were at that time called; instances of which occur in Gen. xiv. 4, where Dan is substituted for Laish, and in several places in Genesis, and also in Numbers, where Hebron is put for Kirjath Arba, &c. He likewise wrote out the whole in the Chaldee character, changing for it the old Hebrew character, which hath since that time been retained only by the Samaritans, and among whom it is preserved even to this day. In the church of Dominic, in Bononia, there is said to be a copy of the Hebrew Scriptures, preserved with great care, which they pretend to be the original copy written by Ezra himself, and for which great sums have been occasionally borrowed by the Bononians upon the pledge of it, and which have again been paid for its redemption. This copy is written in a
very

very fair character upon a sort of leather, and made up in a roll, according to the ancient manner; but as it has the vowel points annexed, and the writing is fresh and fair, without any visible decay, its antiquity is very justly derived, and its novelty is unquestionable. Bishop Pocock, in his *Travels*, vol. i. p. 28. mentions a MS. Bible, preserved at Cairo, in Egypt, which is said to be written by Ezra.

Dapin says, that Nehemiah had a great hand in compiling this canon; for proof of which he refers to the letter of the Jews of Jerusalem written to the Jews of Egypt, mentioned in the beginning of the second book of Maccabees, in which, it is said, that Nehemiah had collected the books of the Kings, of the Prophets, and of David. It is said that this canon was then approved by the grand sanhedrim, the great synagogue or council of seventy, and published by its authority. It is, however, says Dapin, more apparent that about that time the number of the sacred books was fixed among the Jews by a canon, which the whole Jewish nation received and followed; so that they looked no longer upon such books as sacred and divinely inspired, which were not contained in this canon. The canon of the whole Hebrew bible seems, says Kennicott, to have been closed by Malachi, the latest of the Jewish prophets; at about 50 years after Ezra had collected together all the sacred books which had been composed before and during his time. Prideaux supposes the canon was closed by Simon the Just, about 150 years after Malachi. But, as his opinion is founded merely on a few proper names at the end of two genealogies (1 Chron. iii. 19. and Neh. xii. 22.), which few names might very easily be added by a transcriber afterwards; it is more probable, as Kennicott thinks, that the canon was finished by the last of the prophets, about 400 years before Christ. The books of the Old Testament having been settled by Ezra, Nehemiah, Haggai, Zephaniah, and Malachi, were probably left perfect; completely repaired after the injuries of time during the captivity; and corrected from such errors as might have crept in from want of care in the transcriber. But the Hebrew text, thus left to posterity, does not seem to have continued long in the same condition. For the celebrated text, relative to mount Gerizim, was without doubt altered soon after the temple upon Gerizim was built. And as that corruption has been proved upon the Jews, the Jews therefore corrupted their Pentateuch, in this instance, probably between the years 400 and 300 before Christ. See PENTATEUCH.

It is an enquiry of considerable importance, in its relation to the subject of this article, what books were contained in the canon of the Jews. In the arrangement of Ezra these books were divided into three parts; 1st. The Law; 2dly. The Prophets; and 3dly. The *Cantabim*, or Hagiographa, i. e. the Holy writings; which division our Saviour himself has taken notice of (Luke xiv. 34.); meaning by the Psalms the whole third part, called the Hagiographa. In conformity to this division, Josephus (*Contra Apocriphos*, tom. ii. p. 441. distributis) the canonical books of the Jews into three classes. The first contained the five books of Moses; the second, thirteen historical and prophetic books, written from the time of the death of Moses to Artaxerxes; and the third, ten books of hymns and of morals; the whole number amounting to twenty-two. The first class comprehended Genesis, Exodus, Leviticus, Numbers, and Deuteronomy; the second in itself Job, Judges, Ruth, Samuel, Kings, Chronicles, Ezra with Nehemiah, Esther, Haggai, Jeremiah with Lamentations, Ezekiel, Daniel, and the 12 minor prophets; and the third class contained Job, the Psalms, Proverbs, and Ecclesiastes. It appears that the name of Solomon had no place in the list of the sacred writings drawn

up by Josephus. Others, however, have joined Ruth with Judges, referred Job to the second class, and introduced the Song of Solomon into the third class. Origen, Athanasius, Hilary, Gregory Nazianzen, Epiphanius, and Jerom, speaking of the books that are allowed by the Jews as sacred and canonical, agree in saying, that they are the same in number with the letters in the Hebrew alphabet, i. e. twenty-two, and reckon particularly those books which we have already mentioned; with respect to which they all concur, except in relation to the book of Esther. All of them place the book of Job and the Lamentations among the books contained in the canon of the Jews; but Athanasius and Gregory Nazianzen do not reckon the book of Esther among them, and distinguish Ruth from the book of Judges; whereas Origen, Hilary, Epiphanius, and Jerom, make only one volume of Ruth and Judges, and introduce the book of Esther into the number of the twenty-two books reckoned by the Jews as canonical. They who distinguished Ruth from the book of Judges, and the Lamentations from the prophecy of Jeremiah, reckoned up twenty-four of them. These books are disposed of in the following order: viz. 1st. The Law, containing, Genesis, Exodus, Leviticus, Numbers, Deuteronomy; 2dly. The writings of the prophets, divided into the former prophets and the latter prophets; those of the former being Joshua, Judges, Samuel, Kings, and the latter Isaiah, Jeremiah, Ezekiel, and the twelve minor prophets; 3dly. The Hagiographa, which are the Psalms, the Proverbs, Job, the Song of Solomon, or Song of Songs, or Canticles, Ruth, the Lamentations, Ecclesiastes, Esther, Daniel, Ezra, and the Chronicles. Under the name of Ezra is comprehended Nehemiah. However, this order hath not always been observed among the Jews, neither is it so now in all places; for in this respect there has been a great variety, not only among the Jews, but also among the Christians, Greeks as well as Latins. All these books were not received into the canon of the Holy Scriptures in the time of Ezra, for Malachi lived after him, and mention is made in Nehemiah of Jaddua as high priest, and of Darius Codomannus as king of Persia, who lived at least 100 years after his time; and in the third chapter of the first book of Chronicles, the genealogy of the sons of Zerubbabel is extended to as many generations as will bring it to the time of Alexander the Great, so that this book could not have been inserted in the canon till after his time. Accordingly, Prideaux supposes, that the two books of Chronicles, Ezra, Nehemiah, and Esther, as well as Malachi, were added in the time of Simon the Just, when he conceived the canon of the holy Scriptures was completed. (See above).

The five books of the Law are divided into 54 sections, which division is attributed to Ezra, and was intended for the use of their synagogues, and for the better instruction of the people in the law of God. For every sabbath one of these sections was read in their synagogues. They ended the sabbath with the last words of Deuteronomy on the sabbath of the feast of the tabernacles, and then began anew with the first section from the beginning of Genesis the next sabbath after, and so went round in this circle every year. The number of these sections was 54, because in their intercalated year (a month being then added), there were 54 sabbaths. On other years they reduced them to the number of the months which were in those years, by joining two months several times into one. For they held themselves obliged to have the whole law thus read over in their synagogues every year. Till the time of the persecution of Antiochus Epiphanius, they read only the Law; but being then prohibited from reading any more, they substituted in the room of the 54 sections of the Law, 54 sections out of

the Prophets, the reading of which they ever after continued. Thus, when the reading of the Law was restored by the Maccabees, the section which was read every sabbath out of the Law served for their first lesson, and the section out of the Prophets for their second lesson; and this practice was continued in the time of the apostles. Acts, xiii. 15. xiii. 27. These sections were divided into verses, called by the Jews "Pefukim," and they are marked out in the Hebrew Bible by two great points at the end of them, called from hence "Soph-Pafuk," *i. e.* the end of the verse. This division, if not made by Ezra, is very ancient; for when the Chaldee came into use in the room of the Hebrew language, after the return of the Jews from their captivity in Babylon, the Law was read to the people first in the Hebrew language, and then rendered by an interpreter into the Chaldee language; and this was done period by period. To distinguish these periods was an object of importance; and hence arose the division into verses, which was first applied to the Law, and afterwards to the Prophets and Hagiographa. The manner by which these divisions, or verses, are now distinguished is by the "Soph-Pafuk;" but it is not certain that this was the ancient method. Prideaux apprehends, that the Pefukim, or verses of the Hebrew Bibles, were anciently distinguished in the same manner as the "Stichi" afterwards were in the Greek Bibles. The manner of their writing these stichi at first was to allow a line to every stichus, and there to end the writing, where they ended the stichus, leaving the rest of the line a void break. But this mode occasioning a waste of parchment, on which their books were written, and making their bulk too heavy; in order to avoid these inconveniences, they afterwards put a point at the end of every stichus, and continued the writing without leaving any blank. In the Hebrew Bibles they adopted the same mode, and put the two points, called "Soph-Pafuk," at the place where one verse ended, and continued the writing of the next verse in the same line, without leaving any void space. The division of the holy Scriptures into chapters is of a much later date. The Psalms, indeed, appear to have been always divided as they are at present. Acts, xiii. 33. But as to the rest of the Bible, the present division into chapters was unknown to the ancients. See CHAPTER AND CONCORDANCE.

Besides those books which were received into the canons of the books of the Old Testament, and those that have been deemed apocryphal, there are several others which are cited in the Old, and also in the New Testament, which seem either to have been lost, or excluded by Ezra from his canon. Of such books are the books "of the wars of the Lord," cited Numb. xxi. 4. but it does not appear that in this place any book is mentioned, "of the Covenant," of which it is said mention is made Exod. xxiv. 7. but evidently referring to the laws received by Moses from the hand of God, related in the preceding chapters; the "book of the Lord," mentioned II. xxxiv. 16. which does not seem to be any particular book; "the book of Jasher, or the upright," cited in Joshua, x. 13. and 2 Sam. i. 18. supposed by some to be an historical book, but more probably consisting of hymns and songs; and "the books of Nathan (1 Chron. xxix. 29. 2 Chron. ix. 29.) of Gad, (1 Chron. xxix. 29.) of Shemaiah, (2 Chron. xii. 15.) of Iddo, (2 Chron. ix. 29. xii. 15. xiii. 22.) of Abijah, (2 Chron. ix. 29.) and of Jehu," (2 Chron. xx. 34.), which were memoirs composed by those prophets, or rather prophecies, which contained a part of the history. The same may be said of the book of the "Journals or Chronicles" of the kings of Judah or of Israel; which are different from the Paralipomena, or Chronicles; the book of "Samuel the Seer," cited in the

last chapter of the first book of Chronicles; the discourses of Hoseah, cited 2 Chron. xxxiii. 18, 19. the "Acts of Uzziah," mentioned 2 Chron. xxvi. 22. the "three thousand and Proverbs, written by Solomon," (see 1 Kings, iv. 32.); "a thousand and five Songs," &c. composed by the same author, and mentioned in the same place. Jeremiah speaks of a volume of prophecies which he had dictated to Baruch, supposed by some to be the Lamentations. (See BARUCH). Besides these books that are lost, there are others, not included in the canon of the Old Testament, which are still extant; such as the "Prayer of king Manasseh, when captive at Babylon," cited 2 Chron. ch. xxxiii. "the third and fourth books of Esdras;" "the third and fourth books of the Maccabees;" "the genealogy of Job," and "a speech of Job's wife," annexed to the Greek edition of the book of Job; "a Psalm," affixed to the Greek edition of the Psalms; "the book of Enoch," not entire, cited by several of the fathers, and regarded by them as apocryphal, and referred to by Jude, v. 14. the book of the "Assumption of Moses," and his "Testament," placed by St. Athanasius among the apocryphal books; "the Assumption, Apocalypse, or Secrets of Elijah," cited by Origen; and a number of others forged by the Jews, and fathered on the Patriarchs. See NEW TESTAMENT.

It may not be improper to refer, in one view, the books of the Old and New Testaments to their proper authors. We may suppose then, without ascending to the region of conjecture, and tracing the origin of any books, or parts of books of the Bible to patriarchal times, that the Pentateuch consists of the writings of Moses, put together, perhaps, by Samuel, with a very few additions; that the books of Joshua and Judges were, in like manner, collected by him; and the book of Ruth, with the first part of the first book of Samuel, written by him; that the latter part of the first book of Samuel, and the second book, were written by the prophets who succeeded Samuel, *viz.* Nathan and Gad; that the books of Kings and Chronicles are extracts from the records of the succeeding prophets, concerning their own times, and from the public genealogical tables, made by Ezra; that the books of Ezra and Nehemiah are collections of like records, some written by Ezra and Nehemiah, and some by their predecessors; that the book of Esther was written by some eminent Jew, in or near the times of the transactions there recorded, perhaps Mordecai; the book of Job by Moses, or a Jew of an uncertain period; the Psalms by David, and other pious persons; the books of Proverbs and Canticles by Solomon; the book of Ecclesiastes by Solomon, or perhaps by a Jew of later times, speaking in his person, but not with an intention to make him pass for the author; the Prophecies by the prophets, whose names they bear; and the books of the New Testament by the persons to whom they are usually ascribed. See NEW TESTAMENT. There are many internal evidences, and in the case of the New Testament, many external evidences also, by which these books may be known to belong to the authors here named. Or, if there be any doubts, they are merely of a critical nature, and do not at all affect the genuineness of the books, or not alter, at least materially, the arguments that may be adduced in favour of their authenticity and authority. It is readily allowed, that objections have been made to the alleged authors of several of these books. Abenezra, followed by Hobbes, Pereira, Spinoza, and some others, deny the first five books to have been written by Moses. F. Simon, in particular, asserts, that the books, as we now have them, are not the originals, written by the inspired penmen, but abridgments of them, made in after-times by a kind of college, or order of public actuaries, or scribes,

scribes, appointed for that purpose. See PENTATEUCH, and each of the books of the Bible, under its proper title. See also NEW TESTAMENT.

The original language of the Old Testament was, without doubt, the old Hebrew, at least the greatest part of it; for all the books do not appear to have been written in the same language. Some chapters of Ezra and Daniel, (see EZRA and DANIEL,) are judged to have been composed in Chaldee; and it has been supposed, that other chapters of this latter writer, and also the apocryphal books of Maccabees, Wisdom, &c. were written in Greek; Tobit and Ecclesiasticus, either in Greek or Syriac. As for the New Testament, it was written in Greek, except the Gospel of St. Matthew, which is thought by some to have been composed in Hebrew. Some few have thought that the Gospel of St. Mark was written in Latin, and also the epistle to the Hebrews. See the Title of each Book, and TESTAMENT.

With regard to the style of the several writers of the Old and New Testament, there is a very considerable diversity. The style of Paul may be easily distinguished by its peculiarity from that of any other writer. A discerning reader will not easily confound the style of Luke with that of either of the evangelists, who preceded him, Matthew or Mark; nor would he be in any danger of mistaking the apostle John's diction for that of any other penman of the New Testament. The same difference of style will be discovered by one who is but moderately conversant with the Hebrew, in the writers of the Old Testament. In this we have a greater variety than in the New. Some of the books are written in prose, and some in verse; and in each the differences between one book and another are considerable. In the book of Job, for instance, the character of the style is remarkably peculiar. What can be more dissimilar in this respect, though both are excellent in their kind, than the towering flights of the sublime Isaiah, and the plaintive strains of the pathetic Jeremiah? In the several books of Scripture we can specify the concise style and the copious, the elevated and the simple, the aphoristic and the diffuse. This diversity in the diction of the sacred penmen is perfectly reconcileable with the idea of their inspiration; and in speaking on this subject, we should duly advert to the difference between the expression and the sentiment, and avoid confounding these two, as if they were the same, whereas they are widely different. The truths implied in the sentiments are essential, immutable, and have an intrinsic value; the words which compose the expression are in their nature circumstantial, changeable, and have no other value than what they derive from the arbitrary conventions of men. That the Holy Spirit would guide the minds of the sacred penmen in such a manner as to prevent their adopting terms unsuitable to his design, or which might obstruct his purpose; and that in other respects he would accommodate himself to their manner and diction, is both reasonable in itself, and rendered unquestionable by the works themselves, which have the like characteristic differences of style which we find in their composition. Can it be accounted more strange that the Holy Spirit should, by the prophet Amos, address us in the style of a shepherd, and by Daniel, in that of a courtier, than that by the one he should speak to us in Hebrew, and by the other in Chaldee? It is as reasonable to think that the Spirit of God would accommodate himself to the pronunciation and diction, as to the tone of voice and pronunciation of those whom he was pleased to enlighten; for it cannot be denied, that the pronunciation of one person in uttering a prophecy, might be more articulate, more audible, and more affecting than that of another; and in like manner, as one style has more harmony, elegance, and perspicuity than another. Castalio says justly, (Def. cont. Bezam.)

“Res dicat Spiritus, verba quidem et linguam loquenti aut scribenti liberam permittit; i. e. the Spirit dictates the things, leaving the words or language free to the speaker or writer. Jerom also observed a thousand years before, (Comment. in Epist. ad Gal. cap. i.) “Nec putemus in verbis Scripturarum evangelium esse, sed in sensu;” i. e. let us not imagine that the Gospel consists in the words of Scripture, but in the sense. To the same purpose is the observation of the ingenious and learned bishop Lowth, De Sacra Poesi, H. b. Præl. xvi.) “Hoc ita facis vatis tribuimus, ut nihil derogemus Divini Spiritus afflatui; etsi suam interea vim propriam cujusque Scriptoris natura atque ingenio concedamus; neque enim instinctu divino ita concitatur vatis animus, ut protinus obruatur hominis indoles: attolluntur et eriguntur, non extinguuntur aut occultantur naturalis ingenii facultates; et quamquam Mosis, Davidis, et Isaia, scripta semper spirant quiddam tam excelsum tamque caeleste, ut plane videantur divinitus edita, nihilo tamen minus in iis Mosem, Davidem, Isaian, semper agnoscimus;” i. e. we shall detract nothing from the dignity of that inspiration, which proceeds from higher causes, while we allow to the genius of each writer his own peculiar excellence and accomplishments. The Divine Spirit by no means takes such an entire possession of the mind of the prophet as to subdue or extinguish the character and genius of the man; the natural powers of the mind are in general elevated and refined; they are neither eradicated, nor totally obscured; and though the writings of Moses, of David, and of Isaiah, always bear the marks of a divine and celestial impulse, we may nevertheless plainly discover in them the particular characters of their respective authors. See INSPIRATION.

It must be allowed, that many circumstances concur to render the style both of the New Testament and of the Old; of the historical books, as well as of the prophetic and argumentative, generally obscure, and often ambiguous; although we ought not to admit the exaggerated representation of father Simon, (Hist. Crit. des V. T. liv. iii. c. 2.) with regard to the greater part of the Hebrew words, which, he says, are equivocal, and of course their signification altogether uncertain. The origin of this kind of statement must be sought in the author's attachment to tradition, rather than to that kind of scepticism with which he is charged by Bossuet, bishop of Meaux, and which tended to undermine Christianity itself. To any person who duly reflects, this father's representation must appear to be unfounded, or beyond all bounds hyperbolic. It is not just in its reference to the prophetic writings; and as to the historical books, they are, in general, remarkable for perspicuity. The first quality by which the sacred history is distinguished is simplicity, which arises from this property of the Hebrew language, the verbs of which have not, like Greek and Latin, a variety of moods and tenses, nor do they abound, like the modern languages, in auxiliaries and conjunctions. This quality very much conduces to the perspicuity of its style. Of this simplicity we have an example in the first paragraph of Genesis, consisting of five, not long, verses, and containing not fewer than eleven sentences, which are singularly simple; the substantives not being attended by adjectives, nor the verbs by adverbs, without synonyms, or superlatives, or any effort towards expressing things in a bold, emphatical, or uncommon manner. In the Pentateuch, there is also a simplicity of sentiment, arising from the very nature of the early and uncultivated state of society, about which its books are conversant, and this renders the narrative, in general, extremely clear and engaging. Besides the simplicity of structure, and the simplicity of sentiment, there is another species of simplicity, for which Scripture history is more remarkable than any other

other compositions of any language. This may be denominated simplicity of design. The subject of the narrative engrosses the attention of the writer, that he disappears, as it were, from the view of the reader. He introduces nothing as from himself; no opinions of his own, no remarks, conjectures, doubts, or inferences; no reasoning about the cause or the effects of what is related. He never interrupts his reader with the display, either of his talents or his passions: he makes no digressions; he draws no characters: he supplies us merely with naked facts, from which we are left to collect the character. We observe no attempt to shine by means of the expression, composition, or sentiments. Plainness of language is always preferred, because it is the most natural, the most obvious, and the best adapted to all capacities. In this last sort of singularity, for which Xenophon among the Greeks, and Cæsar among the Latins, have been recommended, our Lord's biographers particularly excel. With respect to the first species of simplicity, or that of structure, the difference of the genius of the Greek language from that of the Hebrew must, without doubt, occasion some difference in the manner of Matthew, Mark, Luke, and John, from that of Moses; but the identity of idiom still occasions a strong resemblance between them. If Genesis, therefore, may be justly said to possess the *first* rank for simplicity of composition in the sentences, the Gospels are certainly entitled to the *second*: and John and Matthew have it in a higher degree than Mark and Luke. As to the second species, or simplicity of sentiment, the change of times, which is very great, as well as the difference of subjects, would necessarily confer the first degree of it upon the former. But in simplicity of object or design, the evangelists, of all writers, sacred and profane, appear the foremost. Their manner is indeed, in some respects, peculiar and unrivalled. If we divert our attention from the historical, or narrative parts of the Bible, to the writings of the poets and prophets, we shall discover the animated, elegant, and sublime intermixed, as the subjects suggest, and the occasions require, with the simple and perspicuous. But for other particulars, in reference to this subject, see *STYLE and TESTAMENT*. See also the titles of the several books of the Bible, for the distinguishing character of their writers.

Having considered the appellations by which the Bible is distinguished, the books of which it consists, the time, and manner in which they were collected, their respective authors, and the language and style in which they were written, it may not be improper to subjoin a few observations on the genuineness and authenticity of the Scriptures, on their high original and divine authority, and on their great importance and utility.

It should here be considered, that the genuineness of the Scriptures proves the truth of the principal facts contained in them; to which purpose we may observe, that it is very rare to meet with any genuine writings of the historical kind, in which the principal facts are not true, unless it be in instances where both the motives which engaged the author to falsify, and the circumstances which gave some plausibility to the fiction, are apparent; neither of which can be alleged in the present case with any colour of reason. As this is rare in general, it is more rare, when the writer treats of things that happened in his own time, and under his own cognizance and direction, and communicates his history to persons under the same circumstances; all which may be said of the writers of the Scripture history. Besides, the great importance of the facts mentioned in the Scriptures makes it more improbable, that the several authors should either have attempted to falsify, or have succeeded in such an attempt. This is an argument for the truth of the facts, which proves

the genuineness of the books at the same time. However, the truth of the facts is inferred more directly from their importance, if the genuineness of the Scriptures be previously allowed. The same observation may be applied to the great number of particular circumstances of time, place, persons, &c. mentioned in the Scriptures, and to the harmony of the books with themselves, and with each other. These are arguments both for the genuineness of the books, and truth of the facts distinctly considered, and also arguments for deducing the truth from the genuineness. Moreover, if the books of the Old and New Testaments were written by the persons to whom they have been ascribed, i. e. if they be genuine, the moral characters of these writers afford the strongest assurance, that the facts asserted by them are true. The sufferings which several of the writers underwent both in life and in death, in attestation of the facts delivered by them, furnish a particular argument in favour of these facts. Again, the arguments here alleged for proving the truth of the Scripture history from the genuineness of the books, are as conclusive in respect of the miraculous facts, as of the common ones. It may also be observed, that if we allow the genuineness of the books to be a sufficient evidence of the common facts which they record, the miraculous facts must also be allowed, from their close connection with the others. It is necessary to admit both or neither. We cannot conceive, that Moses should have delivered the Israelites from their slavery in Egypt, or conducted them through the wilderness for forty years, at all, in such manner as the common history represents, unless we suppose the miraculous facts intermixed with it to be true also. In like manner, the fame of Christ's miracles, the multitudes which followed him, the adherence of his disciples, the jealousy and hatred of the chief priests, scribes and pharisees, with many other facts of a common nature, are impossible to be accounted for, unless we allow, that he did really work miracles. And the same observations hold, in general, of the other parts of the Scripture history. We might urge a particular argument in favour of the miraculous part of the Scripture history, that may be deduced from the reluctance of mankind to receive miraculous facts; which would put the writers and readers very much upon their guard, and would operate as a strong check upon the publication of a miraculous history at or near the time when the miracles were said to be performed; and thus it would serve as a strong confirmation of such an history, if its genuineness be previously granted. The converse of the proposition, now stated and explained, is also true: i. e. if the principal facts mentioned in the Scriptures be true, they must be genuine writings.

In connection with the preceding proposition we may observe, that the genuineness of the Scriptures proves their divine authority. Porphyry in effect acknowledges the truth of this proposition, in its reference to the book of Daniel, by being unable to devise a method of invalidating its divine authority implied in the accomplishment of the prophecies which it contains, without asserting, that they were written after the event, or that they were forgeries. Many of the other books of the O. and N. Testaments have unquestionable evidences of the divine foreknowledge, if they be allowed genuine: such are those supplied by Moses's prophecy concerning the captivity of the Israelites, or of a state not yet erected; Isaiah's concerning Cyrus; Jeremiah's concerning the duration of the Babylonish captivity; Christ's concerning the destruction of Jerusalem, and the captivity that was to follow; St. John's concerning the great corruption of the Christian church; and Daniel's concerning the fourth empire in its declension; which last was extant in the time of Porphyry, at least, that is, before the events which

it represents. The truth of the proposition might also be argued from the sublimity and excellence of the doctrines contained in the Scriptures; in no respect suiting the supposed authors, or the ages in which they lived, their education or occupation; so that, if they were the real authors, we are under the necessity of admitting the divine assistance. The converse of this proposition, viz. that the divine authority of the Scriptures infers their genuineness, will be readily and universally acknowledged. And there are several evidences for the Divine authority of the Scriptures, which are direct and immediate, and prior to the consideration both of their genuineness, and of the truth of the facts contained in them. Moreover, the truth of the principal facts contained in the Scriptures proves their divine authority. Such is the frame of the human mind, that the Scripture history, allowed to be true, must convince us that Christ, the prophets, and the apostles, were endued with a power greater than human, and acted by the authority of a Being of the highest wisdom and goodness. But if natural religion be previously established, the truth of the principal facts of the Scriptures proves their divine authority in a more easy and more convincing manner: for the knowledge and power manifested by Christ, the prophet, and apostles, and also their good moral characters, shew them to be in an eminent manner the children, servants, and messengers of him, who is previously acknowledged to be infinite in power, knowledge, and goodness; and they actually lay claim to a divine mission, which claim cannot be thought a fiction, if we admit their credentials: or, in other words, the truth of the principal facts mentioned in the Scriptures proves the divine mission of Christ, the prophets, and apostles, that is, the divine authority of the Scriptures.

By such mode of reasoning it is shewn, that the genuineness of the Scripture, the truth of the principal facts contained in them, and their divine authority, appear to be so connected with each other, that any one being established upon independent principles, the other two may be inferred from it. On the subject of the inspiration of the Scriptures, see INSPIRATION.

Another argument in proof of the genuineness of the books of the Old and New Testaments, and of the truth of the principal facts contained in them, may be deduced from the manner in which they have been transmitted down from one age to another; in such a manner, in which all other genuine books and true histories have been conveyed down to posterity. As the writings of the Greek and Roman writers were commonly transmitted to be translated to them by their scholars in a constant succession, from the times when the respective authors lived, to have the books of the Old Testament by the Jewish nation, and those of the New by the Christian; and that an additional evidence in the last case, that the primitive Christians were not a distinct nation, but a great multitude of people spread through all the nations of the Roman empire, and even extending itself beyond the bounds of that empire. As the Greek and Roman always believed the principal facts of their historical books, so the Jews and Christians believed, and never ceased to have doubted of the truth of any part of them. In short, whatever can be said of the traditional authority due to the Greek and Roman writers, for their writings, and for the reputation of greater wisdom, may be said for the Jewish and Christian. Now, as all historians perform about the book usually ascribed to the Greek and Roman historians, philosophers, &c. to be genuine, and the principal facts related or alluded to in them to be true, and that one chief evidence for this is the general traditionary authority; they ought, therefore, to pay the same regard to the books of the Old and New Testaments, since there are the same,

or greater reasons for it. Besides, these traditionary evidences are sufficient, and we thus obtain a real argument, as well as one "ad hominem," for receiving books thus handed down to us. For it is not conceivable, that whole nations should either be imposed upon themselves, or concur to deceive others, by forgeries of books or of facts. These books and facts null, therefore, in general, be genuine and true; and it is a strong additional evidence of this, that all nations must be jealous of forgeries for the same reasons that we are. On the conclusiveness of this argument, as it relates to miracles; see MIRACLE.

We may proceed to observe further, that the great importance of the histories, precepts, promises, threatenings, and prophecies contained in the Scriptures, are evidences both of their genuineness, and of the truth of the principal facts mentioned in them. The history of the creation, fall, deluge, longevity of the patriarchs, dispersion of mankind, calling of Abraham, descent of Jacob with his family into Egypt, and the precepts of abstaining from blood, and of circumcision, were of such concern, either to mankind in general, or to the Israelites in particular, and some of them of so extraordinary a nature, as that it could not be a matter of indifference to the people amongst whom the account given of them in Genesis was first published, whether they received them or not. On the supposition that this account was first published amongst the Israelites by Moses, and then confirmed by clear, universal, uninterrupted tradition, it will be easy to conceive, how it should be handed down from age to age amongst the Jews, and received by them as indubitable. But supposing the account to be false, or that there were no such vestiges and evidences of these histories and precepts, it will be difficult to conceive how this could have happened, let the time of publication be what it may. If early, the people would reject at once the account for want of a clear tradition; if late, it would be natural to enquire how the author was informed of things never known before to others. If the account was delivered, as having been communicated to Moses by divine revelation, which is not very consistent with the numerous references that occur in Genesis to the existing vestiges of the things related, his fictitious credentials would thus be embarrassed, and his contemporaries would be induced very particularly to examine them. As to other cosmogonies and theogonies current among Pagans, which are evident fictions; they furnish no just objection against the Mosaic history; because they were generally regarded merely as amusing fictions; and yet they concealed in figures, or expressed in plain words some truths, which agree with the book of Genesis, and afford a strong presumptive evidence in favour of this book. With respect to the law of Moses, this was extremely burdensome, expensive, and severe, particularly in its reference to the crime of idolatry, to which mankind were then extravagantly prone; and it was absurd, according to human judgment, in the instances of prohibiting their furnishing themselves with horses for war, and commanding all the males of the whole nation to appear at Jerusalem three times a year. Nevertheless, it claims a divine authority, and applies to facts of the most notorious kind, and to customs, and ceremonies of the most peculiar nature, as the memorials of these facts. Can we then conceive, that any nation, with such motives to reject, and such opportunities of detecting, the forgery of the books of Leviticus, Numbers, and Deuteronomy, should yet receive them, and submit to this heavy yoke? That the Jews did submit to the law of Moses in these circumstances, is evident from the books of the Old and New Testaments, if we allow them the least truth and genuineness, or even from profane writers; and from the present de-

servance of it by the Jews scattered through all the kingdoms of the world. Should it be said, that other nations have ascribed divine authority to their lawgivers, and submitted to very severe laws, it may be alleged in reply, that the pretences of lawgivers amongst the Pagans to inspiration, and the submission of the people, may be accounted for from their peculiar circumstances at the time, without recurring to real inspiration; and more especially, if we admit the patriarchal revelations related by Moses, and his own divine legation, as heathen lawgivers copied after these, and hence we derive a strong argument in their favour. Besides, no instance occurs among the Pagans, of a body of laws framed at once and remaining invariable; whereas the body politic of the Israelites assumed a complete form at once, and has preserved it with little variation, to the present time, and under many external disadvantages; thus supplying us with an instance altogether without parallel, and shewing the high opinion which they entertained of the great importance of their law. In short, of all the fictions or forgeries, that can happen among any people, the most improbable is that of the Jewish body of civil laws, and it seems to be utterly impossible in the case of the law of Moses.

If we further examine the history contained in the books of Joshua, Judges, Ruth, Samuel, Kings, Chronicles, Ezra, and Nehemiah, and extending from the death of Moses to the re-establishment of the Jews after the Babylonish captivity by Ezra and Nehemiah, we shall find a variety of important facts, most of which must be supposed to leave such vestiges of themselves, either external and visible, or internal in the minds and memories of the people, as would verify them if true, or cause them to be rejected, if false. The conquest of the land of Canaan, the division of it, and the appointment of cities for the priests and Levites by Joshua; the frequent slaveries of the Israelites to the neighbouring kings, and their deliverance by the judges; the creation of a kingdom by Samuel; the translation of this kingdom from Saul's family to David, with his conquests; the glory of Solomon's kingdom; the building of the temple; the division of the kingdom; the idolatrous worship set up at Dan and Bethel; the captivity of the Israelites by the kings of Assyria; the captivity of the Jews by Nebuchadnezzar; the destruction of their temple; their return under Cyrus, rebuilding the temple under Darius Hystaspis, and re-establishment under Artaxerxes Longimanus, by Ezra and Nehemiah;—these events are some of them the most glorious, and some of them the most reproachful, that can happen to any people. How can we reconcile forgeries of such opposite kinds, and especially as they are interwoven together by various complicated and necessary connections, which do not admit of separation? The facts, indeed, are of such importance, notoriety, and permanency in their effects, that no particular persons among the Israelites could first project the design of feigning them, that their own people would not concur with such a design, and that neighbouring nations would not permit the fiction to pass. Nothing but the invincible evidence of the facts, here alleged, could induce a jealous multitude amongst the Israelites or neighbouring nations to acquiesce. This must be acknowledged upon the supposition that the several books were published in or near the times when the facts that are recorded in them happened. But suppose all these historical books forged by Ezra;—the hypothesis is evidently impossible. Things so important and notorious, so honourable and so reproachful to the people, for whose sake they were forged, would have been rejected with the utmost indignation, unless there were the strongest and most genuine traces of these things already amongst the people. They must therefore, in part at least, be true. If it be said

that additions were made by Ezra; these additions must have been either of important or trivial matters. On the first supposition, the difficulty already stated recurs; and if the important facts are true, what possible motive could have induced Ezra to make additions of no importance? Besides, if any ancient writings were extant, Ezra must either copy after them, which destroys the present supposition; or differ from and oppose them, which would betray him. If there were no such ancient writings, the people would be led to enquire with regard to matters of importance, for what reason Ezra was so particular in things of which there was neither any memory, nor account in writing. Should it be said, that the people did not regard what Ezra had thus forged, this reduces the subject in question to matters of small, or of no importance. Besides, why should Ezra write, if no one would read, or regard? Farther, Ezra must have had, like other men, friends, enemies, and rivals; and some, or all of these, would have been a check upon him, and a security against him in matters of importance. If we suppose these books, instead of having been forged at once, to have been forged successively, at the interval of one, two, or three centuries after the facts related, we shall involve ourselves in the same or similar difficulties. Upon the whole, then, we may conclude, that the forgery of the annals of the Israelites appears to be impossible, as well as that of the body of their civil laws. It is needless to examine the books of Esther, Job, the Psalms, Proverbs, Ecclesiastes, and Canticles; and we might proceed to the Prophecies. But this subject will be resumed under the article PROPHECY. For the importance of the subjects, comprehended in the books of the New Testament; see TESTAMENT, and CHRISTIANITY.

We shall here subjoin some general evidences in attestation to the importance of the books of Scripture. That Jews and Christians have thought their sacred books very highly important, most genuine, and true, appears from the persecutions and sufferings which they have undergone on account of their attachment to them, and because they would not be prevailed upon to surrender them. The preservation of the law of Moses, probably the first book written in any language, whilst many others of a later date have been lost, shews the great regard that has been paid to it; and from this circumstance we may infer, that this and the other books of the Old Testament have been preserved on account of their importance, or from some other cause, equally evincing their genuineness and truth. The great importance of these books appears also from the many early translations and paraphrases of them; and these translations and paraphrases seem to correct errors that are unavoidable in the lapse of time, and to secure their integrity and purity. The hesitation and difficulty with which some few books of the New Testament were received into the canon, shew the great care and concern of the primitive Christians about the canon, and the high importance of the books admitted into it; and afford a strong evidence of their genuineness and truth. The same observation is in a degree applicable to the Jewish canon. Moreover, the religious hatred and animosity which subsisted between the Jews and Samaritans, and between several of the ancient sects among the Christians, convince us of what importance they all thought their sacred books, and disposed them to watch over one another with a jealous eye.

Farther, the genuineness of the books of the Old and New Testaments may be evinced from the language, style, and manner of writing used in them. The Hebrew language, in which the Old Testament was written, being the language of an ancient people, who had little intercourse with their neighbours, would not change so fast as modern languages have

have done, since different nations have been variously blended with one another by the extension of trade, arts, and sciences; and yet some changes must have occurred in the interval that elapsed between the time of Moses and that of Malachi. The Biblical Hebrew corresponds so exactly to this criterion, as to afford a considerable argument in favour of the genuineness of the books of the Old Testament. Besides, these books have too great a diversity of style to be the work of either one Jew, or of any set of contemporary Jews. If they be forgeries, there must have been a succession of impostors in different ages, who concurred in the same iniquitous design. Again, the Hebrew language ceased to be spoken, as a living language, soon after the time of the Babylonish captivity; and it would be difficult or impossible to forge any thing in it, after it became a dead language. Hence it appears, that all the books of the Old Testament must be nearly as ancient as the Babylonish captivity; and as they could not all be written in the same age, some must be much more ancient, and this would reduce us to the necessity of supposing a succession of conspiring impostors. Moreover, there is, as we have already observed, a simplicity of style, and an unaffected manner of writing, in all the books of the Old Testament, which is a strong evidence of their genuineness. The style of the New Testament, in particular, is not only simple and unaffected, but perfectly adapted to the time, places, and persons. To which we may add, that the narrations and precepts of both the Old and New Testament are delivered without hesitation; the writers teaching as having authority; and this circumstance is peculiar to those, who unite with a clear knowledge of what they deliver, a perfect integrity of heart.

Another argument for the genuineness and truth of the Scriptures, is supplied by the very great number of particular circumstances of time, place, persons, &c. mentioned in them. It is needless to recount these; but they are incompatible with forged and false accounts, which do not abound in such particularities, and the want of which furnishes a suspicion to their discredit. Compare, in this respect, Manetho's account of the dynasties of Egypt, Ctesias's of the Assyrian Kings, and those which the classical chronologers have given of the ancient kingdoms of Greece, which are defective in such particulars, with Thucydides's history of the Peloponnesian war, and Caesar's of the war in Gaul, in which they occur, and the difference will be sufficiently apparent. Dr. Paley's admirable treatise, entitled "Horæ Paulinæ," affords very valuable illustrations of this argument as it respects the genuineness of the books of the New Testament.

The agreement of the Scriptures with history, natural and civil, is a farther proof of their genuineness and truth. The history of the fall agrees in an eminent manner both with the obvious facts of labour, sorrow, pain, and death, with what we see and feel every day, and with all our philosophical enquiries into the frame of the human mind, the nature of social life, and the origin of evil. Natural history bears a strong testimony to Moses's account of the deluge. Civil history affords many evidences, which corroborate the same account. (See DELUGE.) The Mosaic account of the confusion of languages, of the dispersion of Noah's sons, and of the state of religion in the ancient world, is not only rendered probable, but in a very high degree established, by many collateral arguments. See *CONFUSION of Languages, DISPERSION of Mankind, IDOLATRY, SACRIFICE, &c.*

The agreement of the books of the Old and New Testaments, with themselves and with each other, affords an argument both of their genuineness and truth. The laws of the Israelites are contained in the Pentateuch, and referred to, in

a great variety of ways, direct and indirect, in the historical books, in the Psalms, and in the Prophecies. The historical facts also in the preceding books are often referred to in those that succeed, and in the Psalms and Prophecies. In like manner, the gospels have the greatest harmony with each other, and the epistles of St. Paul with the Acts of the Apostles; and, indeed, there is scarcely any book of either the Old or New Testament, which may not be shewn to refer to many of the rest, in one way or other. For the illustration of this argument, let us suppose that no more remained of the Roman writers than Livy, Tully, and Horace, would they not by their references to the same facts and customs, by the sameness of style in the same writer, and difference in the different ones, and numberless other such like circumstances of critical consideration, prove themselves, and one another to be genuine, and the principal facts related, or alluded to, to be true? Whoever will apply this reasoning to the present case will perceive, that the numberless minute, direct, and indirect agreements and coincidences, that present themselves to all diligent readers of the Scriptures, prove their truth and genuineness beyond all contradiction. See *ACTS, EPISTLES, and TESTAMENT.*

The harmony and agreement of the several writers of the Old and New Testament appear the more remarkable, when it is considered that their various parts were penned by several hands in very different conditions of life, from the throne and sceptre down to the lowest degree, and in very distant ages, through a long interval of time; which would naturally have led a spirit of imposture to have varied its schemes, and to have adapted them to different stations in the world, and to the different vicissitudes of every age. David wrote about 400 years after Moses, and Isaiah about 250 after David, and Matthew more than 700 years after Isaiah. And yet these authors, with all the other prophets and apostles, write in perfect harmony, confirming the authority of their predecessors, labouring to reduce the people to the observance of their instructions, and loudly exclaiming against the neglect and contempt of them, and denouncing the severest judgments against such as continued disobedient. Consequently, as the writers of the Holy Scriptures, though they all claim a divine authority, yet write in perfect connection and harmony, mutually confirming the doctrine and testimony of each other, and concurring to establish the very same religious truths and principles, it is a strong proof that they all derived their instructions from the same fountain, the wisdom of God, and were indeed under the direction and illumination of the same spirit. This leads us to add, that the unity of design, which appears in the dispensations recorded in the Scriptures, is an argument not only of their truth and genuineness, but also of their divine authority. In order to perceive the force of this argument, it is only necessary to inquire what this design is, and how it is pursued by the series of events and divine interpositions, recorded in the Scriptures. (See *DISPENSATION.*) We may further add, that divine communications, miracles, and prophecies, recorded in Scripture, are agreeable to natural religion, and even seem to be necessary in the infancy of the world. (See *MIRACLE, PROPHECY, and REVELATION.*) It should also be considered, that the historical evidences in favour of the genuineness, truth, and divine authority of the Scriptures, do not become less from age to age; but, on the contrary, it may rather be presumed, that they increase. See the three great concurring events of printing, the reformation of religion in these western parts, and the restoration of letters, so many more evidences and coincidences have been discovered in favour of the Jewish and Christian histories, as may serve, in some measure, to supply the want of these

those that have been lost in the preceding times; and as this improvement of the historical evidences is likely to continue, there is great reason to hope, that they will grow every day more and more irresistible to all candid, serious inquirers.

The moral characters of Christ, the prophets, and the apostles, prove the truth and divine authority of the Scriptures. The characters of the persons who are said in the Scriptures to have had divine communications, and a divine mission, are so much superior to the characters that occur in common life, that we can scarcely account for the more eminent single ones, and much less so for so large a succession of them, continued through so many ages, without allowing the divine communications and assistance, which they allege. Notwithstanding considerable imperfections that pertained to many of these eminent persons, and the heinous occasional offences chargeable upon some of them, yet the impartial reader should consider, whether the prophets, apostles, &c. were not so much superior, not only to mankind at an average, but even to the best men among the Greeks and Romans, as is not fairly to be accounted for by the mere powers of human nature. If this statement should be disputed, their characters, however, are too good to allow the supposition of an impious fraud and imposture, which must have been the case if they had not divine authority. Besides, it should be recollected, that the undisguised and impartial manner in which the imperfections and faults of the eminent persons mentioned in Scripture are related, furnishes a remarkable additional evidence for the truth of such parts of the Scripture history in which such relations occur, besides such evidences as extend to the whole.

The excellence of the doctrine contained in the Scriptures is an additional evidence of their authority. This argument has great force independently of all other considerations. Suppose, for instance, that the author of the gospel, which goes under the name of St. Matthew, was not known, and that it was unsupported by the writers of the primitive times; yet such are the unaffected simplicity of the narrations; the purity of the doctrine, and the sincere piety and goodness of the sentiments, that it carries its own authority with it. The same observation is applicable in general to all the books of the Old and New Testaments: so that if there was no other book in the world besides the Bible, a man could not reasonably doubt of the truth of revealed religion. If all other arguments were set aside, we may conclude from this single consideration, that the authors of the books of the Old and New Testaments, whoever they were, cannot have made a false claim to divine authority. The Scriptures contain doctrines concerning God, Providence, a future state, the duty of man, &c. far more pure and sublime than can in any way be accounted for from the natural powers of men, so circumstanced as the sacred writers were. Let the reader consider whether it can be reasonably supposed, that Jewish shepherds, fishermen, &c. should, both before and after the rise of the heathen philosophy, so far exceed men of the greatest abilities and accomplishments in other nations, by any other means than divine communications. Indeed, no writers, from the invention of letters to the present times, are equal to the penmen of the books of the Old and New Testaments in true excellence, utility, and dignity; and this is surely such an internal criterion of their divine authority, as ought not to be resisted.

The many and great advantages which have accrued to the world from the Patriarchal, Judaical, and Christian relations, prove the divine authority of the Scriptures. These advantages relate partly to the knowledge, and partly to the practice of religion. The internal worth and excellence of the Scriptures, as containing the best principles of know-

ledge, holiness, consolation and hope, and their consequent utility and importance in a moral and practical view, fully and directly demonstrate their divine original. The wonderful nature, and superior excellence, of the attempt made by Christ and his apostles, for reforming mankind, and making them happy in a future state, are evidences of their divine authority; which is farther illustrated and confirmed by the manner in which the love of God and of our neighbour is taught and inculcated in the Scriptures. This may also be inferred from the doctrine of the necessary subserviency of pain to pleasure, and from the mutual instrumentality of beings to the happiness and misery of each other, unfolded in the Scriptures. The divine authority of the Scriptures may be farther deduced from the superior wisdom of the Jewish laws, considered in a political light, and from the exquisite workmanship manifested in the tabernacle and the temple. The time and manner in which the Scriptures were written and delivered to the world, furnish arguments for their divine authority; nor is the want of universality in the publication of revealed religion any just objection to it. The exclusion of all great degrees of enthusiasm and imposture from the characters of Christ, the prophets, and apostles, prove their divine authority; and it may be also inferred, from the reception which Christ, his forerunners and followers, with their doctrines, have met with in all ages. See these arguments stated, illustrated, and applied at large in Hartley's *Observations on Man*, p. 350—421. See also on the subject of this article, *Prideaux's Conn.* vol. ii. 475—497, 8vo. Dupin's *Hist. of the Canon.* ch. i. and ii. Kenicott's state of the printed Hebrew text of the Old Testament, *diff.* ii. p. 295, &c. and *Dissertatio Generalis*, annexed to the second volume of his *Hebrew Bible*. Taylor's *Scheme of Scripture Divinity*, ch. 39. ch. 40.

The Jews, at first, were very reserved in communicating their Scriptures to strangers: despising and shunning the Gentiles, they would not disclose to them any of the treasures concealed in the Bible. We may add, that the people bordering on the Jews, as the Egyptians, Phœnicians, Arabs, &c. were not very curious to know the laws or history of a people, whom in their turn they hated and despised. Their first acquaintance with these books was not till after the several captivities of the Jews, when the singularity of the Hebrew laws and ceremonies induced several to desire a more particular knowledge of them. Josephus (*Contr. Apion.* p. 1033.) seems surpris'd to find such slight footsteps of the Scripture history interspersed in the Egyptian, Chaldean, Phœnician, and Grecian histories; and accounts for it from this circumstance, that the sacred books were not as yet translated into Greek, or other languages, and consequently not known to the writers of those nations. The first version of the Bible was that of the LXX. into Greek, in the time of Ptolemy Philadelphus, about 280 years before Christ; though some maintain that the whole was not then translated, but only the Pentateuch; between which and the other books in the version of the LXX. critics find a great diversity in point of style and expression, as well as of accuracy. See SEPTUAGINT.

Various kinds of books have been composed on the Bible, either to explain the sense, or make its doctrine more obvious, to facilitate the remembrance of it, or to establish particular opinions from it; such as Introductions, Apparatuses, Summaries, Manuals, Histories, Expositions, Commentaries, Harmonies, &c.

Bibles are distinguished, according to their language, into Hebrew, Greek, Latin, Chaldee, Syriac, Arabic, Coptic, &c.: some account of each, and their several editions, &c. we shall here subjoin.

BIBLES, *Hebrew*, are either manuscript or printed. The best *manuscripts*: Bibles are those copied by the Jews of Spain. Those copied by the Jews of Germany are less exact, but more common. The two kinds are easily distinguished from each other; the former being in beautiful characters, like the Hebrew Bibles of Bomberg, Stephens, and Plantin; the latter in characters, like those of Maister, and Gryphus. F. Simon observes, that the oldest manuscript Hebrew Bibles are not above six or seven hundred years old; nor does rabbi Menaham, who quotes a vast number of them, pretend that any of them exceed six hundred years.

Dr. Kennicott, in his *Dissertatio Generalis*, annexed to his Hebrew Bible, p. 21. observes, that the most ancient MSS. were written between the years 900 and 1100; but though those that are the most ancient are not more than 800 or 900 years old, they were transcribed from others of a much more ancient date. The MS. preserved in the Bodleian library is no less than 800 years old. Another MS. not less ancient, is preserved in the Casarean library at Vienna. The same learned writer informs us, that almost all the Hebrew MSS. of the Old Testament, which are known at present, were written between the years 1000 and 1457; and hence infers, that all the MSS. written before the year 700 or 800, were destroyed by some decree of the Jewish senate, on account of their many differences from the copies then declared genuine. This circumstance is also alleged by Walton (*Prolegomena*, 4, 8.) as the reason why we have so few copies of the age of 500 years, and why even the copies of 700 or 800 years are very rare.

The Hebrew distinctions and denominations of the various parts of the Hebrew Bible, as they occur in the titles of the ancient MSS. will be easily understood by the following table of distribution.

		PENTATEUCH,	
P R O P H E T S,	Prior	}	Joshua
			Judges
	Posterior	}	Samuel
			Kings.
Major	}	Isaiah	
		Jeremiah	
Minor	}	Ezekiel.	
		Hosea, &c.	
		to	
		Malachi.	
C E T H U B I M,	}	}	Job
			Psalms
O R	}	}	Ruth
			Proverbs
H A G I O G R A P H A,	}	}	Ester
			Daniel
		}	Ecclesiastes
			Lamentations
		}	Solomon's Song.
			Chronicle.

Dr. Kennicott, by the industry of his research, has formed a catalogue of the titles and places of above 440 different MSS. of the whole, or of parts of the Hebrew Bible: a number about three times as great as that of the Greek MSS. of the New Testament, which have been collected at a vast expence, and collated with a truly laudable zeal. (See TESTAMENT.) Of these MSS. 54 are preserved in the Bodleian library at Oxford, and 13 in different colleges of the university; 4 are deposited in the public library at Cambridge, and 3 in different colleges; 27 are found in the British Museum; one in the Lambeth library; and one in the library of the Royal Society. The preceding MSS., with 7 copies of the Samaritan Pentateuch, amount to 110 copies, making 125 volumes. Other MS. copies are preserved at Alcalá, or Complutum in Spain, Altorf in Swabia, Amsterdam, Arshalt-Dessau, Augsburg, Baden,

Berlin, Berne, Besançon, Bologna, Brno in Silesia, Cnialong-fou in China, Cairo in Egypt, Cesena in Italy, Copenhagen, Dresden, Erfarth, Florence, Furth in Franconia, Hague, Hall, Hamburgh, Hanover, Heidelberg, Helmstadt, Hesse-Cassel, Holsa near Damascus, Iena, Königsberg, Leipzig, Leyden, Lyons, Mechlin in Flanders, Milan, Modena, Nuremberg, Padua, Paris, Pekin, Rome, Schaffhausen in Swisserland, Stralsburgh, Toledo, Trevigio near Venice, Turin, Venice, Vienna, Ulm in Swabia, Upsal, Utrecht, Wratislaw, Zerbst in Saxony, and Zurich. Besides these, there are others at Fez in Africa, Thessalonica in Greece, and Constantinople, Ethiopia, Malabar, and Cochinchina, at a small distance south of Cranganore, where are about 4000 Jews, who have a synagogue, in which are carefully kept their records, engraven on copper plates, and where, it is said, they can shew their history from Nebuchadnezzar to the present time. See the sequel of this article.

The most ancient printed Hebrew Bibles are those published by the Jews of Italy, especially of Pelaro and Bressa. Those of Portugal, also, printed some parts of the Bible at Lisbon before their expulsion.—This may be observed in the general, that the best Hebrew Bibles are those printed under the inspection of the Jews; there being so many minutiae to be observed, that it is scarcely possible for any other to succeed in it.

The first printed edition of the Hebrew Bible, or at least of that part of it, comprehending the prior prophets, was printed at Soncinum in 1486, according to Le Long (*Biblioth. Sacra.*); it contained also the posterior prophets, according to Wolfius (*Bib. Heb.* ii. 397.); and it seems to have made a first or a second part to the next we shall mention, or Dr. Pellet's, which is regularly the third. The edition presented by Dr. Pellet, in 1735, to the library of Eton college, being that of a third part of the Hebrew Bible, comprehending the Cethubim or Hagiographa, was printed at Naples in 1487. This whole edition was burnt by the Jews, excepting this copy, which had the singular good fortune of escaping the flames. It is printed on vellum, in two folio volumes, and has many readings different from all the other printed copies, and contrary to the Masora, which probably was one of the reasons for which the whole edition was destroyed. This edition is mentioned by Wolfius in his "*Bibliotheca Hebraea*," as formerly belonging to Schröder of Gluckstadt. The antiquity of this edition is argued from its being printed on vellum, as was the case with the first printed books, and from its having variations in the text, which are not found in any later edition. The first edition of the whole Hebrew Bible was printed at Soncinum in 1488, and is mentioned by Le Long, who says that it was printed by Abraham, the son of Rabbi Ithaim, or Chaim. Le Long and Wolfius affirm, that they saw an Hebrew Bible in 8vo. printed at Brescia in 1494.

In the beginning of the 16th century, Dan. Bomberg printed several Hebrew Bibles in folio and quarto, at Venice, most of which are esteemed both by the Jews and Christians: the first in 1518, (the dedication being dated in 1517 which is the least exact, and generally goes by the name of Felix Pratensis, the person who revised it, and who, as Hody says, (p. 461.) was "ex Judo Monachus." This edition contains the Hebrew text, the targum, and the commentaries of several rabbins. It is not known from what particular MSS. the Hebrew text of this edition was taken; but it agrees most with very late MSS. and such as were corrected according to the Masora. The editor, in his dedication to pope Leo, complains of the very corrupt state of the Hebrew MSS., and speaks of his having collated and corrected (probably by means of the Masora) many MSS. which were

used for this edition. At the same time that this edition of the Hebrew Bible was preparing at Venice, another edition of equal fame was preparing by cardinal Ximenes, at Complutum in Spain; and as these two capital editions were thus in the press at once, neither of them could be printed from the other. But as they were both printed by men who either were, or had been Jews, (see Wolfius, tom. ii. p. 339.) from such MSS. as were uniformly corrected by the same Masora, they would exhibit almost universally the same text. And that the Hebrew MSS. here used, had suffered this Masoretical castigation, is plain from the words of Ximenes in his dedication to pope Leo. This famous Bible was begun in 1502, and finished in 1517; but not published till 1522, and not sold publicly, says Michaelis, (Leet. New Test. § 33.) till 1524. In 1526 or 1528, the same Bomberg printed the folio Bible of the celebrated Rabbi Jacob Ben Chaim, with his preface, the Masoretical divisions, a preface of Aben Ezra, a double Masora, and several various readings. No one who duly considers the preface of this editor (printed by Kennicott, Diss. vol. ii. p. 229.) can possibly doubt his having published it, according to the copies most exactly corrected by that Masora, which he profoundly revered. In 1549, was published the second edition of B. Chaim's Bible, with the famous preface at the beginning; and of this edition Le Long says, "prestantissima est et omnium optima, juxta quam præsertim sequentes prodierunt." Wolfius gives it precisely the same character; but adds, that Conrade Zeltner blames B. Chaim for being so excessively devoted to the Masora. In 1572, was published the Royal, or Spanish Polyglott, in 8 volumes, printed at Antwerp; principally under the direction of Arias Montanus. It is not pretended, that the least correction was made in this edition of the Hebrew text; nor could it be expected from an editor who believed the perfection of the Hebrew text. The third edition of B. Chaim's Bible was printed in 1618; it is the same with the second, but much more correct. From the former editions it was, that Buxtorf, the father, printed his rabbinical Hebrew Bible at Basil, in 1619; which, though there are many faults in it, is more correct than any of the former. This was the fifth edition of B. Chaim's Bible, in which the Hebrew text was copied exactly from B. Chaim's second edition. In 1534, Sebastian Münster published a Hebrew and Latin Bible, in 2 vols. fol. at Basil, with the commentaries of the Rabbins, and some notes; and Elias Hutter printed a Hebrew Bible in large letters, at Hamburg, in 1587, fol. Robert Stephens's Hebrew Bible, with the Greek version from the Complutensian edition, the Latin vulgate, and another new Latin version, commonly called Vatablus's Bible, was printed in 1545. In 1623, appeared at Venice a new edition of the rabbinical Bible, by Leo of Modena, a rabbin of that city, who pretended to have corrected a great number of faults in the former edition; but, besides that it is much inferior to the other Hebrew Bibles of Venice with regard to paper and print, it has passed through the hands of the inquisitors, who have altered many passages in the commentaries of the rabbins. The rabbinical Bible of Bomberg and Buxtorf has been superseded by that of rabbi Moses, published at Amsterdam in 4 volumes folio, in 1724—1727. In 1641, was published, in 10 folio volumes, the Paris Polyglott, which, though it claims no merit from correcting the Hebrew text, will ever be honoured by men of true learning, for containing (besides the Syriac and Arabic versions) the first edition of the Samaritan pentateuch and its version, printed from MSS. brought into Europe between the years 1620 and 1630, and published by the learned Morinus, to whom the world is also indebted for many excellent remarks on the

Hebrew text, as well as on the Samaritan pentateuch. In 1657, was published the London Polyglott, under the direction of the eminently learned Brian Walton, in which, however, the Hebrew text is printed Masoretically; almost in an absolute agreement with the many former editions, and with the latest and worst MSS. Although the editor has shewn clearly, that the Jewish transcribers have made many mistakes, and that the MSS. have many true readings, where the printed text is erroneous; and though he speaks (Proleg. 4. 12.) of having supplied some things which were not in the Venice or Basil editions, yet the only supplement which he has made is restoring the two verses in Joshua, which had been arbitrarily expell'd by Masoretic authority. See POLY-GLOTT.

As to Hebrew Bibles in 4to. that of R. Stephens, in 4 vols. Paris, 1539—1544, is esteemed for the beauty of the characters; but it is very incorrect. Plantin also printed several beautiful Hebrew Bibles at Antwerp: one in eight columns, with a preface by Arias Montanus, in 1571, which far exceeds the Complutensian in paper and print, and contents; this is called the Royal Bible, *Biblia Regia*, because it was printed at the expence of Philip II. of Spain; another at Geneva, in 1619; besides many more of different sizes, with and without points. Manasseh Ben Israel, a learned Portuguese Jew, published two editions of the Hebrew Bible at Amsterdam; the one in 4to. in 1635, who tells us in the preface, that he had altered a few letters; and where the most corrected copies differed, he took refuge in grammar rules and the Masora; the other in 8vo. in 1639; the first has two columns, and for that reason is commodious for the reader. It is printed with points, in an elegant type, and has the Keri and Chetib in the margin. The 8vo. edition has vowel points and accents, and the marginal notes. In 1639, R. Jac. Lombroso published a new edition in 4to. at Venice, with small literal notes at the bottom of each page, where he explains the Hebrew words by Spanish words. This Bible is much esteemed by the Jews at Constantinople: in the text they have distinguished between words where the point *kamets* is to be read with a *kamets-katoph*, that is, by *o*, a *d* not an *a*.

Of all the editions of the Hebrew Bible in 8vo. the most beautiful and correct are the two of Jo. Athias, a Jew of Amsterdam. The first, of 1661, is the best paper, which, notwithstanding its being corrected according to ancient MSS. is certainly so far as letters and words are concerned) agreeable only to the latest, as the other printed copies were before it: but that of 1667 is the most exact. This was published by Leusden, who tells the reader, "Tibi damus *Biblia*, impressa per Athiam, quibus correctiora nunquam sol aspexit." And yet, though the sun never saw so much implicit obedience paid to the Masora before, the Rabbins assure us, in their prefatory recommendation, that some whole words were here corrected "ex Masora & a Masoreticis, qui sepem legis fecerunt." This supremely Masoretical edition appeared to their high mightinesses the States-general, so particularly meritorious, that Athias, the typographer, was presented with a chain of gold, and a gold medal pendant. But it is somewhat extraordinary, that a Jew should thus be rewarded for an edition, in which Leusden (though a Christian) confesses, that he permitted the Latin contents, here added in the margin, to explain away some of the prophecies relating to the Messiah. Le Long, in loc.

Leusden's last edition of Athias was followed, in 1705, by Vander Hooght's very elegant edition. No corrections can be expected from this editor, who considered every letter in his book, howsoever it was introduced, as absolutely genuine, and maintained the Masora to be infallible.

After Athias, three H-braizing protestants engaged in printing and publishing the Hebrew Bible; viz. Clodius, Jablonki, and Opitius.—Clodius's edition was published at Frankfurt in 1677, in 4to. At the bottom of the page it has the various readings of the former editions; but the editor does not appear sufficiently versed in the accenting, especially in the poetical books; besides, as it was not published under his eye, many faults have crept in. That of Daniel Leff Jablonki in 1699, in 4to. at Berlin, is very beautiful as to letter and print; but, though the editor pretends he made use of the editions of Athias and Clodius, in reality he did it scarcely in any thing different from the 2d. edition of Bomberg. For this man of eminent learning was intended to lay the foundation for a reformation of the printed Hebrew text. This he has done in the preface, by making several excellent observations on the nature of the printed Hebrew MSS.; with the proper marks of their antiquity, and the great advantages to be derived from them. He has also factually shown, that the Jewish transcribers have committed many mistakes; that the Keris are various readings arising from the mistakes of transcribers; that the older MSS. have them in the text, but the later in the margin; and consequently, that the Masora, which considers the Keris in the margin, must be founded on the later copies; that one of the Hebrew MSS. at Berlin contains some thousands of various readings, and that the other old Hebrew MSS. have numerous differences from the printed text; and that these old MSS. have suffered many alterations from the late correcting Masorets. He also states the possibility of procuring, by due zeal and exertion, very ancient MSS. from such of the Jews as have been settled for many ages in China, Ethiopia, Constantinople, Thessalonica, and other distant parts of the world. Jablonki is the first author, who, after announcing the actual existence of many various readings in the Hebrew MSS., has recommended both an accurate examination of those MSS. now known, and a diligent search after others, at present unknown, through the several quarters of the world. To him, therefore, belongs the honour of having planned the noble scheme for correcting the many corruptions of the printed Hebrew text of the Old Testament; and yet not daring to practise what he recommended, he published the Hebrew text almost the same as it was added to M. Leusden's edition of 1667. His corrections have been confined almost entirely to the vowel-points and accents. The edition of Opitius was published in 4to. at Kiel, in 1709; the character is large and good, but the paper bad; it is done with a great deal of care; but the editor made use of no manuscripts but those of the German libraries; neglecting the French ones, which is a common error to all times. Opitius copied from Leusden's Athias, though, he says, he collated several MSS. in Berlin, and other places; but he neglected the Masora, and he falls into a gross error with respect to the various readings of the Hebrew MSS., in forming a conjecture. Hence it follows, that in this edition will be found many alterations suggested by the Masora, the former editions, and other MSS. collated by Opitius. Vol. F. Bib. Heb. p. 335. The same has been done in the edition of 1709, viz. the 2d. edition of the Hebrew Bible, published by the same author, and printed by the same printer, at Frankfurt, in 1709; the character is large and good, but the paper bad; it is done with a great deal of care; but the editor made use of no manuscripts but those of the German libraries; neglecting the French ones, which is a common error to all times. Opitius copied from Leusden's Athias, though, he says, he collated several MSS. in Berlin, and other places; but he neglected the Masora, and he falls into a gross error with respect to the various readings of the Hebrew MSS., in forming a conjecture. Hence it follows, that in this edition will be found many alterations suggested by the Masora, the former editions, and other MSS. collated by Opitius. Vol. F. Bib. Heb. p. 335.

The little Bible of R. Stephens in 16to. is very much prized for the beauty of the character. It was printed in 7 vols. at Paris, in 1544—1546. Care, however, must be taken; there being another edition of Geneva, exceedingly like it, excepting that the print is worse, and the text less correct. To these may be added some other Hebrew Bibles without points, in 8vo. and 24to. which are much coveted by the Jews; not that they are more exact, but more portable than the rest; and are used in their synagogues and schools; of these there are two beautiful editions, the one of Plantin, in 8vo. with two columns, and the other in 24to. reprinted by Raphaleugius at Leyden, in 1610. There is also an edition of them by Laurentius at Amsterdam, in 1631, in a larger character; and another in 12mo. at Frankfort, in 1694, full of faults, with a preface of M. Leusden at the head of it.

In 1720, an Hebrew Bible was published at Hall, by the learned professor John Henry Michaelis; being the first edition, which contained many various readings, collected from Hebrew MSS. by a Christian editor. The text is taken from Jablonki's edition, with some few emendations. There were collated for this Bible most of the best printed editions, and also five Hebrew MSS. belonging to the library at Erfurth. The propriety of selecting various readings from Hebrew MSS. and ancient versions, is set forth in the preface; and the editor has inserted here and there some variations of words and letters; but the variations, chiefly noted, relate to the minutiae of criticism, consisting only in points and accents.

Charles Francis Houbigant, one of the fathers of the oratory at Paris, published an elegant edition of the Hebrew Bible at Paris, in 1753, contained in four volumes, folio. The text is that of Van der Hooght, without points, to which he has added marginal notes, correcting that text by the Samaritan pentateuch, Hebrew MSS. and ancient versions; and also a new Latin version made by himself, expressive of such a text as his critical emendations appeared to justify and recommend. This celebrated edition, (says Dr. Kennicott, than whom there could not be a more competent judge) seems to proceed upon so just a plan, as to its main principles, and to be executed (in the general) with so much skill and judgment, as to claim for its worthy author the applause of all the friends of religion and learning. He expresses, however, a wish, that the author had spared some of his bolder criticisms, when they are unsupported by MSS., parallel places, or ancient versions; especially, where the proposed emendations are not clearly and strongly recommended by the text. Some learned men have wished, that, instead of inserting only a few select various readings from the Hebrew MSS., all the various readings had been noted by the author after each chapter. But the labour of such a work would have been immense; and would have been almost to be detested with what the learned and excellent editor has actually done. It has, indeed, been objected by Dr. Hody, in his preface to the work, entitled "The History of the Jews," that Houbigant had not done the Hebrew text, to make it conformable to the Vulgate; whereas, in the edition, printed in 1753, he has done the Vulgate, conformably and not otherwise; he proposes, and has proposed, a Latin version of the same. Dr. Houbigant obtained from the pope two hundred livres, as a reward for his publication of the Bible. Dr. Kennicott, in his preface to the edition of 1753, mentions that he had seen a copy, in manuscript, of which about 60000 M. S. either of the whole or parts, were kept of the Bible; and in the year 1754, he printed the Hebrew MSS., and the Vulgate collated by him, published in 1776, the full volume of the Hebrew Bible, in folio.

entitled "Vetus Testamentum Hebraicum, cum variis Lectionibus" The second volume, with the general dissertation, was published in 1780. The text is that of Everard Van der Hooght, in 1705, already mentioned, which is very correctly printed, with the similar Hebrew letters, remarkably sharp and well defined; differing from it only in the disposition of the poetical parts, which Dr. Kennicott has printed in hemistichs, into which they naturally divide themselves; however, the words follow one another in the same order as they do in the edition of Van der Hooght; so that any person may read these passages as prose, if he is so inclined; or may divide the hemistichs differently, according to his own judgment. This edition is printed on an excellent type; the Samaritan text, according to the copy in the London Polyglott, is exhibited in a column parallel with the Hebrew text; those parts of it only being introduced, in which it differs from the Hebrew: and the rest of the Samaritan column being left blank, so that the eye perceives at once, with the utmost ease, the variations of the Hebrew and Samaritan texts. The numerous variations, both of the Samaritan manuscripts from the printed copy of the Samaritan text, and of the Hebrew manuscripts from the printed text of Vander Hooght, are placed separately at the bottom of the page, and marked with numbers referring to the copies from which they are taken.

We shall subjoin to this article a brief account of the rise and progress of that highly interesting and meritorious undertaking, for the completion of which we are indebted to the indefatigable industry and perseverance of the late Dr. Kennicott. A very general opinion seemed to have prevailed among learned men, till about the middle of the last century, in favour of the integrity of the Hebrew text: and Dr. Kennicott ingenuously confesses, that he was misled by the common error. The Rabbins boldly asserted, and the Christians implicitly believed, that the Hebrew text was free from error, and that in all the MSS. of it, no instance of any various reading of importance could be produced. The first person, who seems to have combated this notion in the way of a regular attack, was Ludovicus Capellus. From the differences he observed between the Hebrew text and the version of the LXX. and between the Hebrew pentateuch and the Samaritan pentateuch, from the palpable and manifest corruptions, which he thought he saw in the text itself, and from the many reasons which induced him to suppose that the vowel points and the Masora were both a modern and an useless invention, he was led to question the general integrity of the text; and his enemies allowed, that in his attack upon it, he discovered much learning and ingenuity. Still, however, he acquiesced and admitted the uniformity of the MSS. But the matter was not brought to the test of an actual collation of any number of MSS. and versions, and little was done, till Dr. Kennicott's attention was directed in 1748, by the late learned Dr. Lowth, bishop of London, to an examination of 2 Sam. xxiii. 8. This circumstance convinced him of his former error, and he was soon satisfied that the Hebrew text was far from being perfect, and that it was impossible to undertake this single verse, without allowing that there were in it four corruptions. Kennicott's explanation of this verse having been approved by Dr. Lowth, he was requested to examine the subsequent parts of the same chapter; which was likewise performed, and the whole was published in 1753. He proceeded to examine two parallel chapters in the first book of Chronicles, and the second book of Samuel, and found an omission in the former of no less than 34 Hebrew words. Although such great corruptions were proved from the printed text itself, and from the ancient versions, yet it had not at that time been suspected, that there were now

extant any Hebrew MSS. which would at all assist in correcting the faulty passages of the Old Testament. In the sequel, however, this was found to be actually the case, for Dr. Kennicott, on examining some of the Hebrew MSS. in the Bodleian library, found that they contained, in the chapters above cited, several of the readings which he had recommended as genuine, before he had inspected these MSS. A discovery so important to sacred literature being thus begun in 1753, and extended to 70 Hebrew and Samaritan MSS. in Oxford, it was soon much improved by consulting a number of others at Cambridge, and in London. The inquiry was promoted by means of a catalogue of all the other Hebrew and Samaritan MSS. which were then known to exist in different parts of the world, published by Dr. Kennicott in 1760, in a second dissertation on the Hebrew text. In this work he endeavoured to produce a general conviction, as to the certainty of the Hebrew printed copies being much corrupted, and the great advantages to be derived from MSS., by furnishing many various readings of consequence, which are the true ones; and by confirming the ancient version in a multitude of instances of little moment in themselves, and therefore not likely to have originated from design. It was also proved, that the Samaritan Pentateuch was of great importance; that its MSS. would serve to correct a variety of typographical errors, which disgraced the two printed editions; and that the Samaritan copies were frequently confirmed even by the Hebrew MSS.

In consequence of these interesting discoveries, Dr. Kennicott was solicited by the late archbishop Secker, and many other learned persons, and by several societies of literary men, particularly by the university of Oxford, to whose countenance and encouragement the undertaking was recommended by the late Dr. Hunt, professor of Hebrew and Arabic in that university, to undertake a collation of all the Hebrew and Samaritan MSS. in our own country. Discouraged at first by the prospect of so arduous an undertaking, he at last, in 1760, consented to engage in it. Of his progress, and the circumstances that attended it, we have a detailed account in the "Dissertatio Generalis," published with the second volume of his Bible. Having proposed ten years as the time which, he thought, would be necessary for collating the Hebrew and Samaritan MSS., he was enabled by his singular assiduity to fulfil his own expectations and those of the public. Patronized by his majesty, and by a great number of liberal friends and well-wishers to the undertaking, both at home and in foreign countries, in the list of whom are no fewer than seven crowned heads, several princes, cardinals, archbishops, and bishops, besides universities, public libraries, and many of the most eminent literati in various parts of Europe; Dr. Kennicott instituted various and extensive inquiries after MSS. at Constantinople, Warsaw, Venice, Bologna, Mantua, Pavia, Genoa, Lisbon, Geneva, Utrecht, Erfurt, Berlin, Stockholm, and Hamburg. The numerous Hebrew MSS. of the latter place were collated by the celebrated Reimarus, who not only concurred in, but applauded the undertaking. In the prosecution of this work, it was discovered, that the printed editions of the Hebrew Bible, which had been supposed to agree, and on the agreement of which the notion of the integrity of that text had been founded, very much differed from one another; and particularly, that the *oldest* editions agreed most with the oldest and best MSS., and the *modern* editions with the latest and worst MSS. As one proof of this, it is alleged, that the variations in the first edition (in 1488) from Van der Hooght (in 1705) amount to twelve thousand. In the year 1767, Dr. Kennicott derived great advantage from his own examination of the Paris MSS., both Hebrew and Samaritan, and from

B I B L E.

Dr. Gill's collation of all the passages quoted in the Talmud. An Hebrew MS., which once belonged to a synagogue at Jerusalem, was at this time purchased by his Britannic majesty; and our author himself, hoping to obtain other treasures from the East, first to Canton, and had nearly succeeded in procuring a MS. from the Jews at Cal-fong-fu, in the province of Honan. But though he failed in China, he succeeded in America, and procured a complete Hebrew MS. from a Jew at New York. During the tenth and last year of this collation, eight Danish MSS. were sent to Oxford for the author's own examination, as were also six others from Toledo, by Dr. Bayer. Collations of other MSS. were furnished, at the same time, from Silesia, Cologne, Strasburg, Königsburgh, Upsal, Leyden, and Ireland. The indefatigable author, having thus collected materials for his noble undertaking, an undertaking no less honourable to his country than to himself, proceeded to digest the variations, with which he was furnished, under their several books, chapters, and verses. During this operation, he formed a plan for a more complete scrutiny of the best MSS. through Europe, by sending some well-qualified person to re-examine the MSS. already collated, and to examine the rest in passages of greater moment, and where success seemed at all probable. Mr. (afterwards Dr.) Bruns, a learned German, was selected for this embassy; and he was honoured with letters from the secretaries of state here, to all our foreign ambassadors, as well as from the rulers of the two synagogues in London. The places in which he thus examined MSS., during a tour of three years, were Paris, Louvain, Cologne, Mantz, Worms, Maheim, Nuremburgh, Augsburgh, Stuttgart, Carlsruhe, Strasburgh, Basle, Zurich, Berne, Geneva, Turin, Casale, Verulli, Milan, Genoa, Leghorn, Sienna, Rome, Florence, Bologna, Casena, Modena, Reggio, Parma, Mantua, Palua, Venice, Udine, Gorizia, Gradisca, Trieste, Vienna, Dresden, Lipsic, Erfurt, Jena, Dessau, Berlin, Hamburgh, Helmsstadt, Cassel, Amsterdamb, Utrecht, Leyden, and the Hague.

The variations contained in nearly 700 bundles of papers, being at last digested, including the collections made by Dr. Bruns; and the whole, when put together, being corrected by the original collations, and then fairly transcribed into 20 folio volumes, the work was put to the press in 1773; and both volumes (as we have already said, with the general disquisitions, were finished in July 1770.

In order to evince the necessity as well as the utility of this work, Dr. Kennicott has prefixed in with a surprising detail of testimonies, which exhibit the opinions both of the Jews and Christians, as to the Hebrew text, from the earliest times down to the present. The Jewish testimonies are arranged under five distinct periods, viz. from the time of Malachi, about 420 years before the birth of Christ, to the commencement of the Christian era; from Christ to the year 500 after Christ; from the year 500 after Christ to the year 1000; from this year to the invention of printing, about 1450; and from the invention of printing to the year 1780. The first Jewish testimonies are those of Josephus and Philo, who speak of the Greek version as perfectly agreeing with the Hebrew text in their time; whereas Dr. Kennicott asserts the corruption of the Hebrew text before the time of these Jews, and also the very great importance of the Greek version. For the pentateuch of this version being made about 280 years before Christ, and the other books being also translated into Greek about 100 years before Christ (as is inferred from the prologue to Ecclesiasticus), this version must have had many true readings, where the Hebrew was afterwards corrupted. Although in Pl. xvii. 10. the word for "thy holy one," which is now plural in the text of

every copy expressed Masoretically, yet in the Greek version it is singular, which is the case in no less than 180 copies, agreeably to the quotations of St. Peter and St. Paul. And because the argument of these apostles urged upon the Jews, just after the resurrection of Christ, depends on this word's being truly singular, Dr. Kennicott considers this various reading as of greater moment than any other which was ever drawn forth from MSS. He observes, that as the Greek version thus helps to prove the Hebrew text corrupted when it differs from it, so where the Hebrew text is corrupted, and that version agrees, it proves the corruption to be older than the version, unless the version has since been assimilated to the Hebrew. Such very early corruptions occur, as he conceives, in Deut. x. 6. Gen. xi. 32. and Gen. xxxvi. 31—43. The third instance contains 13 verses, which, not being written by Moses, were probably inserted from 1 Chronicles, i. 43—54. in some MS. of Genesis, into the margin, and thence taken into the text. This interpolation is so old as to be found in all the versions, and likewise in the Samaritan text. In the first instance, many words are omitted in the Hebrew text, and in all the versions, which are preserved only in the Samaritan text. In the second instance, the number 145 is corrupted into 205 in the Hebrew text, and in all the versions, and it is right only in the Samaritan text. Dr. Kennicott afterwards specifies two great corruptions: one, where the Greek version has been assimilated to the Hebrew, by addition; and another, in which the Syriac version has been thus accommodated, by change. The first relates to 20 verses, probably interpolated in 1 Sam. xvii.; and the second, to the word for *body* altered to the word for *ears*, in Psalm xl. 7.; on which word, *body*, the argument is grounded, in the 10th chapter of the epistle to the Hebrews: and a very old Syriac MS. in the royal library of Paris, translated from the Hebrew, has preserved the true word for *body*; and another has proved, that the Jews have altered their ancient copies, wilfully, from the Hebrew text and Greek version of Isaiah, xix. 18. respecting the temple at Heliopolis; and also from their turning Moses into Manasses, in Judges xviii. 30. Many other instances occur in the period now under consideration.

In the interval between the birth of our Saviour and the year 500, Dr. Kennicott remarks, that though the present Masora separates our tenth commandment into two, agreeable to the division now made by the Roman Catholics; yet the unity of this commandment, as made by Protestants, is expressly confirmed by Philo and Josephus; and the Masoretic mark of separation (at Exodus, xii. 17.) is absent from at least 234 Hebrew copies. Josephus is further cited, as confirming the ancient chronology in the Greek version against that now in the Hebrew text; and likewise, as having a number much more credible as to the gold and silver hit by David. The same historian also confirms the reading in the epistle to the Hebrews, chap. vii. 4. from Genesis xiv. 20. He confirms, too, the Syriac version, and the edition of Sixtus, reading four in 2 Sam. xv. 7, and the Vatican MS. reading four in 1 Sam. xvii. 4. And though the later Jews have taken Daniel out of their prophetic book, yet Josephus calls him a prophet, in the strongest terms. It appears further under this period, that the Hebrew MSS. differed at the time of the composition of the Talmud; and that some of the true readings may still be found in this work. This fact is confirmed by several instances, and particularly by Psalm xvi.

Under the third period Dr. Kennicott considers the subject of the *Keri*, which see. This period also includes a collection of 216 variations between the oriental and occidental MSS. Proofs of differences are likewise deduced from the old Jewish books,

books, Rabboth, Pirke Eliezer, and Cozri. Saadias, who flourished about the year 1000, is also referred to as having read differently from the printed text; and Hai, about the same period, is shewn to have followed those MSS., which were defective in Joshua, chap. xxi., where two whole verses, absolutely necessary, though expelled by the Masora, have been found in 149 Hebrew copies. At the end of this period, Dr. Kennicott introduces the Arabic version, generally ascribed to R. Saadias, which has hitherto been reputed only secondary, as if it had been always taken from the Greek or the Syriac; whereas it is honoured with the title of a primary version in several places: because it is found to agree with the Hebrew MSS. where both Greek and Syriac differ from it. This Arabic version has some very important readings, particularly in preserving that word which expresses the cause of God's anger against Balaam, Num. b. xxii. 22. It is also important where it is only secondary; because it helps to determine the true reading of the Greek version, where the Greek MSS. are now at variance; as in Psalm xviii. 14. lxxviii. 9. Micah v. 1. and Zechariah xiii. 7. To the close of this period, Dr. Kennicott refers the two oldest and best Hebrew MSS. now extant, one at Oxford, and the other at Vienna. Of the Bodleian MS., supposed to be 800 years old, he observes, that it contains about 14,000 variations. In the pentateuch of this MS. the Greek version is confirmed by 109 various readings; the Syriac, by 98; the Arabic, by 82; the Vulgate, by 88; and the Chaldee paraphrase, by 42. It also agrees with the Samaritan text, against the Hebrew, in 700 instances. This, it is added, is the only one which has preserved a word of great importance for understanding, 2 Sam. xxiii. 3—7; which word is confirmed by the Greek version, and recovers to us a prophecy of the Messiah.

The fourth period, from 1000 to 1450, is introduced with an observation, that the oldest Hebrew MS. which has a certain date (1106), though containing only 9120 verses, has above 6000 variations. The testimonies of Aben-Ezra, Jarchi, Maimonides, and Kimchi, who all flourished between 1150 and 1250, belong to this period. After taking notice of several true readings preserved by these four Rabbies, Dr. Kennicott introduces Meir Hallevi, who died in 1244, with his pathetic lamentation over the many variations in the Hebrew MSS.

Under the fifth and last period, from 1450 to 1780, including the printed Hebrew text, Dr. Kennicott takes particular notice of the five first editions of different parts, and of the first edition of the whole together. He adds, that the Psalms, as first printed in 1477, contain about 600 variations; and that the Hebrew Bible, as first printed in 1488, contains above 12,000. These, and some other very early editions, agree with the older MSS. much more than the editions after the year 1500, but still more than that by Jacob Ben Chaim, in 1526, which has been in general the standard down to the present time. About the year 1500, began the superstitious regard for the Masora; and such MSS. as had been masoretically corrected, were preferred for the editions of Cardinal Ximenes and Felix Pratensis. But the Masora being highly venerated by Ben Chaim, he chose for his text such MSS. as had the Masora most perfect; which MSS. were the latest and the worst: and yet, unfortunately, this text became the general standard for the Antwerp, Paris, and London Polyglotts, as well as for other editions of less note afterwards. The Jews have not, however, been satisfied with the correctness of Chaim's edition. For Rabbi Lonzano was afterwards encouraged to visit many countries, and to collate ten MSS. in order to render the text more perfect; and yet this complaint of errors was

again renewed in 1635, by Manasseh Ben Israel. These testimonies are concluded with the Mantuan edition, called Minchath Shai, in which are about 2000 various readings, collected from MSS. and early editions, by Solomon Menorzi, in the last century: but it was not printed till 1744. So that, at the time when Christians were generally insiting on the perfection of the Hebrew text, the Jews were labouring to correct it, and lamenting its great imperfection in the following terms: "Quis restituet decus? Quis ejiciet raphanos et ipinas? Horror confredit me: quum viderem multitudinem variantium, quæ ceciderunt in libros! Editores enim obsecrati, neque lax est eis; neque est qui quærit cessationem hujus diversitatis! Ecce nos palpantes tanquam cæci, in obsecrante diversitatum! Deus auferat tenebras nostras!"

On examining the testimonies of Christian writers with regard to the state of the Hebrew text, Dr. Kennicott begins with the Evangelists and Apostles; and here he adverts to the quotations made in the New Testament from the Old: on which subject, see QUOTATION. It appears, by unquestionable evidence, that the Old Testament has been corrupted, in many instances: and that a just correction of the Hebrew text, grounded on the authorities of Hebrew MSS., the Samaritan pentateuch, and the ancient versions, will, in many places, restore to the Old Testament that harmony with the New which it has long wanted. Instances occur in Gen. ii. 24.: Psalm xvi. xxxiv. 22. compared with John xix. 36, 37. and xi. compared with Hebrews x.; Jeremiah xxxi. compared with Hebrews viii.; Amos ix. compared with Acts xv.: Isaiah vii. 14. liii. 4. Psalm lxviii. 19. Hof. xiii. 14. Amos v. 26. Deut. xxxii. 5. and Habakkuk ii. 4. Many arguments are adduced by Dr. Kennicott to shew, that the Jews have corrupted the chronology, from the creation to Abraham, either by subtracting or by adding 1300 years; and this great corruption is not in the Greek version, but in the Hebrew text; and that it was introduced in the second century. As it was a very ancient tradition, that the Messiah was to come in the sixth chiliad, because he was to come in "the last days," (founded on a mythical application of the six days' creation), it was contrived to shorten the age of the world from about 5500 to 3760, and thence to prove that Jesus could not be the Messiah, because at the æra of his birth the time for the advent of the Messiah was not yet come. The time of this grand corruption is shewn to have been between the years 175 and 200. The old Italic version, made from the Greek about the year 100, is adduced to confirm some ancient readings of the Greek version, particularly as to the more extended chronology. Dr. Kennicott, after various pertinent quotations from Ignatius, Justin Martyr, and Irenæus, refers more particularly to Tertullian, with a view of proving that, in his time, the passage in Isaiah liii. 4. expressed the sense ascribed to it in the 8th chapter of St. Matthew, where the Evangelist quotes it as foretelling, that "the Messiah should heal bodily diseases." The Hebrew words, it is shewn, admit this sense: Tertullian so expresses them; and so did the old Greek version, which has been strangely altered in this place, out of opposition to the gospel. Origen is cited, as affording many interesting particulars, with regard to the differences in the Hebrew copies, and the true readings of the Greek versions; and Eusebius, Theophilus Antiochenus, Ephraim Syrus, Jerom, Epiphanius, Augustin, and Salpicius Severus, are quoted to the same purpose. The first period of the Christian writers terminates with the oldest MSS. of the Greek version, particularly the Vatican and Alexandrian MSS. written about the year 400, which see. Dr. Kennicott proceeds to the period that elapsed between the years 500 and 1000, and avails himself

of the Syriac versions (see SYRIAC) for introducing some useful observations on several passages, particularly Psalm xl. 6, 7. 9. and 2 Kings viii. 16.; in which last passage three words are now interpolated in the Hebrew text, which, though they are also found in the Vatican and Alexandrian MSS. are not in the Complutensian and Aldine editions; nor are they in an ancient manuscript of Kings, nor in some of the best MSS. and earliest editions of the Vulgate. See VULGATE. From the year 1000 to 1450, the testimonies of Christians are very few. Yet soon after the Jews fled from the East to Europe in 1040, the Hebrew language was studied by several Christians, particularly by Lanfranc and Anselm, Grossthead and Roger Bacon; and this last learned man, with his Franciscan brethren at Oxford, bought many Hebrew MSS. when the Jews were expelled from England in 1290. In the 13th century, Raymond Martini accused the Jews of corrupting the Hebrew text; and he speaks of MSS. differing in Zeck. xii. 10. with respect to which Dr. Kennicott observes, that forty copies have here the reading expressed in John xix. 37. Dr. Kennicott also cites Nic. Lyranus, Radulphus Armachanus, Tolatus, Perez de Valentin, and Marilianus Ficinus.

Under the last period, from 1450 to 1780, Zuinglius takes the lead; and he extends the Greek version, and remarks the corrupt addition of Jer. chap. li. Luther is also mentioned; and Bibliander is celebrated on account of his excellent criticism on Ez. xl. xiii. 21. As it is very improbable that the news of the capture of Jerusalem should be nearly eighteen months in reaching Babylon, it will be satisfactory to know, on the authority of the Syriac version and eight Hebrew MSS., that this period was not more than six months. Having described the editions of Sixtus and Clement, Dr. Kennicott observes, that the present English version frequently expresses, not what the translators found in their Hebrew text, but what they thought should have been there; and that the 14th psalm, inserted in the liturgy of the Church of England, contains three verses not found at present in the Hebrew text of that psalm, but which are probably genuine. We have already mentioned Capellus's opinion on this subject; and yet though he proved the corruption of the Hebrew text, by every argument except that of MSS., Buxtorf, the son, following his father, who asserted the absolute agreement of all the ancient MSS., affirmed that no Hebrew MS. in the world contained a variation differing which agreed with either of the ancient versions. It is needless to recite the opinion of Mede, Mericurius, Beveridge, Walton, Hammond, Bochart, Heortus, Pocock, Le Clere, &c. on this subject. We shall here only observe, with Dr. Kennicott, that Jablonski was the first editor of an Hebrew Bible, who spoke of any Hebrew MSS.; and he takes care, by the help of which he made a few corrections. Nevertheless, he cited the two references from Joshua, chap. 21. though Dr. Kennicott has established them, in consequence of the correction of 149 copies. Oudin declares that his 11th edition, which obeyed the Maluta, in defiance of all the MSS. and editions of the world in that. Vitruvius also flows, according to Dr. Kennicott, how a still keener MS. may be found and have been introduced into ours, from the practice of consulting many MSS. by one of their standards. The second general edition of the Hebrew Bible by the eminent biblical critic, in 2 Chron. xxvi. 5. is corrected by fifty copies; and the reading of Haneh x. 18. is established by the Talmud and fifteen Hebrew copies. J. H. Michaelis, although he published four various readings, omitted our various of great number, probably from an undue deference to the advocates of the purity of the Hebrew text. Among these advocates we

may reckon Wolfius, who maintained that mistakes might exist in some MS. copies, but not in all; because some one MS., or some one edition, always had the true reading. Carpzovius contended, that the Hebrew text has descended to us in the same state of purity in which it was first found; not indeed in all the copies, but in those of the better sort; nor in these separately, but in such altogether; and he thought it needless to collect these from every quarter of the world, because, in his opinion, those which are near at hand will be sufficient; a concession which abolishes his former doctrine. The learned Hallet, in his notes on the Holy Scriptures, published in 1729, alleges as a reason why the quotations in the New Testament differ from those of the Old, that the Hebrew copies have been altered since the days of the apostles. Bishop Hare, with whose testimonies Dr. Kennicott concludes his catalogue of Christian writers, contends earnestly for admitting the corruption of the Hebrew text. He rejects the titles of many of the psalms as not given by the authors of these psalms. He condemns the practice of varnishing over, instead of correcting, the corrupted readings; and he laments that Hebrew MSS., the chief support of criticism, were wanting.

Dr. Kennicott closes his account of his laudable undertaking, with evincing the great use to be derived from the Hebrew MSS. and ancient versions, for amending the printed Hebrew text; and with exhorting persons in power to render such corrections subservient to the public good, by procuring a more correct and a more intelligible English translation, or rather a revival of the present English translation of the Old Testament. These MSS., he says, strongly confirm the ancient versions, and enable us to ascend to the times of Jerom, of the Apostles, and even of Ptolemy Philadelphus; and, he adds, it now remains to be seen in what kingdom or country through Europe, will be manifested the greater zeal, for correcting the modern translations of the Old Testament.

The work of which, for the gratification of our readers, and with a view of recording and transmitting the honour of our country, where it was undertaken, and of the age in which we live, we have given a copious account, will appear in its pre-eminent importance and utility, whenever it shall be applied to the desirable purpose of aiding a public and authoritative new translation of the Bible, or at least, an effectual revision of the common version. In the translation of particular books of Scripture, by bishops Lowth and Newcome, and by others of inferior rank in the church, &c. we observe the advantage resulting from Dr. Kennicott's labours; but the full benefit can only be enjoyed, when the translation is complete, and authentically introduced into common use. It has contributed eminently to the honour of the king of Sweden, that he has been the first prince in Europe, who has issued his royal commands for executing a purpose of this kind; and Dr. Kennicott thinks, it would be criminal to suppose that Great Britain, which has enjoyed such distinguished blessings of Providence, will be backward to possess a similar sign. No persons, whatever be their rank either in the church or state, can more laudably testify their veneration for the Holy Scriptures, and their concern for the reformation and benefit of the world, than by adopting and accomplishing a measure of this kind. It would serve also to obviate every objection against the truth and authority of divine revelation. It has been urged by lord Bolingbroke, and by other writers on the side of freethinking or infidelity, "that if the Scriptures had been from God, they would always have been preserved in their primitive purity." Dr. Kennicott shews, that neither the freedom nor

the goodness of the Supreme Being can be justly impeached, from the supposition that many errors have crept into the present text; because the most important matters are still secure and certain, and men have always been able to derive from the Bible a rule both of faith and practice. For the illustration of this position, he appeals to the ancient churches, both Greek and Italian, and the modern churches of both Protestants and Roman Catholics; since, amongst all these, their sacred books taught them "what they must do to be saved;" though they contained many errors, the correction of which was very desirable. Indeed, the integrity of the sacred books could not have been preserved without a "miracle," perpetual as to time and universal as to place, which would consequently be a greater miracle than any in the Bible: nevertheless as many corruptions, in transcripts made from transcripts, ever since the year 400 before Christ, were unavoidable, it is happy that several versions, made 1500 or 2000 years ago, will correct some of these corruptions; and that the Hebrew MSS. still extant, will correct others. Upon the whole, it is of great importance, that the effect of these corrections should appear in its whole extent, and as speedily as possible, not only to Christians in particular, but to the world in general.

The learned Dr. John Bernard Rossi, professor of divinity and the oriental languages in the Royal Academy of Parma, undertook to make a collection of the various readings of the Old Testament, in imitation of that of Oxford; and for this purpose he examined by himself, or his friends, 1470 MSS. or printed copies. Of foreign MSS. 210, which had been omitted by Dr. Kennicott, were collated in the most important passages; and of ancient editions, either in his own possession, or to which he had access, the number amounted to 288, of which 230 are such as had not been collated by Dr. Kennicott. M. de Rossi announced his design in a tract, entitled, "Apparatus Hebræo-Biblicus," and published at Parma in 1782, 8vo.; and he proposed to comprize the result of his labours in 4 vols. 4to. The first volume was published at Parma in 1784, under the title of "Variæ Lectiones Veteris Testamenti, &c." or the various readings of the Old Testament, drawn from an immense number of MSS. and printed editions, compared with the Samaritan text and the ancient versions, and examined and appreciated by the most accurate rules and principles of sacred criticism. This volume contains the "Prolegomena," and a clavis of the books of Genesis, Exodus, and Leviticus. In the introduction we have several curious critical discussions, from which we learn that this collection ascertains, as Dr. Kennicott's valuable and judicious labours had before done, instead of invalidating the integrity of the sacred text in matters of the greatest importance; as all the MSS. notwithstanding the diversity of their dates, and of the places where they were transcribed, agree with respect to that which constitutes the proper essence and substance of divine revelation, namely, its doctrines, moral precepts, and historical relations. M. Rossi charges the variations not merely on the copyists, but on the ignorance and temerity of the critics, who have, in all ages, been too ambitious of dictating to their authors, and who, instead of correcting the pretended errors of others, frequently substitute in their place real errors of their own. This author is of opinion, that the common reading of an ancient text ought never to be changed but by the authority of MSS.; and if there be any exceptions to this general rule, they are very rare: and the conjectural alterations of critics should be thrown into the notes. M. Rossi, however, observes, that we must not confound the alterations introduced into the sacred text by the injuries of time, the negligence of transcribers, or the boldness of critics, with

those which have been made by public authority. The sacred writers of ancient times left, as he says, their records to other writers, who were often their disciples, as also to public scribes, and to magistrates, who revised them. In this revision, which was executed either by sacred authors, or by the public authority of the synagogue, corrections and retrenchments were made, where they were judged necessary. This, M. de Rossi thinks, appears evident from the present state of the sacred writings; and in confirmation of his opinion, he quotes the Syriac Interpreter, who, in a note placed at the end of the Pentateuch, says, that this work was composed by Moses, but was afterwards digested and finished by Joshua. He also conjectures that Moses himself made use of ancient records, both in his history of the creation, and in that of the deluge. He thinks that the frequent repetitions and anachronisms, which are discernible in the book of Genesis, ought rather to be attributed to a writer anterior to Moses, than to scribes in after-times; or to the confusion of the ancient records themselves, as some have imagined. This opinion was proposed and maintained with singular ingenuity and erudition, before the time of Rossi, in a French work published at Brussels in 1753, and entitled "Conjectures concerning the original memoirs, which Moses appears to have made use of in composing the book of Genesis, together with remarks designed to confirm or illustrate the several conjectures." The revision, says Rossi, which Ezra made of the sacred writings, with the assistance of MSS. and according to the rules of criticism, both on his own authority as a sacred writer, and that of the council of which he was a member, did not annul the MSS. that were anterior to his time, either in the hands of the Samaritans, or in those of the Jews, from which those of the Cushites or Samaritans had been taken, or in the hands of the Egyptians, or in those of the Babylonian Jews, who did not return to the holy land. The edition of Ezra remained entire till the destruction of Jerusalem; but it underwent several alterations before the time of the Masorites, whose critical labours or attempts with a view of securing the sacred code against future injuries are well known. Yet, notwithstanding these attempts and labours, some faults, which were anterior to their time, still remained; and others, though of little consequence, afterwards crept into the sacred text. The only sources from which we can derive warrantable corrections of these faults are, according to this author, the MSS., the ancient editions, the Samaritan text, the ancient versions, the parallel places, the analogy of the text or of the history, the testimonies of ancient writers, critical conjectures, and the Masora, which De Rossi treats with more respect than Dr. Kennicott, of whom he complains on that account. He subjoins many learned and judicious observations on the various sources, from which materials are to be derived for the necessary corrections. As to the MSS. he lays down rules for ascertaining their age, of which the most obvious is the date; and in order to understand their dates, he takes notice of the various methods of computing time employed by the Jews, and the different eras from which they reckon. When the dates are wanting, it becomes difficult to ascertain the time of a MS., if it be anterior to the thirteenth century. Those which are anterior to the twelfth century are very rare; and the author minutely indicates the marks that distinguish them. The rarity of the ancient Hebrew MSS. has been occasioned by the Jewish custom of depositing their books and phylacteries in public places, from whence, to make place for others, they have been taken and buried in wells, or under ground, where they soon rot. Those of a very remote antiquity, which are no longer extant,

tant, are often restored, in part, by copies which still subsist. With regard to ancient editions, De Rossi distinguishes the Masoretic from those editions without the Masora, which are anterior to the year 1525, when the rabbinical Bible of Jacob Ben Chaim was published. Of 242 which he has collected, he reckons 30 which belong to the sixteenth century, and above 60 which are anterior to the first Masoretic Bible. The ancient versions enumerated by the author are the Greek, Chaldaic, Syriac, Arabic, and Persian; and among these, the Greek version of the Pentateuch, yet unpublished, which is in the library of St. Mark at Venice, and which he supposes to have been made in the twelfth or thirteenth century, by an Hellenist, from the Hebrew of Ezra or of Palestine; and not as the Septuagint, from the Egyptian or Israelitish text. The differences that are found in these versions must not be considered as various readings; since many of these diversities are to be attributed, says De Rossi, to the translators themselves, who have sometimes taken great liberties with the original text, by altering it in their versions. For other particulars, we refer the learned reader to the work itself. The second volume was published at Parma, in 1785, and contains the books of Numbers, Deuteronomy, Joshua, Judges, Samuel, and Kings. The third comprehends Isaiah, Jeremiah, Ezekiel, the twelve lesser prophets, with the Song of Solomon, Ruth, Lamentations, Ecclesiastes, and Esther. And in the fourth, or last, are the Psalms, Proverbs, Job, Daniel, Ezra, Nehemiah, and Chronicles. Paris, 1786. The high price of Kennicott's and De Rossi's very valuable works, induced M. Breitkopf to employ Dr. Doederlein and Professor Meisner, to collect the most interesting various readings from the above works, and to print them under the text of his new edition of Reineccius's bible, printed at Leipzig in 1725, and again in 1739, under the title of "Biblia Hebraica, olim a Christiano Reineccio edita, nunc denuo, cum variis lectionibus, ex ingenti codicum copia, a B. Kennicotto & J. B. de Rossi collatorum," Lipsia, 8vo. 1793.

BIBLES, Greek. The most ancient Greek version is the Septuagint; for an account of which, the manner in which it was found, the collation of its MSS., and other circumstances relating to it, see SEPTUAGINT; see also ALEXANDRIAN, and VATICAN. The number of editions of the Bible in Greek is very considerable; but they may be all reduced to three or four principal ones, namely, that of Complutum or Alcalá de Henares, that of Venice, that of Rome, and that of Oxford. The first or Complutensian edition was undertaken by the divines of Complutum, under the direction and at the expense of cardinal Ximenes, and finished in 1514, but not allowed by Leo to be published till 1520; nor were the copies of it distributed to the world at large before the year 1522. It was inserted in the Polyglott Bible, usually called the "Complutensian Bible." In this edition the Greek of the LXX. is said to be altered in many places, in order to accommodate it to the Hebrew text, and to the Vulgate. For a more particular account of it, see COMPLUTENSIAN, and POLYGLOTT. It has been reprinted in the Polyglott Bible of Antwerp, called "Biblia Regia," by Arias Montanus, in 1572; in that of the Commenes, commonly called "Vatablus's Bible," in 1599; and in De Jay's Polyglott of Paris, in 1645. See POLYGLOTT.

The second Greek Bible is that of Venice, formed from many ancient copies by Andrea Fulanus, and printed by Aldus Manutius in 1518, and hence called the "Aldine edition." This edition approaches nearly to the Roman, and is said to be purer than the Complutensian. Masius says of it, that it is a copy of the simple interpretation of

the ancient LXX.; but not pure, nor free from all intermixture of the words of Theodotion. Usher observes, that it sometimes deviates from the LXX. and adopts the readings of Aquila; and that various glosses have crept into it. From this Aldine edition all the German copies have been derived, which generally adopt the words of it, but differ from it in the order of the books, chapters, and some verses. The apocryphal books are printed separately after the rest. This edition was reprinted, with the Complutensian Latin version, in 1520, by And. Cratandrus: and again, in 1550, by Rich. Brylingerus; at Strasburg, in 1526; at Hamburg, in 1596; at Frankfurt, by the Wechliani, in 1597; and in other places, with some alterations, to bring it nearer to the Hebrew. The most commodious is that of Frankfurt, in which are published, from the Complutensian edition, the four last chapters of Exodus, and a great part of the 24th chapter of the Proverbs. There are also added little Scholia, which shew the different interpretations of the old Greek translation. The author of this collection has not annexed his name, but it is commonly ascribed to Francis Junius.

The third Greek Bible is that of Rome, or the Vatican (see VATICAN), formed from the Vatican copy by cardinal Carassa, and other learned persons, who were employed in this work for nine years, by the order and under the auspices of pope Sixtus V. It was printed at Rome in 1587, with the Greek Scholia, collected from the MSS. in the Roman libraries. It was afterwards printed in Latin, with learned and useful notes, by Flaminius Nobilius, at Rome, in 1588. The Greek edition, with the Latin annexed, the distinction of verses, according to the Vulgate, the Greek Scholia, and the Notes of Nobilius, was printed at Paris, in 1628, by J. Morin, priest of the Oratory. In forming this edition, Carassa made use of several ancient MSS. besides the Vatican, and particularly one procured from the library of Cardinal Bessarion, written in large letters, and another from Magna Græcia, agreeing with the Vatican; and Carassa professes that it was his design, not to accommodate this edition to the Latin Vulgate, or the Hebrew, but to the ancient LXX. Notwithstanding some few trivial objections, this edition has been extolled for its purity, its freedom from any material corruptions, and its superiority to all other editions. From this all the English editions have been derived. The Greek edition of Rome, or as Græbe says in his Prolegomena, that of Paris, has been printed in the Polyglott Bible of London, in 1657; to which Walton has added, at bottom, the various readings of the Aldine and Complutensian editions, and of the Alexandrian MS., as well as of Marchialanus's and Card. Barberini's. It was printed at London in 1653, in 8vo. with some deviations with regard to the order of the books, the number of the psalms, &c.; at Cambridge, in 2 vols. 12mo., with a preface by the learned Pearson, in 1665; at Amsterdam, with the same preface, in 1683, by Leusden, 8vo.; and at Leipzig, in 1697, 8vo. with the Greek Scholia of the Roman edition, the parallel places and various readings, and a preface by J. Trinius of Ulm. Another Greek Bible was published at Francfort, in 1723, by Lambert Bos, who professes to adhere to the Roman edition of the Vatican copy, and to subjoin at the bottom of the page, besides the Scholia of the Roman edition, all the various readings he could find, together with fragments of the versions of Aquila, Symmachus, and Theodotion. Breitinger, however, observes, that Bos, instead of adhering to the Roman edition, has followed that of Paris by Morinus, or the text in Walton's polyglott. This edition of Bos has been long the common text-book of biblical scholars,

scholars, who cannot easily purchase the Roman edition; although it is far from being a correct copy of its prototype.

The fourth Greek Bible is that done from the Alexandrian MS., begun at Oxford by Dr. Grabe, in 1707. An edition of a similar kind had been undertaken by Patrius Junius, or Patrick Young, who proceeded no farther than the 17th chapter of the book of Numbers, and also proposed by Vossius, but not undertaken. In Grabe's edition, the Alexandrian manuscript is not printed such as it is, but such as it was thought it should be; i. e. it is altered wherever there appeared any fault of the copyists, or any word inserted from any particular dialect. This some think an excellence, but others a fault; urging, that the manuscript should have been given absolutely and entirely of itself, and all conjectures, as to the reading, should have been thrown into the notes. For the plan of this work, and the mode of its execution, we refer to the author's Prolegomena. A valuable edition of this work, enriched with various readings from the Vatican copy, and other manuscripts, and illustrated by critical dissertations, was published by Jos. Jac. Breitinger, in 4 vols. 4to. in 1730. Tigur. Helvet. A collection of the MSS. of the most ancient Greek version of the Septuagint has, within these few years past, been undertaken by Dr. Holmes, canon of Christchurch, Oxford; and the first volume was published at Oxford in 1798, folio; for an account of which, see SEPTUAGINT. Walton's Prolegomena. IX. Grabe's Prolegom. Hodii de Bibliorum Textibus originalibus, &c. p. 638, &c. Fabr. Bib. Græc. l. iii. c. xi. § 6. Tom. II. p. 324, &c. See SEPTUAGINT, and TESTAMENT.

BIBLES, *Latin*, how numerous soever, may be all reduced to three classes; the ancient *Vulgate*, called also "the old Italic," or "Vulgar Latin," (see *ITALIC Version*), translated from the Greek Septuagint, for the use of the Latins, soon after their conversion to Christianity: which version was allowed to be superior to all the rest, being, as St. Austin calls it, "tenacior verborum cum perspicuitate sententiæ:" which version being corrupted, Jerom, between the years 370 and 380, made a new Latin version from the Hexaplar Greek; the *modern Vulgate*, the greatest part of which is done from the Hebrew text; and the *new Latin translations*, done also from the Hebrew text in the sixteenth century. We have nothing remaining of the *ancient Vulgate*, used in the primitive times in the Western churches, but the Psalms, Wisdom, and Ecclesiastes. Nobilius has endeavoured to retrieve it from the works of the ancient Latin fathers; but it was impossible to do it exactly, because most of the fathers did not keep close to it in their citations.

As to the *modern Vulgate*, there are numerous editions very different from each other. Cardinal Ximenes has inserted one in the *Bible of Complutum*, corrected and altered in many places. R. Stephens, and the doctors of Louvain, have taken great pains in correcting the modern Vulgate. See VULGATE.

The best edition of Stephens's Latin Bible is that of 1540, reprinted in 1545, in which are added, on the margin, the various readings of several Latin manuscripts, which he had consulted. The doctors of Louvain revised the modern Vulgate after R. Stephens; and added the various readings of several Latin manuscripts. The best of the Louvain editions are those, at the end of which are added the critical notes of Francis Lucas of Bruges.

All these reformations of the Latin Bible were made before the time of pope Sixtus V. and Clement VIII. since which people have not dared to make any alterations, ex-

cepting in comments, and separate notes. Sixtus V. who was advanced to the papal see in 1585, although the Latin Bible of Gregory XIII. was declared to have been restored to its primitive integrity, formed, by the assistance of learned persons, another edition; and issued a bull in 1589, resolving and declaring that this was to be deemed, without doubt or controversy, that which was acknowledged as authentic by the council of Trent, and to be maintained as true, legitimate, authentic, and unquestionable; forbidding the alteration, addition, or subtraction of the least tittle of it, and declaring such a mutilated edition destitute of credit or authority. Nevertheless, after the death of Sixtus V. this edition was suppressed by succeeding popes, as inaccurate and imperfect. A new edition was undertaken by pope Gregory XIV. and completed and announced by Clement VIII. in 1592, which, though different from that of Sixtus, and even repugnant to it, is received as authentic, under the name of Sixtus V.; and it is now the standard throughout all the Romish churches. That pontiff made two reformations; but it is the first of them that is followed. See VULGATE. From this the Bibles of Plantin were done, and from those of Plantin all the rest; so that the common Bibles have none of the after-corrections of the same Clement VIII. It is a heavy charge that lies on the editions of pope Clement, viz. that they have some new texts added, and many old ones altered, to countenance and confirm what they call the Catholic doctrine; witnesses that celebrated passage of St. John, *tres sunt*, &c. Mr. James, an English protestant, has collected above 2000 articles, some of which are indeed of no great consequence, in which Clement's edition differs from that of Sixtus. Clement has adhered more closely to the Hebrew text; and his edition, says Dupin, is much more correct than that of Sixtus. He adds, though the vulgar version be not altogether free from errors and defects, it must nevertheless be confessed that the council of Trent had sufficient reason to prefer this before all the other Latin versions, as Theodore Beza, P. Fagius, L. de Dieu, Casaubon, Grotius, Walton, and some other protestants, have allowed. This version was the most ancient of all that were extant at the time of this council; the greater part of it was done by Jerom, a very exact and faithful interpreter. It had been used for many ages in the Latin church: it was written in a simple and natural style, and yet occasionally heightened by noble expressions; and upon the whole, says Dupin, it was the best and most perfect version.

There is a great number of Latin Bibles of the third class, comprehending the versions from the originals of the sacred books made within three hundred years. The first is that of Sanctus Pagninus, a Dominican, under the patronage of pope Leo X. printed at Lyons, in 4to. in 1528, authorized by two letters of pope Adrian VI. and pope Clement VII. prefixed to it, the former dated in 1523, and the latter in 1526, and much esteemed by the Jews. He employed 25 years in the execution of this work, and finished it before the year 1518. This the author improved in a second edition. In 1542, there was a beautiful edition of the same at Lyons, in folio, with *scholia*, published under the name of Michael Villanovanus, i. e. Michael Servetus, author of the *scholia*. Those of Zurich have likewise published an edition of Pagninus's Bible in 4to. And R. Stephens reprinted it in folio, with the Vulgate, in 1557, pretending to give it more correct than the former editions. There is also another edition in 1586, in four columns, under the name of *Vatablus*: and we find it again in the Hamburgh edition of the Bible in four languages.

In the number of Latin Bibles is also usually ranked the version of the same Pagninus corrected, or rather rendered literal, by Aria Montanus; which correction being approved of by the doctors of Louvain, &c. was inserted in the Polyglot Bible of Philip II. and since in that of London. The chief aim of Montanus has been to translate the Hebrew words by the same number of Latin ones; so that he has accommodated his whole translation to the most scrupulous rules of grammar, without duly adverting to his latitude; and therefore this version may be considered rather as a grammatical commentary than a true version, and adapted to instruct young beginners in the Hebrew, rather than to be read separately. There have been various editions of this in folio, quarto, and octavo; to which have been added the Hebrew text of the Old Testament, and the Greek of the New. The best of them all is the first, which is in folio, 1571. The translation of Thomas Malvenda, a Spanish Dominican, is more grammatical and barbarous than that of Montanus, and not much esteemed.

Since the Reformation, there have been several Latin versions of the Bible from the original Hebrew by Protestants. The most esteemed are those of Munster, Leo Juda, Castalio, and Tremellius: the three last of which have been reprinted various times. Munster published his version at Basil in 1534, which he afterwards revised; he published a correct edition in 1546. Without rigidly adhering to the grammatical signification of the words, like Pagninus and Montanus, he has given a more free and intelligible version: but by not deviating from the sense of the Hebrew text, he has retained some of its idiotism. He has also availed himself of the commentaries of the best Rabbins. Huetius gives him the character of a translator well versed in the Hebrew language, whose style is very exact and conformable to the original. Castalio's fine Latin pleases most people; but there are some who think it too much affected, and destitute of that noble simplicity and natural grandeur, and of that inexpressible energy of style, belonging to the originals, and some other versions: the best edition of it is that in 1573. Leo Juda's version, altered a little by the divines of Salamanca, was added to the ancient Latin edition, as published by R. Stephens, with notes under the name of "Vatablus's Bible," in 1545. It was printed at Zurich in 1543, and is more elegantly written than Munster's, but sometimes recedes too far from the literal sense. It was condemned by the Parisian divines, but printed, with some alterations, by the Spanish divines of Salamanca. That of Junius and Tremellius is preferred, especially by the Calvinists, and has undergone a great number of editions. It possess much more of the true natural simplicity. The chief Hebraisms are preserved, and the whole is exactly conformable to the Hebrew text, without the least obscurity or barbarity. Nevertheless, it is not without defect; relative pronouns are introduced, without attention to the Hebrew text, and they are charged with adding some words to express their own sense.

We may add a fourth class of Latin Bibles, comprehending the *Vulgate* edition, corrected from the originals. The Bible of Hieronimus Clarius is of this number: that author, not being contented with restoring the ancient Latin copy, has corrected the translator in a great number of places, which he thought ill rendered, so as to make them conformable to the Hebrew text. Although he corrected above 8000 passages, he has omitted some to avoid giving offence to the Catholics, by making too many alterations in the vulgar version. Some Protestants have followed the same method, and, among others, Andrew and Luke Oshander, who have each published a new edition of the "*Vulgate*," corrected from the originals, according to the Hebrew text. They have inserted their emendations in a character different from the

text of the vulgar version, instead of throwing them into the margin, and thus they have occasioned some confusion.

BIBLES, Oriental. At the head of the Oriental versions of the Bible, must be placed the Samaritan, as being the most ancient of all, though neither its age nor author have been yet ascertained, and admitting no more for Scripture but the Pentateuch, or five books of Moses. This translation is made from the Samaritan Hebrew text, which is a little different from the Hebrew text of the Jews. This version has never been printed alone; nor any where but in the Polyglotts of London and Paris. See **PENTATEUCH**, and **SAMARITANS**.

BIBLES, Chaldee, are only the glosses or expositions made by the Jews in the time when they spoke the Chaldee tongue. These they call by the name of *Targumim*, or *paraphrases*, as not being any strict versions of the Scripture. They have been inserted entire in the large Hebrew Bibles of Venice and Basil; but are read more commodiously in the Polyglott, being there attended with a Latin translation. See **Chaldee PARAPHRASE**.

BIBLES, Syriac. There are extant two versions of the Old Testament in the Syriac language; one from the Septuagint, which is ancient, and made probably about the time of Constantine; the other, called *antiqua & simplex*, made from the Hebrew, as some suppose, about the time of the apostles. This version is printed in the Polyglotte of London and Paris.

In the year 1555, Widmanstadius printed the whole New Testament in Syriac, at Vienna, in a beautiful character. After him there were several other editions; and it was inserted in the Bible of Philip II. with a Latin translation. The best edition of the Syriac New Testament is unquestionably that of Leyden, published by Schaaf in 1708, and reprinted, much improved, at Leyden, in 1717. A new Syriac and Arabic Testament was printed at Rome, in 1703, by the Propaganda, for the use of the Maronite Christians in Syria. Gabriel Sionita also published a beautiful Syriac edition of the Psalms, at Paris, in 1525, with a Latin interpretation. See **SYRIAC Version**.

BIBLES, Arabic. Although the Christian religion was preached in Arabia, as well as in other countries of the East, at an early period, it never was the established religion of the country, as in Syria and in Egypt; for even the temple of Mecca was a heathen temple till the time of Mahomet. A translation of the Bible into Arabic was therefore wholly unnecessary before the conquests of the Saracens, when the Arabic became the vernacular language of Christian countries. Historical evidence on this subject extends no further than the tenth century, when Rabbi Saadas Gaon published an Arabic version of the Pentateuch; and if conjecture may be allowed (says Marsh, in his edition of Michaelis's Introduction, vol. iii. p. 599.), we may suppose that most of the Arabic versions were made during the period that elapsed between the conquests of the Saracens in the 7th century, and the crusades in the 11th, especially about the middle of this period, when the Syriac and the Coptic, though they had ceased to be living languages, were still understood by men of education; and Arabic literature, under the patronage of Almamon and his successors, arrived at its highest pitch. The age in which the Arabic printed version, or versions of the New Testament, were written, is wholly undecided, for we have no knowledge of the MSS. from which the Roman edition of the four Gospels (mentioned below) was printed; and all that we know of the MSS. used by Gabriel Sionita in his edition of the Paris Polyglott, and by Erpenius in his edition of the Arabic New Testament, is, that the former used a MS. brought from Aleppo, and written in Egypt in the 14th century, and the latter a manu-

script brought from Egypt, in which the gospels were written in the 13th, and the Acts, Epistles, and Revelation in the 14th century. But we are left wholly in the dark with respect to the century in which the versions themselves were made. The Arabic versions may be divided into four classes; viz. those taken immediately from the Syriac, from the Coptic, from the Greek, and from the Latin. That various Arabic versions have been made from the Latin in modern times by oriental monks residing at Rome, who being instructed by the Romish clergy to regard the Vulgate as the standard by which all other versions should be regulated, proposed essentially to serve their brethren in the East, by translating it into their native language, is evident from what is related by professor Adler in his *Biblical and Critical Journey to Rome*, p. 178; and an Arabic version of this kind was actually published at Rome, in 1752, by Raphael Tuki, bishop of Arsan. As for those versions which are written in parallel columns with the Syriac and Coptic, of which copies exist in the royal library at Paris, it is reasonable to suppose that they were not made from the Greek, but immediately from the ancient versions with which they are connected, as the means of understanding them, after the languages in which they were written had ceased to be spoken. For the same reason, those annexed to the Greek text were probably taken immediately from the Greek; but of these Greek Arabic MSS. only one has been discovered, namely, that in the university library at Leyden. Walton (*Prolegomena*, p. 96.) says, that there are two kinds of Arabic versions in use among the eastern Christians; one called the Syriac, and the other the Egyptian, from the countries in which they are used. Both these versions, according to Aug. Justinian, bishop of Nebo, were translated from the Greek. In the year 1516, Aug. Justinian printed at Genoa an Arabic version of the Psalter, with the Hebrew text and Chaldee paraphrase, adding Latin interpretations, which, he says, were taken from the Syrian or Antiochian version. There are also Arabic versions of the whole Scriptures in the Polyglotts of London and Paris, said by Justinian to be taken from the Egyptian or Alexandrian versions; and we have an edition of the Old Testament entire, printed at Rome in 1671, by order of the congregation *de propaganda fide*; but it is of little esteem, as having been altered agreeably to the Vulgate edition. The Arabic Bibles among us are not the same with those used by the Christians in the East. Some learned men take the Arabic version of the Old Testament, printed in the Polyglotts, to be, at least in the main, that of Saadias, who died in the year 942, and who translated the whole Old Testament from the Hebrew into the Arabic, expressing the Arabic in Hebrew characters. Their reason is, that Aben Ezra, a great antagonist of Saadias, quotes some passages of his version, which are the same with those in the Arabic version of the Polyglotts; yet others are of opinion that Saadias's version is not extant. For though the whole Hebrew Bible was thus translated by him, the Pentateuch only has been, as yet, published from his version. The other books, now in Arabic, in the Paris and London Polyglotts, were translated at different times by different authors; partly from the Greek, and partly from the Syriac versions; and few parts, if any, excepting the Pentateuch, were translated from the Hebrew text. The Arabic version is the latest of all the ancient versions of the Old Testament; however, that part of it which has been translated from the Hebrew, will assist in detecting some corruptions that have crept into the Hebrew text since, and those parts that are made from the ancient versions will assist in establishing the true readings of those versions. In 1622, Erpenius printed an Arabic Pentateuch, called also the Pentateuch of Mauritania, as being made by the Jews of Barbary, and

for their use. This version is very literal, and esteemed very exact. The four evangelists have also been published in Arabic, without and with a Latin version, at Rome, in 1591, folio. The Latin translation is printed under each line of the Arabic text, and is taken from the Vulgate, though the Latin text is in some measure altered, so as to make it correspond to the Arabic. In a representation of the baptism of Christ, annexed to it, the rite appears to be performed, not according to the oriental custom of immersion, but according to the northern practice of aspersion; for our Saviour is placed, not in Jordan, but at the brink of the river, with his feet only immersed, while John the Baptist, kneeling on a rock, pours water on his head. The MS. from which this edition princeps of the Arabic gospels is taken, is wholly unknown. Michaelis observes, that upon comparing it with the catechism of the Druses, the passages there quoted from the gospels coincide with this edition; whence he infers that this version must have been long and generally known in Asia. But from this coincidence no other inference can be justly drawn, except that the Arabic version of the gospels, printed at Rome in 1591, was made before the 11th century; for to that age the origin of the Druses is referred. Erpenius observes, in the preface to his Arabic New Testament, that this edition bears a great resemblance to the MS. from which he printed the four gospels, except the first thirteen chapters of St. Matthew. The version, says Michaelis, was certainly taken from the Greek: but father Simon (*Hist. Crit. des Versions du N.T.* ch. 18.) says, that upon comparing the Arabic version of the four gospels printed at Rome, and afterwards reprinted in the Polyglotts, with an Arabic translation of the Coptic version, he found them dissimilar; but that on comparing it with an Arabic translation of the Syriac version, he perceived a great resemblance. Hence he concluded, that it was taken, not from the Greek, but from the Syriac text. This version has been since reprinted in the Polyglotts of London and Paris, with some little alteration of Gabriel Sionita. This Gabriel Sionita, a Maronite by birth, from the neighbourhood of Libanus, and one of the principal editors of the Paris Polyglott, relates, that he made use of a manuscript written in Egypt in the 14th century; but he seems to have been unacquainted both with the name of the author, and with the age in which he lived. Le Loag relates, that it was brought immediately from Aleppo to Paris. From this MS. the Arabic version of the Acts and of the Epistles was taken, which was first in the Paris, and reprinted with additions in the London Polyglott. But this version of the Acts and Epistles can lay no claim to high antiquity; and though it was probably not taken from the Syriac, yet it is not certain whether it was taken from the Greek or the Coptic. Erpenius published an Arabic New Testament entire, as he found it in his manuscript copy, at Leyden, in 1616, from a manuscript written in the Upper Egypt, in 1342. From two dates, which Erpenius seems to have confounded, it is probable, that the manuscript used by him was a compound of two different manuscripts, one written in the 13th, and the other in the 14th century; and this is very consistent with the opinion, that the gospels in this manuscript were translated either from the Coptic or from the Greek, and the Acts and Epistles from the Syriac.

There are some other Arabic versions of late date mentioned by Walton in his *Prolegomena*; particularly a version of the Psalms preserved in Sion College, London, and another of the prophets at Oxford; neither of which has been published.

The English society for promoting Christian knowledge published, in 1727, an Arabic New Testament, for the use of the Christians in Asia. Ten thousand copies were printed, but none sold in Europe, so that this edition is very scarce.

Two copies are preserved at Cambridge, one in the university library, and another in the library of St. John's college. The text is taken from the Polyglotts; but the editor Solomon Negri, by order of the society, altered it in those passages which vary from the reading of our present Greek text. The editor, says Michaelis, has taken the liberty of inserting 1 John v. 7. without cautioning the reader that it was not taken from any MS.

An Arabic Bible is said to have been printed at Bukarest, in 1700, and the gospels at Aleppo, in 1706. Of these, as well as of the complete editions of the Arabic version, a description is given in Le Long's *Bibl. Sacr.* ed. Masch. P. ii. vol. i. p. 110—137. For an account of the MSS. of the Arabic version of the N. T. preserved in the different libraries of Europe, see Boerner's edition of Le Long's *Bibl. Sacr.* P. i. p. 234—240. or vol. i. p. 120—122. Paris ed. 1723; Uri's Catalogue, N. 22—34 of the Arabic MSS.; and Note 11 to § 3. ch. vii. in Marsh's edition of Michaelis's Introduction to the N. T. In the university library are two Arabic manuscripts of the gospels, which formerly belonged to Cyrilus Lucaris.

BIBLES, Coptic. There are several manuscript copies of the Coptic Bible in some of the great libraries, especially in the library of Paris. The Coptic version of the New Testament must be regarded as a principal version of considerable antiquity, because it has given birth to several others in the Arabic language; for since Egypt was invaded by the Saracens, who extirpated the old language, the Egyptians have generally annexed to the Coptic N. T. an Arabic translation, which has almost superseded the original. Niebuhr, in his Description of Arabia (p. 86), relates, that though the gospels are still read in the Coptic version in the public service, it is not understood even by the priests; and that immediately after the lessons have been read in Coptic, the same are read in Arabic, which is the present language both of the Upper and the Lower Egypt. Thomas Marshall had once intended to print the Coptic version, and had even prepared the four gospels for the press, but he died before they were printed. Upon which the publication was referred for Dr. D. Wilkins, a native of Memel in Prussia, who, after having studied the Coptic, made a journey to Amsterdam with this view; but induced by several advantageous circumstances, he removed to Oxford, where his Coptic New Testament was printed in 1716, at the expence of the university. Besides a long preface, he added a Latin translation of the Coptic text, which Jablonski and La Croze have criticised with some severity. It is said, however, that Wilkins took great pains to present the world with a faithful copy, and that his endeavours were not unsuccessful. He also printed the Pentateuch, with a Latin translation, in 1731. Since his time a great variety of MSS. have been collated; and if Woide had undertaken the task, a more complete edition of the Coptic version might have been expected. The title of Wilkins's edition is "*Novum Testamentum Aegyptium vulgo Copticum, ex MSS. Bodleianis descriptis, cum Vaticanis et Parisiensibus collatis, et in Latinum sermoem convertit, David Wilkins, Bachel. Anglicanæ Presbyter.*" Oxon. 1716, 4to. Maj. Montfaucon, in his *Palaographia Græca* (l. iv. c. 7. p. 31.), says that the Coptic MSS. which remain, are not very ancient, and that he has not seen any older than 500 years. Wilkins, in his preface, supports the antiquity of the Coptic version by several arguments, the chief of which is drawn from Antoninus, who began to lead an ascetic life about the year 271, and who, though an Egyptian, and ignorant of Greek, read the New Testament. To the same purpose Woide (p. 97. of his Essay, mentioned below) maintains, that the Egyptian version used by Antoninus in the third century, was written in Coptic,

because he actually read an Egyptian version of the Bible, and as he understood only the dialect of his own country, he concludes that the Coptic version existed before the middle of the third century. Ludovicus Pickins, or Louis Picques, who was acquainted with the Coptic language, refers this version to the fifth century. See Mill's Prolegomena, § 1509.

The readings of the Coptic have a striking affinity with those of the Latin version, and sometimes with those of the Codex Cantabrigiensis. The story of the adulteress is found in some copies, and omitted in others; but 1 John v. 7. is omitted in all. Wetstein has also observed, that the Coptic New Testament has a very great similarity to the quotations of Origen, Eusebius, Cyril, and to the Alexandrine manuscripts. The best accounts of the Coptic version are given in Simon's *Histoire Critique des Versions du Nouveau Testament*, ed. 16.; in the Preface to Wilkins's edition of the Coptic New Testament; in Le Long's *Bibl. Sacr.* ed. Masch. P. ii. vol. i. § 10; and particularly by the learned Woide, in a German Essay printed in 1778, in vol. iii. of the *Kielische Beytrage*, p. 1—10. See **COPTIC**.

BIBLES, Sahidic. The Sahidic version of the Old and New Testament, or that of Upper Egypt, existed only till of late in MS.; but in 1778, the learned Woide published proposals for an edition of several fragments of this version, comprehending about a third part of the New Testament, under the following title, "*Fragmenta Novi Testamenti juxta interpretationem dialecti superioris Aegypti, quæ Thebaidica seu Sahidica appellatur, MSS. Oxoniensibus descripta quæ Latinè reddet, et simul etiam de antiquitate et variis lectionibus hujus interpretationis disseret, C. G. Woide.*" The learned editor lived to continue the work so far as to print the fragments of St. Luke's gospel, and to prepare for the press the manuscript of the fragments of St. John's gospel, but he died in May 1780. After his decease, the delegates of the Clarendon press entrusted the completion of the work to Dr. Ford; and under his care it made its appearance, entitled "*Fragmenta Novi Testamenti, e versione Aegyptiaca Dialecti Thebaidicæ, Sahidicæ, seu Superioris Aegypti,*" Oxon. large folio. In an elaborate dissertation prefixed to this work, Dr. Woide treats of the Coptic version of the Old Testament; of the Sahidic version of the Old Testament; and of the original texts from which those versions were made. In his opinion both the versions were made from the Greek; they express the phrases of the version of the LXX.; and most of the additions, omissions, and transpositions, which distinguish the LXX. from the Hebrew, are discoverable in both the Coptic and the Sahidic version. In a second section the author treats of the Coptic version of the New Testament, and Wilkins's edition of it; of the Sahidic version of the New Testament; and of the antiquity of the versions of the Old and New Testament in both dialects. And in a third section, Dr. Woide gives an account of the versions, in both dialects, of the apocryphal books of the Old and New Testament. From his observations and account, we may conclude, that the Coptic and Sahidic are distinct and independent versions; that the Coptic inclines more to the Alexandrian or Western edition, than the Sahidic; that no remarkable coincidence is to be found between the Coptic or Sahidic version and the Vulgate; and that we have no reason to suspect the former to have been altered or made to conform to the latter; and that the age of the Sahidic version is not yet ascertained. Dr. Woide supposes, that it was made in the second century; and in proof of this opinion, he alleges three arguments. The first argument, deduced from the use made of an Egyptian version by St. Anthony, who is said by St. Athanasius to have been ignorant of the Greek language, and yet to have constantly read the Scripture, has been mentioned under the preceding article.

article. His second argument is deduced from a Sahidic MS. which is probably of the second century, and which contains various passages both of the Old and New Testaments, coinciding with some of the fragments of the Sahidic versions. His third argument is founded on an apparent coincidence of some passages in the fragments, with a manuscript containing two books of the fabrication of the Gnostics, and evidently written in the second century. It appears then, if no objections can be made to these arguments, that proofs may be alleged of a higher antiquity in favour of the Sahidic version than can be produced in favour of any other version of the New Testament: and it must of course be of the greatest importance in the criticism of the Greek Testament. At the same time it must be acknowledged, that the oldest historical evidence for the high antiquity of an Egyptian version is that of Epiphanius and Theodoret; the former quoted by Semler in his "Apparatus ad Novi Testamenti interpretationem," p. 64.; the latter by Wilkins, in the "Prolegomena" to his Coptic New Testament, p. 6. From an examination of the various readings furnished by the above-mentioned fragments, it appears, that the story of the adulteress, John viii. 1—12. is not among them; in the Acts of the Apostles, ch. xx. 28. the Sahidic version coincides with those Greek MSS. which have *απερου*, not *θεις*, in 1 Tim. iii. 16. they coincide with those which read *O* instead of *θεος*: and 1 John ch. v. has the sixth and eighth verses; but the seventh, which contains the testimony of the three heavenly witnesses, is absent. We have an account of the Sahidic version of the New Testament in "Friderici Münter Commentatio de indole versionis N. T. Sahidicæ, &c." Hafniæ, 1789, 4to. to which are annexed some fragments of the New Testament from manuscripts in the possession of cardinal Borgia. Some fragments of the Sahidic version of the gospels of St. Matthew and St. John have been likewise published by Mingarelli in his "Ægyptiorum codicum reliquæ, Venetiis in bibliotheca Namiana asservatæ," Bonon. 1785, 4to. MSS. or rather fragments of MSS. of the Sahidic version of the New Testament are preserved in the libraries of Rome, Paris, Oxford, Berlin, and Venice.

BIBLES, Ethiopic. The Ethiopians have also translated the Bible into their language. Chrysolom, cited by Michaelis, says, that the Ethiopians had in his time a version of the Bible; but his evidence is unsatisfactory. Ludolf, in his history of Ethiopia, relates, that the Scripture was translated into that idiom of the Ethiopic language, which was at that time more peculiar to the inhabitants of Tigré, from the Greek version of the LXX, according to a certain copy used in the church of Alexandria, which the innumerable various readings that are inserted in the English Polyglott Bible from one of the same copies, plainly prove. As for the author, and time of the translation, he is unable to ascertain either; but thinks it most probable that it was begun at the time when the Habeshines, or Abyssinians, were converted, or soon after, and that it was gradually perfected. Mr. Bruce, in his "Travels," vol. i. p. 490, says, that the Abyssinian copy of the Holy Scriptures was, in Mr. Ludolf's opinion, translated by Frumentius, a bishop in the 4th century, who first preached Christianity in Ethiopia; but Ludolf has left the matter undecided. See Hist. of Ethiopia, p. 262 ed. 1682. Mr. Bruce himself inclines to this opinion. They divide the Old Testament, says Ludolf, containing 46 books, into four principal parts, and mix the apocrypha with the canonical. Walton, (Proleg. xv. p. 100.) says, that Gaulmin had an ancient MS. of the whole Ethiopic Old Testament, which was deposited in the royal library of Sweden. Mr. Bruce informs us, (vol. i. p. 489.) that he brought with him a copy of the Ethiopic

version of the O. T. which he has deposited in the British Museum: but it does not appear that he brought a copy of any part of the New. Indeed, he says, (vol. i. p. 493.) that copies of the whole N. T. are in that country very scarce; that, except in the churches, he had never seen a single MS. which comprehended all the parts of it; and that even the transcripts of the Gospels were in the hands only of men of the first distinction. The Ethiopic version of the N. T. contains the whole of it, divided, according to Ludolf, into four separate parts, viz. the Gospels, the Acts, the fourteen Epistles of St. Paul, and the seven Catholic Epistles. The Apocalypse is added as an appendix, and entitled "Abukalamis." Scaliger refers the Ethiopic version to the time of Justinian, at which period he dates the conversion of the Abyssinians: but Walton refers it to a much earlier period, and not far distant from the times of the Apostles. Whoever was the translator of it, it appears to have been taken immediately from the Greek: from the frequent confusion of words which found alike in the Greek, but which have not been confounded by any other translator, and from its agreement in many of its readings with the Alexandrine MS. and with the quotations of Origen. Neither of these circumstances can appear extraordinary, as it was natural for the inhabitants of Abyssinia to procure their copies of the Greek Testament from Egypt. The translation of the Gospels is much superior to that of the Epistles. This version was first published at Rome, in 1548 and 1549, under the pontificate of Paul III. but the editors, who were natives of Ethiopia, had a very imperfect MS. of the Acts, the chafms of which they were obliged to supply from the Vulgate. To this purpose, Ludolf observes, that the Acts of the Apostles, for the most part, were translated at Rome, out of the Latin and Greek, for want of the Ethiopic original. This original seems to have been the source from which our editions of the Ethiopic version of the N. T. have flowed; and it is probably preserved in the Vatican, though it has not yet been described. Walton reprinted this Roman edition in the London Polyglott; but his copy, being in some places illegible, the editors filled up the deficiencies according to their own judgment, so that the Roman edition retains the same value, as if no other were extant. The Latin translation was made by Dudley Loftus, and corrected by Castell; but it is of little worth, and has led Mill, and other collectors of various readings, into error. A more accurate Latin translation of the Ethiopic version has been published by professor Bode, under the following title, "Novum Testamentum ex versione Ethiopici interpretis in Bibliis polyglottis Anglicanis editum ex Ethiopicâ lingua in Latinum translatum," Brunsvigie. 1752, 1755. 2 toms. 4to. The best extracts from the Ethiopic version, says Michaelis, are and must be uncertain, because we have no accurate impression of the version itself; however, his editor (Dr. Marsh) observes, that if the Ethiopic version was made immediately from the Greek, and in an early age; if its readings coincide with the quotations of Origen, and the Greek MSS. of the Alexandrine edition, it seems to be entitled to the same privileges, as other versions of equal antiquity. The principal objection applies not so much to the version itself, as to our printed text, which is probably incorrect, as not being the result of a collation of different MSS. But the same objection may be made to the old Syriac version, in which, though various MSS. have been used since the original edition of Widmanstad, the alterations that have been made deserve rather the name of corruptions than of improvements. Of all the books of the O. T. there never was any printed, but the Psalms and the Song of Solomon, in the Ethiopic language at Rome, in 1513; at Cologne, in 1518, and since that time,

with corrections and emendations, by Walton, in the London Polyglott.

BIBLES, Armenian. There is a very ancient Armenian version of the whole Bible, done from the Greek of the LXX. by some of their doctors, about the time of St. Chrysostom. See *ARMENIAN version*. The first printed edition of the Armenian version was published in the 17th century by Uscan, bishop of Erivan; because the Bible was at that time become so scarce in Armenia, that a single copy cost 1200 livres. Hence a council of Armenian bishops assembled in 1662, ordered the Bible to be printed in Europe. Accordingly, three distinct editions were printed at Amsterdam; the first in 1665, containing both the O. and N. T. in 4to. a second, in 1668, including only the N. T. in 8vo., and a third, in 1698, in 12mo. The two first were printed under the direction of Uscan; but the last is the most beautiful edition. A complete description, particularly of the first of these editions, is given in *Le Long. Bib. sacra*, ed. Mafel, P. II. vol. i. p. 173—176. 180. A list of Armenian MSS. of the N. T. is given in Dr. Boerner's edition of this work, P. i. p. 20, or vol. i. p. 138, of the Paris edition of 1723; see also vol. i. p. 76, of the *Catalogus MSS. Bib. Regiæ*, and note 11 to p. 3. chap. vii. of *Marli's Michaelis*. La Croze and G. Whiston have accused the editor of the above-mentioned edition of having corrupted, in some places, the Armenian text. It is certain, however, says Michaelis, that John v. 7. was not in his MS.; for Sandius declares that he had seen the MS. from which the Amsterdam edition was printed, and that it wanted that verse. Sandius, in the place referred to by Michaelis, speaks of one ancient MS. which he had seen, in possession of the bishop of the Armenian church, and which had been collated at Amsterdam, in which this passage did not occur. It is possible, however, and even probable, that Uscan had more than one MS. and the words of Sandius do not imply the contrary. Nevertheless, we have positive evidence, that Armenian MSS. written before the time of the council at Cis, in 1307, have not this verse. In like manner, John v. 4. is wanting in the Armenian MS. but inserted in Uscan's edition; and La Croze observes, that Uscan himself acknowledges, in his preface, that he had altered some passages from the Vulgate; not, as he candidly allows, with an intention to deceive, but from ignorance and superstitition.

BIBLE, Georgian. The Georgian version was first printed at Moscow, in 1743, fol. and a description of it is given by the learned Michaelis, in his "Allgemeine Bibliothek," or Universal History of Biblical Literature, vol. i. p. 153—160. From the description it appears, that the Georgian text was altered from the Slavonian, in the edition of Moscow, and it would therefore be of little value, the criticism of the N. T. Two MSS. of the Georgian version of the Gospels are preserved in the Vatican. See *Le Long. Bib. Sacr. tom. i. p. 140. ed. Paris, 1723.*

BIBLE, Persian. Some of the Fathers seem to say, that all the Scripture was formerly translated into the language of the Persians; but we have nothing now remaining of the ancient version, which was, certainly, done from the Septuagint. The Persian Pentateuch, printed in the London Polyglott is, without doubt, the work of Rabbi Jacob, a Persian Jew, surnamed Tavosht, Tavulus, or Tufus, from the city Tus, where the Jews had a famous academy. It was translated from the Hebrew text, for the use of the Jews, who lived in Persia, and printed in the Hebrew character, with the Hebrew text, and with the version of O. Kelai and Saadiah, at Constantinople, in 1751. From the collation of this, with other versions, we may deduce a satisfactory explanation of the famous prophecy of Jacob concerning the advent

of the Messiah, unperverted by the glosses of the Rabbins. We have likewise two Persian versions of the four Gospels, of which the most ancient, and that which is of course the most valued by the learned, is printed in the London Polyglott, accompanied with a Latin translation by Dr. Sam. Clarke, and notes by Dr. Thomas Greaves, contained in the appendix. This Persian version of the four Gospels, which is the only part of the N. T. hitherto printed, was taken from a MS. in the possession of Dr. Pococke, and written in the year 1341, as appears by a declaration annexed to it. A new Latin translation has been published by professor Bode, at Helmstadt, in 1750, 1751, with a preface containing historical and critical remarks on the Persian version. Dr. Greaves has very justly observed, that the Persian is a translation of the Syriac, for it sometimes retains even Syriac words, and subjoins a Persian interpretation; and in other places confounds the meaning of words, that have a similar sound only in the Syriac. This is likewise probable in itself; for the Christians, who lived scattered in the Persian empire, made use of Syriac as the language of the church, and as the language of literature; and it was common for the Persians to study in the schools of Syria, especially at Edessa. The principal use then of the Persian version is in discovering the false readings that have crept, since that period, into the Syriac. It might be added, that the Persian omits passages, that are wanting in no MS. or version except the Syriac; as *Matth. xxvii. 46. Mark. vii. 34.* There is another Persian version of the Gospels, which Abraham Wheeloe began to print in 1653, and which was finished after his death by Pierfon, in 1657. It was published in London, and three MSS. were used by the editors. Walton, in his "Prolegomena," xvi. 9. p. 102, informs us, that he knew of only three MSS. of the Persian Gospels, one in the possession of Dr. Pococke, which he used, and the other two in the libraries of Oxford and Cambridge, different from the other, and less ancient. If this be the case, Wheeloe must have used MSS. containing distinct versions, and his text must be of a mixed nature, and of less value in that respect, as well as in point of antiquity, than that of the Polyglott. Wheeloe, or rather Pierfon, whose name is prefixed to the second title page, was of opinion, that this Persian version was made from the Greek; but Renaudot believed it to have been taken from the Syriac. Walton mentions two Persian versions of the Psalms, that were made in the 17th century from the vulgar Latin.

BIBLES, Gothic. It is generally said, that Ulphilas, a Gothic bishop, who lived in the fourth century, made a version of the whole Bible, for the use of his countrymen. Philoborgius (*Hist. Eccles. l. ii. c. 5.*) asserts, that Ulphilas omitted the book of Kings, from an apprehension, that the martial spirit of his nation might be roused by the relation of the Jewish wars; yet this opinion has been confuted by Kaitel, in his learned commentary, s. 255. Michaelis, who was once a strenuous advocate for the opinion, that this was a Frankish version, has since changed his mind, and in the last edition of his *Int. to N. T.* vol. ii. p. 130. ed. Marli, expresses his conviction, that it was Gothic. For an account of the author, see *ULPHILAS*; and to the account already given of this version under the article *ARGENTINUS Codex*, we shall here subjoin the following particulars. From the martyrology of Nicetas, preserved by Simeon Metaphrastes, it appears, that this version was made immediately from the Greek. Besides, independently of this evidence, it is natural to conclude, that a native Cappadocian, who was bishop of a nation in the neighbourhood of Constantinople, and was sent ambassador to the Greek emperor, would translate from the original Greek, with which he was much better

ter acquainted than with the Latin version, from which some writers have erroneously supposed his version was taken. Moreover, from a passage quoted by Blanchini in the "Prolegomena," to the first volume of his "Evangelium quadruplex," p. 8. from a MS. preserved at Brascia, containing the old Latin version of the Gospels, we may infer, that the Gothic version was known in Italy, and that a distinction was made between it and the Italian. Of this important version we have few remains. The principal of these are contained in the *Codex ARGENTÆUS*; which has the four Gospels, though not without considerable chasms. It was first printed in Gothic letters, at Dort, in 1665, 4to.; and reprinted at Amsterdam, in 1684, (Michaelis); and another edition was printed in Latin letters, at Stockholm, accompanied with the Islandish, Swedish, and Latin vulgate. In 1750, it was printed at Oxford, by Lye, after the corrections and emendations of archbishop Beazel; and in 1752 and 1755, the learned Ibre published two small essays, under the title of "Ulphilas illustratus," in which the erroneous passages of the former editions are correctly printed in Latin letters, accompanied with a Latin translation, and notes.

BIBLES, *Muscovite, Russian, or Slavonian.* The Russian or Slavonian version was taken from the Greek by two brothers, Methodius and Cyril, natives of Thessalonica, and apostles of the Slavonians, who lived in the 9th century. According to the account given by Poletika, a learned person of Russia, and formerly Greek translator to the holy synod, in answer to inquiries proposed by Michaelis, it appears, that the holy synod ordered a complete copy of the Bible to be taken, in 1499, which is preserved in the library of that synod; but from the same testimony it appears, that MSS. of the New Testament are extant from the 11th to the 14th century, some on vellum, others on paper, which are also preserved at Moscow, in the library of the holy synod. The oldest known edition is that of Prague, published by Francis Scorina, in 1519; but Poletika is not certain whether it contains the Bible complete. It was revised in 1570, altered in several passages from an ancient MS. written in the time of the grand duke Wladimir, given to Garabunda, secretary to the duchy of Lithuania, and used in the edition of the Bible, printed at Ostrog, in 1581, at the expence of Con. Basil, duke of Ostrog, for the common service of all Christians who spoke the Slavonic language. Other editions were printed at Moscow, in 1663, 1751, 1756, 1757, and 1766, in folio, in 1759 in large 8vo. and in 1783, in 4to. It was also printed at Kiow, in 1758, folio; and at Suprasl in Poland, in small folio. A copy of the edition of 1581, and another of that of 1663, both which are scarce, are preserved in the university library of Göttingen. A particular edition of the Acts of the Apostles, and the Epistles, was printed in 1653. The passage 1 John v. 7. is found neither in the Ostrog edition, the ancient MSS. nor in those editions of the Acts and Epistles, which are prior to 1653. That of 1653 contains it; that of 1663 has it in the margin, and that of 1751, and other modern editions, in the text. Poletika thinks this interpolation was made in the time of the patriarch Nikon, in 1653, when an edition was published of the Acts and Epistles. A very excellent description of the Slavonian version has been communicated to the public by Dobrowsky, a very learned critic in the "Neue Orientalische Bibliothek," vol. vii. p. 153—167. From this work the following particulars, relating to this version, are extracted, by Marsh, in his edition of Michaelis' notes to ch. vii. § 37. The Slavonian version is very literally translated from the Greek, the Greek construction being frequently retained where it is contrary to the genius of the Slavonian; and resembles, in general, the most ancient

MSS. In the Gospels it agrees with the Codex Stephani more frequently than with any other Greek MS. In the catholic epistles it agrees, in general, with the Codex Alexandrinus, and frequently in the Revelation. In the Acts and in the Epistles of St. Paul, it agrees, in general, with the most ancient MSS. but sometimes with one, sometimes with another, yet most frequently with Wettstein's Codex E. Of the readings adopted by Griesbach in the text of his Greek Testament, the Slavonian version has at least three-fourths. Where the united evidence of ancient MSS. is against the common printed reading, the Slavonian version agrees with the ancient MSS. It has not been altered from the Vulgate, as some have supposed, though the fact is in itself almost incredible. It varies from the text of Theophylact, in as many instances as they agree; and their coincidence is to be ascribed, not to an alteration from Theophylact, but to the circumstance, that both Theophylact and the authors of the Slavonian version used the Greek edition. The Slavonian version has few or no readings peculiar to itself, or what the critics call "lectiones singulares."

BIBLES, *Spanish.* There are two translations of the Bible into this language; one done by the Jews, from the Hebrew, and first printed at Ferrara, in 1553, and at Amsterdam, in 1661; the other by Cassiodore Reyna, printed at Basil, in 1569. A corrected edition of it was printed at Amsterdam, in 1602, and at Frankfurt, in 1622. This translation was made from the Hebrew, or rather from the version of Pagninus, and the New Testament from the Greek. There is a translation of the N. T. in Spanish done by Francis Enzinas, and dedicated to Charles V. of which there are several editions; and another different Spanish translation of the N. T. printed in 1596.

BIBLES, *Italian.* There are four Italian versions: the first towards the close of the 13th century, by James de Voragine, archbishop of Genoa, who translated the whole Bible into Italian, from the Vulgate; which ancient version is quite lost; the second by Bruccioli, in 1530, who translated the Bible from the Hebrew, or rather from the version of Pagninus, and dedicated it to Francis I. king of France; the third by Malhermi, a Venetian and Benedictine monk, abbot of St. Michael de Lemo, translated from the vulgar Latin towards the end of the 15th century; the first edition of which was published in 1471; one of them, in 1477, revised by friar Martin, a Dominican; and afterwards printed at Venice in 1541; and the 4th by Diodati, a Protestant, which is much esteemed, and has been often printed. This edition, which was conformable to the French edition of Geneva, was first published in 1607, and again a second time in 1641. The New Testament was translated by father Zachary, a Dominican friar of Florence, and printed apart at Venice, in 1542. An Italian edition of the Epistles and Gospels was printed in 1583.

BIBLES, *French.* The most ancient translation of the Bible into French is that of Guiars de Moulins, a canon of St. Peter d'Aire, in the diocese of Touraine, who was employed in translating the historical books of the O. and N. T. from the year 1291 till 1294. Of this translation there are several editions in the Paris library. Some historians affirm, that Charles V. king of France, caused the Bible to be translated into French by Nicholas Oresme, superior of the house of Navarre, and doctor of Paris. These, and some other translations of parts of the Bible, are extant in MS. in the Paris library. The first French Bible was printed by order of Charles VIII. and dedicated to him, and consequently before the year 1498; being the translation of Guiars de Moulins. The New Testament was printed in French by Colins, printer of Paris, in 1523. But the

same language were read in their religious assemblies. The whole scripture is said by some to have been translated into the Anglo-Saxon by Bede, about the year 701; though others contend that he only translated the Gospels; and others ascribe to him only the gospel of St. John.

We have certain books, or parts of the Bible, by several other translators; as, 1. The Psalms, by Adelm, bishop of Shireborn, contemporary with Bede, about the year 706; though by others this version is attributed to king Alfred, who lived near two hundred years after, and who is said by Mr. Fox to have translated both the Old and New Testament into his native language; and by others to have translated the greatest part of the New Testament: but the authority on which these assertions is founded is too precarious to claim any great degree of confidence. On equally uncertain authority it has been said, that the whole Bible was translated into the Saxon language in the reign of Athelstan. Bale, however, "Script. Brit." cent. 2. c. 27, cites the testimony of Malmesbury to this purpose; and archbishop Usher refers this to the year 930. Some books of the Bible were translated by Eadfried, or Egbert, bishop of Lindisfarne, about the year 680, according to the conjecture of Mr. Selden. A celebrated version of the four Gospels in the Saxon language, said to be made by one Aldred, a priest, is reported to have been found in the celebrated code of bishop Eadfried. Adelm is said to have written a letter to Eadfried, extant in "Wharton's Auctarium Hist. Dogm. Ufferii," p. 351; in which he exhorts him, for the common benefit and use of all people, to put the scriptures into the vulgar language, which Butler, in his book against the vulgar translation, says he did. And archbishop Usher, in his "Hist. Dogm." c. 5. informs us, that the Saxon translation of the Evangelists, done by Eadfried, without distribution of chapters, was in the possession of Mr. Rob. Bowyer. In the Cotton library is a book of the four Gospels, said by Wharton, in his "Anglia Sacra," part. i. p. 695, to be written by bishop Eadfried himself, and which had been adorned with pictures, gold, and jewels, by Ethelwold, bishop of Winchester. Eadfried, or Egbert, died in 721. But some have doubted the existence of such an Anglo-Saxon MS. A version of the Psalms in Anglo-Saxon was published by Spelman in 1640. 2. The Evangelists, still extant, done from the ancient Vulgate, before it was revised by St. Jerom, by an author unknown, and published by Matth. Parker in 1571. This was printed from a MS. now in the Bodleian library, under the direction of archbishop Parker, by John Fox the martyrologist, with the following title, "the Gospels of the fowre Evangelists, translated in the olde Saxons' tyme out of the Latin into the vulgare toung of the Saxons, and now published for testimonie of the same;" at London, by John Daye, 1571. This edition has a preface by John Fox, and is dedicated to queen Elizabeth. Another edition of this version was published at Dort in 1665, by Dr. Thomas Marshall, who tells us that he could ascertain neither its author nor age. An old Saxon version of several books of the Bible, was made by Elfric, abbot of Malmesbury, and afterwards, viz. in 995, archbishop of Caeterbury; several fragments of it were published by Will. Lilly, or W. L'Isle, in 1638, the genuine copy by Edm. Thwaites, in 1699, at Oxford.

Wm. L'Isle observes, on occasion of this publication, that if that good ordinance first enacted by God, Deut. x. 5. for the preservation of the book of the law, by keeping a copy of it in the ark, had been continued, and standard Bibles had been preserved in our cathedral churches, as it has been since appointed by king Alfred, we might now have shewed the whole book of God, or the entire Old and New Testament in Saxon, which was the English of those times,

translated both by that king, and the archbishop of Canterbury, Elfric. Elfric translated the Pentateuch, Joshua, Judges, Ruth, four books of Samuel, entitled in Latin, liber regum, a fifth book called Verba Dierum, or Chronicles, the Psalter, three books of Solomon, viz. Proverbs, Ecclesiastes, the chief of all songs, the books of Wisdom and Ecclesiasticus, the prophets Isaiah, Jeremiah, Ezekiel, Daniel, the twelve Prophets, Ezra, Job, Tobias, Esther, Judith, and Maccabees. Hence we may conclude, with little doubt, that the books of the New Testament were before translated into Saxon, and commonly read in that language. The Pentateuch, Joshua, and Judges, of Elfric's translation, are preserved, says Usher, in Cotton's library; where is also a Psalter, with several hymns of the Old and New Testament, with the Apostles' and Athanasian creed, with an English interlineary translation. The book appears, by a note at the end of it, to have been written in the year 1049. The Anglo-Saxon version, above-mentioned, is divided into sections, over each of which is placed a rubric, directing when it should be read; and this circumstance shews, that at this time the Holy Scriptures were read in the public service of the church in a language which the people understood. Various readings from this version of the four Gospels were first quoted by Mill (Proleg. § 1462.), who took them from the papers of Marshall. With respect to its antiquity, the learned are not agreed: some have referred it to the sixth or seventh century, since Bede died A. D. 735, but others, more generally, to some part of the eighth century. For an account of the MSS. of the Anglo-Saxon version, see Le Long, Bibl. Sacr. tom. i. p. 422, 423. ed. 1723; and for a complete catalogue of Anglo-Saxon MSS. in general, Wanley's Appendix to Hickes's Thesaurus, published at Oxford in 1705, folio. Lewis's Hist. Eng. Transl. of the Bible, p. 5. &c.

BIBLES, *English*. The first English Bible we read of was that translated by J. Wickliffe, about the year 1370, according to some, and 1380, according to others: but never printed, though there are MS. copies of it in several public and private libraries. The MS. of the Old Testament ending with the second book of the Maccabees, in St. John's college Oxford, is said to have been written by Wickliffe himself. This circumstance, though expressed on the top of the leaf before Genesis, is very doubtful. This translation was made from the Latin Bibles then in common use, not because Wickliffe thought the Latin to be the original, or of the same authority with the Hebrew and Greek text, but because he did not understand those languages well enough, to translate from them. He likewise chose to translate word for word, as had been before done in the Anglo-Saxon translation, without observing the idioms of the several languages, so that this translation is in some places not very intelligible to those who do not understand Latin. Before the invention of printing, transcripts were obtained with difficulty, and copies were so rare, that the price of one of Wickliffe's English New Testaments appears, from the registry of William Alnewick, bishop of Norwich, in 1429, to have been four marks and forty pence, or 2l. 16s. 8d. This translation gave such offence, that a bill was brought into the house of lords, 13 Ric. II. A. D. 1390, for suppressing it. But by the opposition of the duke of Lancaster, the king's uncle, the bill was thrown out of the house. Wickliffe's followers were encouraged, by this favourable circumstance, to revise the translation of their master, or rather to make another not so strict and verbal, but more free and accommodated to the sense. The MS. copies of this translation are more rare than those of the other; but they are found in the Bodleian library, and in other libraries both of Oxford and Cambridge. J. de Trevisa, vicar of Berkley in Gloucestershire, who died

about the year 1398, is also said to have translated the whole Bible; but if this be true, it does not appear that any copies of his translation are now remaining. It is probable, that Trevisa merely translated certain sentences of the Bible, that occur in his writings, and some of which are said to have been painted upon the walls of the chapel in Berkley castle. Another English translation has been erroneously ascribed to Reginald Peacock, bishop of Chichester, A.D. 1450, in consequence of his having translated some passages of Scripture, cited in his works. Roile, an hermit of Hampol in Yorkshire, who translated the Psalms about the year 1340, is supposed by Weever, in his "Funeral Monuments," p. 151, to have been the translator of the New Testament, which translation was in reality Wickliffe's. Richard Fitz-Ralph, archbishop of Armagh, is said to have translated the Bible into Irish. He died in 1360. Dr. James, relying on a vague declaration of sir Thomas More, in his account of the constitutions of Arundel, asserts, that the Bible hath been twice translated into English; and that one of these translations is much more ancient (some hundred years) than Wickliffe's. But Lewis has shown this to be a mistake. (Hist. Eng. Transf. p. 43.) The zealots of those times were alarmed by these English translations; and in order to prevent their increase, they urged the necessity of restoring the use of Latin Bibles; and to this purpose Chaucer represents the religious as collecting and depositing them in their libraries, and thus withdrawing them from secular priests and curates, and thus hindering them from preaching the gospel to the people. In 1357, when some secular priests were sent from the diocese of Armagh in Ireland, to study divinity at Oxford, they were obliged soon to return, because they were not able to purchase a Bible. Aeneas Sylvius, afterwards pope Pius II. observed in 1458, concerning the Italian priests, that they did not seem to have ever so much as read the New Testament; and Robert Stephens, speaking of the Sorbonists, says, that when they are asked in what place of the New Testament any thing was written, they replied, that they had read it in Jerom, or in the Decrees, but what the New Testament was they did not know. (See Hody de Bibl. Textibus, p. 464.) Indeed, at that time, if copies of the Bible had been more frequent, the clergy were generally so ignorant as not to be able to read or understand Latin. The Latin Bibles were not only scarce, but much corrupted by the carelessness of transcribers, and the interference of prelatry was critics. In 1457, Wickliffe's followers were become so numerous, and copies of his English translation of the New Testament so common, that an English Bible was sold for 20s., whereas the price of a portulife, or breviary, was 6 marks. After the art of printing was introduced into England, Latin, Hebrew, and Greek Bibles, and particularly copies of the New Testament, became much more common; and accordingly a vicar of Croydon in Surry, is said to have expressed himself to this purpose, in a sermon preached at Paul's cross about this time: "We must root out printing, or printing will root out us."

BIBLE, Tindal's. For the first printed English translation of the Scriptures we are indebted to William Tindal, who, having formed a design of translating the New Testament from the original Greek into English, removed to Antwerp in Flanders, for that purpose. Here, with the assistance of the learned John Fry, or Fryth, burnt for heresy in Smithfield, in 1553, and a friar, called William Roye, who suffered death on the same account in Portugal, he finished it, and in the year 1526, it was printed either at Antwerp or Hanburgh, without a title, in a middle sized 8vo. volume, and without either colophon, concordances in the margin, or table at the end. Tindal annexed a preface at the close of it, in which he

defyred them that were learned to amende if ought were found amysse." Le Long calls this "the New Testament translated into English, from the German version of Luther;" but for this degrading appellation he seems to have no other authority besides a story related by one Cochläus (in Actis Martini Lutheri ad an. 1526, p. 132.), with a view of depreciating Tindal's translation. Many copies of this translation found their way into England; and to prevent their dispersion among the people, and the more effectually to enforce the prohibition published in all the dioceses against reading them, Tostall, bishop of London, purchased all the remaining copies of this edition, and all which he could collect from private hands, and committed them to the flames at St. Paul's cross. The first impression of Tindal's translation being thus disposed of, several other numerous editions were published in Holland, before the year 1530, in which Tindal seems to have had no interest, but which found a ready sale, and those which were imported into England, were ordered to be burned. On one of these occasions, sir Thomas More, who was then chancellor, and who concurred with the bishop in the execution of this measure, inquired of a person, who stood accused of heresy, and to whom he promised indemnity on consideration of an explicit and satisfactory answer, how Tindal subsisted abroad, and who were the persons in London that abetted and supported him; to which inquiry the heretical convert replied, "It was the bishop of London who maintained him, by sending a sum of money to buy up the impression of his Testament." The chancellor smiled, admitted the truth of the declaration, and suffered the accused person to escape. The people formed a very unfavourable opinion of those who ordered the word of God to be burned, and concluded, that there must be an obvious repugnance between the New Testament, and the doctrines of those who treated it with this indignity. Those who were suspected of importing and concealing any of these books, were adjudged by sir T. More, to ride with their faces to the tails of their horses, with papers on their heads, and the New Testaments, and other books which they had dispersed, hung about their cloaks, and at the standard in Cheapside to throw them into a fire prepared for that purpose, and to be fined at the king's pleasure.

When Tostall's purchase served only to benefit Tindal, and those who were employed in printing and selling successive editions of his Testament, and other measures for restraining their dispersion seemed to have little or no effect, the pen of the witty, eloquent, and learned sir Thomas More, was employed against the translator; and the bishop granted him a licence, or faculty, dated March 7, 1527, to have aid to read the several books which Tindal and others published; and at his desire sir Thomas composed a dialogue, written with much humour, and designed to expose Tindal's translation, which was published in 1529. In this dialogwe he alleges, among other charges, that Tindal had mistranslated three words of great importance, viz. the words *prist*, *church*, and *charity*; calling the first seniors, the second congregation, and the third love. He also charges him with changing commonly the term *grace* into *favour*, *confession* into *knowledging*, *penance* into *repentance*, and a *contrite heart* into a *troubled heart*. The bishop of London had, indeed, in a sermon, declared, that he had found in it no less than 2000 errors, or mis-translations; and sir Thomas More discovered above 1000 texts by tale, falsely translated. In 1530, a royal proclamation was issued, by the advice of the prelates and clerks, and of the universities, for totally suppressing the translation of the scripture, corrupted by William Tindal. The proclamation set forth, that it was not necessary to have the scriptures in the English tongue, and in the hands of the common

people; that the distribution of them, as to allowing or denying it, depended on the discretion of their superiors; and that, considering the malignity of the time, an English translation of the Bible would rather occasion the continuance, or increase of errors, than any benefit to their souls. However, the proclamation announced the king's intention, if the present translation were abandoned, at a proper season, to provide that the Holy Scriptures should be by great, learned, and catholic persons, translated into the English tongue, if it should then seem convenient. In the mean time, Tindal was busily employed in translating from the Hebrew into the English the five books of Moses, in which he was assisted by Miles Coverdale. But his papers being lost by shipwreck in his voyage to Hamburg, where he designed to print it, a delay occurred, and it was not put to press till the year 1530. It is a small 8vo. printed at different presses, and with different types. In the preface he complained, that there was not so much as one *i* in his New Testament, if it lacked a tittle over its head, but it had been noted, and numbered to the ignorant people for a heresy, who were made to believe, that there were many thousand heresies in it, and that it was so faulty as to be incapable of amendment or correction. In this year he published an answer to sir Thomas More's dialogue, containing his reason for the changes which he had introduced into his translation. The three former editions of Tindal's English New Testament being all sold off, the Dutch booksellers printed a fourth in this year, in a smaller volume and letter. In 1531, Tindal published an English version of the prophet Jonah, with a prologue, full of invective against the church of Rome. Strype supposes that before his death he finished all the Bible but the Apocrypha, which was translated by Rogers; but it seems more probable that he translated only the historical parts. In 1534, was published a fourth Dutch edition, or the fifth in all, of Tindal's New Testament, in 12mo. In this same year, Tindal printed his own edition of the New Testament in English, which he had diligently revised and corrected; to which is prefixed a prologue; and at the end are the pistils of the Old Testament, closing with the following advertisement, "Imprinted at Antwerp, by Marten Emperour, anno M. D. XXXIV." Another edition was published this year, in 16to. and printed in a German letter. Hall says, in his Chronicle, printed during the reign of Henry VIII. by Richard Grafton, the benefactor and friend of Tindal; "William Tindal translated the New Testament, and first put it into print; and he likewise translated the five books of Moses, Joshua, Judicum, Ruth, the books of Kings, and books of Paralipomenon, Nehemiah, and the first of Esdras, and the prophet Jonas; and no more of the Holy Scriptures." Upon his return to Antwerp, in 1531, king Henry VIII. and his council, contrived means to have him seized and imprisoned. After long confinement he was condemned to death by the emperor's decree in an assembly at Augsberg; and in 1536, he was strangled at Villefort, near Brussels, the place of his imprisonment, after which his body was reduced to ashes. He expired, praying repeatedly and earnestly, "Lord, open the king of England's eyes." Several editions of his Testament were printed in the year of his death. Tindal had little or no skill in the Hebrew, and therefore he probably translated the Old Testament from the Latin. The knowledge of languages was in its infancy; nor was our English tongue arrived at that degree of improvement, which it has since attained; it is not, therefore, surprising, that there should be many faults in this translation which need amendment. This, indeed, was a task, not for a single person, but requiring the concurrence of many, in circumstances much more favourable for the execution of it than

those of an exile. Nevertheless, although this translation is far from being perfect, few just translations, says Dr. Geddes (Prospectus, p. 88.), will be found preferable to it. It is astonishing, says this writer, how little obsolete the language of it is, even at this day; and in point of perspicuity, and noble simplicity, propriety of idiom, and purity of style, no English version has yet surpassed it.

BIBLE, Coverdale's. In 1535 the whole Bible, translated into English, was printed in folio, and dedicated to the king by Miles Coverdale, a man greatly esteemed for piety, knowledge of the Scriptures, and diligent preaching; on account of which qualities king Edward VI. advanced him to the see of Exeter. In his dedication and preface, he observes to this purpose, that, as to the present translation, it was neither his labour nor his desire to have this work put into his hand; but "when others were moved by the Holy Ghost to undertake the cost of it," he was the more bold to engage in the execution of it. Agreeably, therefore, to desire, he set forth this "special" translation, not in contempt of other men's translations, or by way of reproving them, but humbly and faithfully following his interpreters, and that under correction. Of these, he said, he used five different ones, who had translated the Scriptures not only into Latin, but also into Dutch. He further declared, that he had neither wrestled nor altered so much as one word for the maintenance of any manner of sect, but had with a clear conscience purely and faithfully translated out of the foregoing interpreters, having only before his eyes the manifest truth of the Scripture. But because such different translations, he saw, were apt to offend weak minds, he added, that there came more understanding and knowledge of the Scripture by these sundry translations, than by all the glosses of sophistical doctors; and he therefore desires, that offence might not be taken, because one translated "scribe," and another "lawyer," one "repentance," and another "penance," or "amendment." This is the first English Bible allowed by royal authority; and also the first translation of the whole Bible printed in our language. It was called a "special" translation, because it was different from the former English translations; as Lewis has shewn (Hist. Eng. Transl. p. 98.) by comparing it with Tindal's. It is divided into six tomes, adorned with wooden cuts, and furnished with Scripture references in the margin. The last page has these words: "Printed in the year of our Lorde M.D. XXXV. and fynished the fourth day of October." Of this Bible there was another edition in a large 4to. 1550, which was re-published, with a new title, 1553; and these, according to Lewis, were all the editions of it. Coverdale, in this edition of the English Bible, prefixed to every book the contents of the several chapters, and not to the particular chapters, which was afterwards the case; and he likewise omitted all Tindal's prologues and notes. Soon after this Bible was finished, in 1536, lord Cromwell, keeper of the privy-seal, and the king's vicar-general and vicegerent in ecclesiastical matters, published injunctions to the clergy by the king's authority, the seventh of which was, that every parson, or proprietary of any parish church within this realm, should, before the first of August, provide a book of the whole Bible, both in Latin and in English, and lay it in the choir, for every man that would, to look and read therein; and should discourage no man from reading any part of the Bible either in Latin or English, but rather comfort, exhort, and admonish every man, to read it, as the very word of God, and the spiritual food of a man's soul, &c.

BIBLE, Matthew's, or Matthews's. In 1537, another edition of the English Bible was printed by Grafton and Whit-

With much, at Hamburg, as some think, or, as others suppose, at Milbrow, or Marpang in Hesse, or Marbeck in the duchy of Wittenberg, where Rogers was superintendent. It bore the name of Thomas Matthewe, and it was first sent with the king's most gracious licence. Mr. Wadley is of opinion, that, to the end of the book of Chronicles, this edition is Tindal's translation; and from thence to the end of the apocrypha, Coverdale's: but Lewis (p. 107.) thinks it probable that the prophecy of Jonah should be excepted, which Tindal finished in his life-time, and which is the same in this edition, and in Coverdale's Bible of 1535. Mr. Wadley also observes, that the whole New Testament was Tindal's. Bale says, Rogers translated the Bible into English, from Genesis to the end of Revelation, with the use of the Hebrew, Greek, Latin, German, and English (i. e. Tindal's) copies. This book contained Tindal's prologue and notes; and, as Heylin says (Hist. Ref. fol. 20.), it was no other than the translation of Tindal and Coverdale somewhat altered. The name of Matthewe is allowed to have been fictitious, for reasons of prudence; one of which was, that the memory of Tindal had become odious to many. It may well be admitted that John Rogers, a learned academic, and the first who was consigned to the flames in the reign of queen Mary, was employed by Crammer to superintend this edition, and to furnish the few emendations and additions that were thought necessary. This must have been the general period in 1535, as the condemning sentence preserved by Fox (Act, &c. vol. iii. 125.), is "against Rogers, priest, alias called Matthewe." Crammer presented a copy of the book to lord Cromwell, joining his intercession with the king for the royal licence, that it might be purchased and used by all. There are extant two letters, Strype's life of Crammer, p. 511 from the archbishop, on the subject of lord Cromwell's intercession, expressing warm approbation and acknowledgements. "I doubt not," says he, "but that hereby such fruit of good knowledge shall ensue, that it shall well appear hereafter what high and excellent service you have done unto God and the king; which shall so much redound to your honour, that, besides God's reward, you shall obtain perpetual memory for the same within this realm."—"Tindal you shall hear of at the great day, when all things shall be opened and made manifest." In the year 1533, an injunction was published by the vicar-general of the kingdom, obliging the clergy to provide, before a certain festival, one book of the whole Bible, of the largest volume in English, and to set it up in some convenient place within their churches, where their parishioners might not commodiously resort to read it. A royal declaration was also published, which the curates were to read in their several churches, informing the people, that it pleased the king's majesty to permit and command the Bible, being translated into their mother tongue, to be publicly taught by them, and to be openly read in every parish church. But the curates were very cold in this affair (say Lewis, p. 106.), and read the king's injunctions and declarations with such a manner, that scarcely any body could know or discern what they read. Johnsa (Hist. Account, &c. i. fol. p. Wadley's Collection, p. 94.) adds, that they did not read the word of God sincerely; and that they did thus pervert, notwithstanding how well they read, which they were commanded to read, "to do as they and in times past, and to live as their fathers, the old fathers of the land." Fox observes (Act, &c. vol. iii. 516.), that the first success of this book much offended Gardiner and his fellow bishops, both for the prologue, and especially because there was a table in the book chiefly about the

Lord's supper, the marriage of virgins, and the mass, which there was said not to be found in scripture. Strype, however, says, (Life of Crammer, p. 64.), it was wonderful to see with what joy this book was received, not only among the more learned, and those who were noted lovers of the reformation, but generally all over England, among all the common people; and with what greediness God's word was read, and what resort there was to the places appointed for reading it. Every one that could, bought the book, and busily read it, or heard it read: and many elderly persons learned to read on purpose. During a vacancy in the see of Hereford it was visited by Crammer, who enjoined the clergy to procure, by the 1st of August, a whole Bible in Latin and English, or, at least, a New Testament in these languages; to study every day one chapter of these books, conferring the Latin and English together, from the beginning to the end; and not to discourage any layman from reading them, but encourage them to it, and to read them for the reformation of their lives and knowledge of their duty. In the course of the year 1538, a quarto edition of the New Testament, in the vulgate Latin and Coverdale's English, bearing the name of Hollybush, was printed, with the king's licence, by James Nicolson. Of this, another more correct edition was published in 1539, in 8vo., and dedicated to lord Cromwell. In 1538, an edition in octavo of the New Testament, in English, with Erasmus's Latin translation, was printed, with the king's licence, by Romain. In this year it was resolved to revise Matthewe's Bible, and to print a correct edition of it. With this view Grafton went to France, where the workmen were more skilful, and the paper was both better and cheaper than in England, and obtained permission from Francis I. at the request of king Henry VIII. to print his Bible at Paris. But, notwithstanding the royal licence, the Inquisition interposed, and issued an order, dated December 17, 1538, commanding the French printers, their English employers, and Coverdale the corrector of the work, and prohibiting them to proceed; and the impression, consisting of 2500 copies, was seized, confiscated, and condemned to the flames. Some sheets, however, of these books, escaped the fire, by the avarice of the person who was appointed to superintend the burning of them; and the English proprietor, who had fled on the first alarm, returned to Paris, as soon as it subsided, and not only recovered some of these copies, but brought with them to London the presses, types, and printers, and, refining the work, finished it in the following year.

BIBLE, Crammer's, or the Great. As soon as the papal power was abolished in England, and the king's supremacy settled by parliament in 1534, Crammer was very assiduous in promoting translations of the Holy Scriptures into the vulgar tongue; well knowing how much the progress of the reformation depended upon this measure. Accordingly, he moved in convocation, that a petition should be presented to the king for leave to procure a new translation of the Bible. The motion was vigorously opposed by Gardiner, bishop of Winchester, and his party: but Crammer prevailed. The arguments for a new translation, urged by Crammer, and supported by queen Anne Bullen, who had then great interest in the king's affections, were so much considered by him, that, notwithstanding the opposition, public and private, on the part of Gardiner and his adherents, Henry gave orders for setting about it immediately. To prevent any revocation of the order, Crammer, whose mind was intent on introducing a free use of the English Scriptures by faithful and able translators, proceeded without delay to divide an old English translation of the New Testament into

nine or ten parts, which he caused to be transcribed into paper-books, and to be distributed among the most learned bishops, and others; requiring that they would perfectly correct their respective portions, and return them to him at a limited time. When the assigned day came, every man sent his appropriate portion to Lambeth, except Stokesly, bishop of London. This laudable design of the archbishop failed; but the business was executed by other persons, whom he countenanced and encouraged, as we have already stated in the preceding articles. In April 1539, Grafton and Whitchurch printed the Bible (called the "Great Bible,") in large folio, "cum privilegio ad imprimendum solum." A beautiful frontispiece, designed by Holben, and particularly described and exhibited in an engraving by Lewis, p. 122, &c. was prefixed to it: and in the text, those parts of the Latin version, which are not found in the Hebrew or Greek, are inserted in a smaller letter; such, for instance, as the three verses of the 14th psalm, which are the 5th, 6th, and 7th, in the translation of the English liturgy, and the controverted words, 1 John v. 7, 8.; and a mark is used to denote a difference of reading between the Hebrew and Chaldee, afterwards explained in a separate treatise. In this edition Matthew's Bible was revised, and several alterations and corrections were made in the translation, especially in the book of Psalms. Tindal's prologues and notes, and the notes added by others, in the edition of 1537, were wholly omitted. Pointing hands, placed in the margin and in the text, shew the passages on which these notes were to have been written. Johnson (*ubi supra*, p. 76.) calls this third edition of the Scriptures the Bible in the large or great volume, ascribes it to the year 1539, and supposes it to have been the same which Grafton obtained leave to print at Paris. He says, that Miles Coverdale compared the translation with the Hebrew, mended it in many places, and was the chief director of the work. Agreeably to this, Coverdale, in a sermon at Paul's cross, defended his translation from some slanderous reports which were then raised against it, confessing "that he himself now saw some faults, which, if he might review the book once again, as he had twice before, he doubted not he should amend; but for any hereby, he was sure that there was none maintained in his translation." This is related by Dr. Fulk, who was one of Coverdale's auditors. A second edition of this Bible seems to have been printed either this or the next year, by Edward Whitchurch; but the copy is imperfect and has no date.

In the course of the year 1539, another Bible was printed by John Byddell, called "Taverner's Bible," from the name of its conductor, Richard Taverner, who was educated at Christchurch, Oxford, patronised by lord Cromwell, and probably encouraged by him to undertake the work, on account of his skill in the Greek tongue. This is neither a bare revival of the English Bible just described, nor a new version; but a kind of intermediate work, being a correction of what is called "Matthew's Bible," many of whose marginal notes are adopted, and many omitted, and others inserted by the editors. It is dedicated to the king. After his patron's death, Taverner was imprisoned in the Tower for this work; but he had the address to reinstate himself in the king's favour. Wood (*Hist. et Ant. Univ. Oxon. fol. 1674, l. ii. p. 264.*) gives a particular account of Taverner; attributes his imprisonment to the influence of those bishops who were addicted to the Romish religion; and informs us, that his version was read in churches by royal authority. In November 1539, the king, at the intercession of Cranmer, appointed lord Cromwell to take special care that no person, within the realm, should attempt to print any English Bible

for five years, but such as should be admitted by lord Cromwell; and assigns this reason for the prohibition, that the Bible should be considered and perused in one translation in order to avoid the manifold inconveniences to which human frailty might be subject from a diversity of translations, and the ill use that might be made of it. In the year 1540, two privileged editions of the Bible, which had been printed in the preceding year, issued from the presses of Edward Whitchurch. Lewis mentions three other impressions of the "Great Bible," which appeared in the course of this year; two printed by Whitchurch, and one by Petyt and Redman. Cranmer wrote a preface for the editions of the year 1540, from which we learn the opinions and practice of those times. In May of this year, the curates and parishioners of every parish were required, by royal proclamation, to provide themselves with the Bible of the largest volume before the feast of All-Saints, under the penalty of 40s. for every month during which they should be without it. The king charged all ordinaries to enforce the observance of this proclamation; and he apprized the people, that his allowing them the Scriptures in their mother-tongue was not his duty, but an evidence of his goodness and liberality to them, of which he exhorted them not to make any ill use. In May 1541, one edition of Cranmer's Bible was finished by Richard Grafton; who, in the November following, completed also another Bible of the largest volume, which was superintended, at the king's command, by Tonstal, bishop of Durham, and Heath, bishop of Rochester.

In consequence of the king's settled judgment, "that his subjects should be nursed in Christ by reading the Scriptures," he again, on the 7th of May, published a brief, or decree, for setting up the Bible of the great volume in every parish church throughout England. However, this decree appears to have been very partially and reluctantly observed; and the bishops were charged, by a writer in 1546, with attempting to suppress the Bible, under pretence of preparing a version of it for publication within seven years. After the death of Cromwell in 1540, the bishops inclined to popery gained strength; and the English translation was represented to the king as very erroneous and heretical, and destructive of the harmony and peace of the kingdom. In the convocation, assembled in Feb. 1542, the archbishop, in the king's name, required the bishops and clergy to revise the translation of the New Testament, which, for that purpose, was divided into fourteen parts, and portioned out to fifteen bishops; the Apocalypse, on account of its difficulty, being assigned to two. Gardiner clogged this business with embarrassing instructions; and Cranmer clearly perceiving the resolution of the bishops to defeat the proposed translation, procured the king's consent to refer the matter to the two universities, against which the bishops protested; but the archbishop declared his purpose to adhere to the will of the king his master. With this contest the business terminated; and the convocation was soon after dissolved. The Romish party prevailed also in parliament, which enacted a law that condemned and abolished Tindal's translation, and allowed other translations to remain in force, under certain restrictions. After the passing of this act, Grafton, the king's printer, was imprisoned; nor was he released without giving a bond of 300l. neither to print nor sell any more English Bibles, till the king and the clergy should agree on a translation. In 1544, the Pentateuch was printed by John Day and William Seres; and in 1546, the king prohibited by proclamation having and reading Wickliffe's, Tindal's, and Coverdale's translations, and forbade the use of any other than what was allowed by parliament.

liament. From the history of English translations, during the reign of Henry VIII. we learn, that the friends to the reformation conducted themselves with zeal and prudence in the great work of introducing and improving English translations of the Bible; that they encountered many difficulties from the dangerous inconstancy of a despotic prince, and from the inveterate prejudices of a strong Romish party; and that the English scriptures were sought after and read with avidity by the bulk of the people.

Upon the accession of Edward VI. the severe stat. 34 & 35 Henry VIII. c. 1. was repealed, and a royal injunction was published, that not only the whole English Bible should be placed in churches, but also the paraphrase of Erasmus in English to the end of the four Evangelists. It was likewise ordered by this injunction, that every parson, vicar, curate, &c. under the degree of a bachelor of divinity, should possess the New Testament, both in Latin and English, with the paraphrase of Erasmus upon it: and that the bishops, &c. in their visitations and synods should examine them, how they had profited in the study of the Holy Scriptures. It was also appointed that the epistle and gospel of the mass should be read in English; and that on every Sunday and holiday, one chapter of the New Testament in English should be plainly and distinctly read at mass, and one chapter of the Old Testament at even-song. But, in the year 1549, when the book of common prayer, &c. was finished, what nearly resembles our present custom was enjoined, that after reading the Psalms in order at morning and evening prayer, two lessons, the first from the Old Testament, and the second from the New Testament, should be read distinctly with a loud voice. During the course of this reign—that is, in less than 7 years and 6 months, eleven impressions of the whole English Bible were published, and six of the English New Testament; besides an English translation of the whole New Testament, paraphrased by Erasmus. The Bibles were reprinted, according to the preceding editions, whether Tindal's, Coverdale's, Matthew's, Cramer's, or Taverner's; that is, with a different text, and different notes. But it is doubted by the writer of the preface to king James's translation, whether there were any translation, or correction of a translation, in the course of this reign.

In 1562, the "Great Bible," viz. that of Coverdale's translation, that had been printed in the time of Henry VIII. and also in the time of king Edward, was reviewed by archbishop Parker, and reprinted for the use of the church; and this was to serve till 1568, when by his grace was ready for publication. See *Dissert.* p. 5 BIBLE.

BIBLE, Geneva. Many of the principal reformers having been driven to Geneva, during the persecutions of queen Mary's reign; they published, in 1557, an English New Testament, printed by Conrad Balus; the first in our language which contained the distinctions of verses by numerical figures, after the manner of the Greek Testament, which had been published by Robert Stephens in 1551. R. Stephens indeed, published his figures in the margin; whereas the Geneva editors placed them at the beginning of minute subdivisions with breaks, after our present manner. When queen Elizabeth passed through London for the Tower to her coronation, a pageant was erected in Cheapside, representing Time coming out of a cave, and leading a person clothed in white silk, who represented Truth, his daughter. Truth had the English Bible on her back, on which was written "Verbum veritatis." Truth addressed the queen, and presented her with the book. She kissed it, held it in her hands, laid it on her breast, greatly thanked the city for their present, and added, that she would often and diligently read it. Upon a royal visitation in 1559, the Bible, and

Erasmus's paraphrase, were restored to churches; and articles of enquiry were exhibited whether the clergy discouraged any from reading any part of the Scriptures. "Ministers were also enjoined to read every day one chapter of the Bible at least; and all who were admitted readers in the church were daily to read one chapter at least of the Old Testament, and another of the New, with good advisement, to the increase of their knowledge."

During this year, the exiles at Geneva published the book of Psalms in English, with marginal notes, and with a dedication to the queen, dated February 10. In 1560, the whole Bible in 4to. was printed at Geneva by Rowland Hare; some of the refugees from England continuing in that city for this purpose. The translators were bishop Coverdale, Anthony Gilby, William Whittingham, Christopher Woodman, Thomas Sampson, and Thomas Cole; to whom some add John Knox, John Beldigh, and John Pulkain; all zealous Calvinists, both in doctrine and discipline: but the chief and the most learned of them were the three first. Professing to observe the sense, and to adhere as much as possible to the words of the original, and in many places to preserve the Hebrew phraseology, after the labour and study of two years and more, day and night, they finished their translation, and published it; with an epistle dedicatory to the queen, and another, by way of preface, to their brethren of England, Scotland, and Ireland. Besides the translation, the editors of the Geneva Bible noted in the margin the diversities of speech and reading, especially according to the Hebrew; they inserted in the text, with another kind of letter, every word that seemed to be necessary for explaining any particular sentence; in the division of the verses, they followed the Hebrew examples, and added the number to each verse; they also noted the principal matters, and the arguments, both for each book and each chapter; they set over the head of every page some remarkable word or sentence, for helping the memory; they introduced brief annotations for ascertaining the text, and explaining obscure words; they set forth with figures certain places in the books of Moses, of the Kings, and Ezekiel, which could not be made intelligible by any other description; they added maps of divers places and countries, mentioned in the Old and New Testament; and they annexed two tables, one for the interpretation of Hebrew names, and the other containing all the chief matters of the whole Bible. Of this translation, there were above 30 editions in folio, 4to., or 8vo., mostly printed by the queen's and king's printer, from the year 1560 to 1616. Editions of it were likewise printed at Geneva, Edinburgh, and Amsterdam. To some editions of the Geneva Bible, e. g. to those of 1599 and of 1611, is subjoined Beza's translation of the New Testament, Englished by L. Tompson. (See *Rhemish Bible*.) Dr. Geddes (*Gen. Answer*, &c. p. 4.) gives an honourable testimony to the Geneva translation; and hesitates not in declaring, that he thinks it in general better than that of king James's translators.

BIBLE, Bishop's. In the year 1568, the Bible, proposed by archbishop Parker three years before, was completed. This edition, according to Le Long, was undertaken by royal command; and it is mentioned by Strype, to the honour of the archbishop, that he had resolution to perform what Cramer, as opposed by the bishops of his days, had in vain endeavoured to accomplish. In this performance, distinct portions of the Bible, at least 15 in number, were allotted to select men of learning and abilities, appointed, as Fuller says, by the queen's commission; and, accordingly, at the conclusion of each part, the custom of 1568 has the initial letter of each man's name to the end of the Pentateuch.

W. E. for William, bishop of Exeter, whose allotment ended there; at the end of Ruth, R. M. for Richard Menvenis, or bishop of St. David's, to whom pertained the second allotment; and so of the rest. But it still remains uncertain, who, and whether one or more, revised the rest of the N. T. Eight of the persons employed were bishops; whence the book was called the "Bishop's Bible," and the "Great English Bible." The archbishop employed other critics to compare this Bible with the original languages, and with the former translations; one of whom was Laurence, a man famous in those times for his knowledge of Greek, whose castigations the bishop's Bible followed exactly. His grace also sent instructions concerning the method which his translators were to observe; and recommended the addition of some short marginal notes, for the illustration or correction of the text. But the particulars of these instructions are not known. The archbishop, however, directed, and finished the whole; which was printed and published in 1568, in a large folio size, and with a beautiful English letter, on royal paper; and embellished with several cuts of the most remarkable things in the O. and N. T. and Apocrypha, maps cut in wood, and other draughts engraven on copper. It has many marginal references and notes, and many useful tables. It has numerous insertions between brackets, and in a smaller character; which are equivalent to the italics afterwards used by James's translators. Dr. Geddes is of opinion, (Letter to the bishop of London, p. 33.) that italic supplements were first used by Arias Montanus, who died in 1598. The several additions from the vulgar Latin, inserted in the "Great Bible," are omitted; and verse 7 of 1 John v. which was before distinguished by its being printed in a different letter, is here printed without any distinction; and the chapters are divided into verses. In the following year, 1569, it was again published in large 8vo. for the use of private families. This Bible was reprinted in 1572, in large folio, with several corrections and amendments, and several prolegomena; this is called "Matthew Packer's Bible." With regard to this Bible, Lewis (p. 61.) observes, that the editions of it are mostly in folio and 4to., and that he never heard but of one in 8vo.; for which he supposes this to be the reason, that it was principally designed for the use of churches. In the convocation of the province of Canterbury, which met in April, 1571, a canon was made, enjoining the church-wardens to see, that the Holy Bible be in every church in the largest volumes, if convenient; and it was likewise ordered, that every archbishop and bishop, every dean and chief rectiditary, and every archdeacon, should have one of these Bibles in their cathedrals and families. This translation was used in the churches for forty years; though the Geneva Bible was more read in private houses. For king James's opinion of it, see *King James's Bible*.

BIBLE, Rhemish. After the translation of the Bible by the bishops, two other private versions had been made of the New Testament; the first by Laur. Tomson, undersecretary to sir Francis Walsingham, made from Beza's Latin edition, together with the notes of Beza, published in 1576, in 8vo. and afterwards in 1599, varying very little from the Geneva Bible; the second, by the papists at Rhems, in 1582, in 4to. called the "Rhemish Bible;" or "Rhemish Testament." These finding it impossible to keep the people from having the scriptures in the vulgar tongue, resolved to give a version of their own, as favourable to their cause as might be. It was printed on a large paper, with a fair letter and margin. One complaint against it was, its being translated from the vulgate Latin, and retaining a multitude of Hebrew and Greek words untranslated,

for want, as the editors express it, of proper and adequate terms in the English to render them by; as the words *azymes, tunike, rational, holocaust, prepuce, pasche,* &c. whence Fuller called it, in his quaint manner, "a translation which needed to be translated," and Fuller says that "by all means they laboured to suppress the light of truth, under one pretence or other." They added large annotations, to shew, as they say, the studious reader, in most places, pertaining to the controversies of those times, both the heretical corruptions, and false deductions, and also the apostolic traditions, the expositions of the holy fathers, the decrees of the Catholic church, and most ancient councils. Some have said, that it was printed in a most costly manner, in order to put it out of the power of common people to purchase it; but if any of the laity secretly procured one of these Rhemish Testaments, he durst not own that he had read it, without previously obtaining from his superior a licence for this purpose. Many of the copies were seized by the queen's searchers, and confiscated; and Th. Cartwright was solicited by secretary Walsingham to refute it; but after a good progress made therein, archbishop Whitgift prohibited his farther proceedings therein, as judging it improper the doctrine of the church of England should be committed to the defence of a puritan, and appointed Dr. Fulk in his place, who refuted the Rheimists with great spirit and learning. Cartwright's refutation was also afterwards published in 1618, under archbishop Abbot, together with the Rhemish translation. This procedure was much more agreeable to the true spirit of protestantism, than the act of seizing and burning the copies; "argument being the only weapon (says the truly excellent primate Newcome), which should be wielded to defend Christianity, or any mode of professing it." Other editions were printed at Antwerp, in 1600, and in 12mo. at the same place, in 1630, and at Paris, in 4to. in 1633. Within 30 years after their New Testament, the Roman Catholics published a translation of the Old, at Doway, hence called the "Doway Bible," in two 4to. volumes, the former in 1609, the other in 1610, from the Vulgate, with annotations. It is said that the translators were William Allyn, afterwards cardinal, Gregory Martin, and Richard Brislow; and that the annotator was Thomas Worthington. But some (Le Long. 418.) ascribe the version of the New Testament chiefly to William Raynold.

BIBLE, King James's. The last English Bible was that which proceeded from the Hampton-court conference, in 1603, where many exceptions being made to the Bishop's Bible, king James gave order for a new one; not as the preface expresses it, for a translation altogether new, nor yet to make of a bad one a good one, but to make a good one better, or of many good one best. On the second day of this conference, Dr. Reynolds, the speaker of the Puritans, moved his majesty, that a new translation of the Bible might be undertaken; because those which were allowed in the reigns of Henry VIII. and Edward VI. were corrupt, and such versions as were extant were not answerable to the truth of the original. It has been observed by learned men with regard to the translators in the reign of Henry VIII. that they followed Erasmus and Sebastian Munster too closely; of the Geneva version, that it was formed too faithfully on the model of Beza; and of the Bishop's Bible, that it was not sufficiently exact, but full of errors, because its conductors departed from the Hebrew, and trod too exactly in the footsteps of the Greek. In reply to Dr. Reynolds, the king laid, that he had never yet seen a Bible well translated into English; though he considered the Geneva translations as the worst. On the suggestion of Bancroft, bishop of London, he forbade marginal notes; some of the Geneva

notes having been, in his opinion, "very partial, untrusty, and favouring too much of dangerous and traitorous opinions." In 1604, the king commissioned fifty-four learned men of the two universities, and of other places, to confer together, that nothing should pass without a general consent, in order to make a new and more correct translation of the Bible. Such of these as survived till the completion of the work were divided into six classes. Ten were to meet at Westminster, and to translate from the Pentateuch to the end of the second book of Kings. Eight, appointed at Cambridge, were to finish the rest of the historical books, and the Hagiographa. At Oxford, seven were to undertake the four greater prophets, with the lamentations of Jeremiah, and the twelve minor prophets. The epistles of St. Paul, and the remaining canonical epistles, were allotted to another company of seven, at Westminster. Another company of eight, at Oxford, were to translate the four gospels, the Acts of the Apostles, and the Apocalypse. Lastly, a fourth company of seven, at Cambridge, had assigned to them the Apocrypha, including the prayer of Manasse. The king prescribed certain rules, which the translators were required carefully to observe. The Bishop's Bible was to be the standard, from which as few deviations as possible were to be allowed; the names of the prophets, and the holy writers, with the other names in the text, were to be retained as near as possible to their vulgar use; the old ecclesiastical words were to be retained, as the word "church," which was not to be translated "congregation," &c.; of various other words, if significations, those were to be retained which had been most commonly used by the ancients, or most ancient fathers, being agreeable to the propriety of the place, and the analogy of faith; the divisions of the chapters were to remain without alteration as possible; no marginal notes were to be added, except for the explanation of Hebrew or Greek words, which should not without circumspection be lightly supplied; quotations were to be annexed in the margin, for the purpose of referring from one scripture to another; every particular person of each company was to take the same chapter or chapter, and having separately translated his appropriate part, all were to meet, to compare what they had done, and to agree as to that which should remain; when any part was finished by the company, it was to be referred to a superior authority, and judicious consideration; if any doubt or difference occurred, it was to be settled at a general meeting; with respect to places of special obscurity, the opinion of learned persons was to be obtained by letters addressed to them for that purpose; and skilled persons were required to translate any observations that might be of use to the company, either at Westminster, Cambridge, or Oxford; the directors in each company were to be the deans of Westminster and Chester, for that place, and the king's professors in the Hebrew and Greek, in each university; and the following translations, if they agreed better with the text than the Bishop's Bible, were to be used, viz. Theodotus, Metastew's, Coverdale's, Wicliffe's, or the Great Bible, printed in 1539 and 1540, by Wicliffe and Grafton; and the Geneva Bible. The king also intended his pleasure, that three or four of the most eminent and grave divines of the university, assisted by the vice-chancellor, upon conference with the rest of the heads, should be overseers of the translations, as well Hebrew as Greek. The translation was begun in the spring of 1607, and the completion of it occupied almost three years. When the whole was finished, and three copies of it were sent to London, one from Cambridge, a second from Oxford, and a third from Westminster, two were chosen from the joint companies which had assembled at those places, to review and polish it.

The two from the Cambridge companies were Mr. John Bois, fellow of St. John's college, and Mr. Andrew Downes, professor of Greek. These daily met their fellow-labourers in Stationers' hall, London; where, in nine months, they completed their task, and received, each of them, by the week 3*l.* from the Company of Stationers, whereas, "before they had nothing." The whole was, at first, reviewed by Bilson, bishop of Winchester, and Dr. Myles Smyth, afterwards bishop of Gloucester, who prefixed arguments to the several books; and the latter was ordered to write the preface. This edition of the Bible, with the preface and a dedication to the king, was first published in London, in the year 1611; and is commonly called "King James's Bible." Several editions of it were published in 4*to.* and in 8*vo.*; and particularly one by R. Barker, in 1613. In some editions of this Bible, betwixt 1638 and 1685, an alteration is introduced in Acts vi. 3. where, instead of "We may appoint," is inserted "Ye may appoint," which has been charged on the Independents. But as the first Bible in which it was observed is that printed at Cambridge by Buck and Daniel, in 1638, it is probably an error of the press, without any design to favour any particular party. In 1660, a beautiful edition of this Bible in folio, with chorographical cuts, engraved by Ogilby, was printed at Cambridge, by John Field; and another edition was printed in 8*vo.* at Amsterdam, in 1664, by John Canne, a leader of the English Brownists, with marginal notes, shewing Scripture to be the best interpreter of Scripture. The editor has prefixed a preface; and the Apocrypha is omitted. A very fine edition of this Bible was published in a large folio, in 1701, under the direction of Dr. Tenison, archbishop of Canterbury, with chronological dates, and an index, by bishop Lloyd, and tables of scripture measures by bishop Cumberland; but this edition abounds with typographical errors. After this translation, all the other versions dropped, and fell into disuse, except the Epistles and Gospels in the Common Prayer Book, which were still continued, according to the Bishop's translation, till the alteration of the liturgy in 1661, and the Psalms and Hymns, which are to this day as in the old version.

About the time when king James resolved on a new translation of the Bible, another translation was finished by Mr. Ambrose Uther, elder brother of the learned printer of Armagh of the same name. It was never printed; but is preserved in MS. in 3 vols. 4*to.* in the library of Trinity college at Dublin. In 1764, Mr. Anthony Purver published a new translation of the Bible, at London, in 2 vols. folio. We have also had several translations of the New Testament, (THE TESTAMENT) and of particular books and parts of the Old and New Testament, the principal of which will be noticed in their proper places.

Learned persons have entertained very different opinions concerning the accuracy and value of the translation, made by order of king James, and now in common use. Bishop Newcomen, the late much respected printer of Ireland, has given an abstract of these opinions. Bidden recommends it as the "best translation in the world." The committee for religion in the time of Cromwell, A.D. 1656, whilst they pretended to discover some mistakes in it, allowed it to be the "best extant;" Walton, in his "Prolegomena," highly commends it; and Poole, in his "Synopsis, &c." says, that "in this royal version occur very numerous specimens of great learning and skill in the original language, and of an uncommon accuracy and judgment." In the "Bibliotheca Lætararia," A.D. 1723, it is observed, that "it made its way by general consent and approbation, without the interposition of authority to enforce it. A true argument that it is generally esteemed the best we have; though it has still many con-

siderable faults, and very much needs another review." Dr. Wells, in his general preface to the O. T. professes to correct it, "either where it does not give the true sense of the original, or where the true sense is not well expressed," according to the modern idiom. The author of an "Essay for a New Translation of the Bible, &c." 1727, after speaking in praise of this version, recommends the attempt to give a more exact translation than any that has hitherto appeared; and he adds, "it were indeed to be wished, that those who are to power did employ men of true learning, and solid piety, free from bigotry and blind zeal, in so noble and necessary a work." "Innumerable instances," says Blackwall in his "Sacred Classics," might be made (in the English Bible) of faulty translations of the divine original; which either weaken its sense, or debase and tarnish the beauty of its language." He also observes, that "a new translation can give no offence to people of sound judgment and consideration; because every body, conversant in these matters, and unprejudiced, must acknowledge, that there was less occasion to change the old version into the present, than to change the present into a new one."—"Such an accurate and admirable translation, proved and supported by sound criticism, would quasi and silence most of the objections of pert and profane cavillers, which chiefly proceed from their want of penetration and discernment of the connection of the argument, and their ignorance of the manner and phrase, of the divine writings. It would likewise remove the scruples of many pious and conscientious Christians."—"A new division of the sacred books into chapters, sections, and periods, might be so contrived and managed as to make a new edition very commodious and beautiful; which would overbalance all inconveniences which superstition and weakness could pretend might arise from alterations, and make a victorious and speedy way to the favour and full approbation of the world." There is hardly one chapter in the N. T., says this author, that is not faultily divided, in consequence of which, the connection and meaning of particular passages are rendered confused and obscure; whilst the style is materially injured. "It is, with pleasure and just veneration," he continues, "to the memory of our learned and judicious translators, that I acknowledge their version in the main, to be faithful, clear, and solid. But no man can be so superstitiously devoted to them, but must own that a considerable number of passages are weakly and imperfectly, and not a few falsely, rendered. And no wonder; for since their time there have been great improvements in the knowledge of antiquity, and advancements in critical learning, &c." "If ever" (says Dr. Waterland, *Scripture Vindicated*), "a proper time should come for revising and correcting our last English translation, which, though a very good one, and upon the whole scarce inferior to any, yet is undoubtedly capable of very great improvements, &c." Doddridge, Wesley, Wynne, Pilkington, Purver, Worsey, Priestley, &c. &c. express themselves to the same purpose. "To confirm and illustrate the holy scriptures," says the eminently ingenious and learned bishop Lowth (*Visitation Sermon at Durham, 1758*), "to evince their truth, to shew their consistence, to explain their meaning, to make them more generally known and studied, more easily and perfectly understood by all; to remove the difficulties, that discourage the honest endeavours of the unlearned, and provoke the malicious cavils of the half-learned: this is the most worthy object that can engage our attention; the most important end to which our labours in the search of truth can be directed. And here I cannot but mention that nothing would more effectually conduce to this end, than the exhibiting of the holy scriptures themselves to the people in a more advantageous and just light, by an accu-

rate revival of our vulgar translation by public authority. This hath often been represented; and, I hope, will not always be represented in vain." The late archbishop Secker delivers similar sentiments in his "Latin speech intended to have been made at the opening of the Convocation in 1761, printed at the end of his charges;" London, 1769, p. 363. To the same purpose are the declarations of Dr. Durell, in his "Critical Remarks on Job, &c." Oxf. 1772. pref. p. 6.; of bishop Lowth, in his "Prelim. Diss. on Isaiah," 4to. Lond. 1778, p. 69.; of Dr. White, in his "Revival of the English Translation of the O. T. recommended," Oxf. 1779, p. 8, 9, &c. &c. Dr. Kennicott, Green, and Blayney, excellent judges on this subject, have concurred in the same opinion, of the necessity and utility of either a new translation or a revival of the old one. The late Dr. Geddes, in his "Prospectus of a new Translation of the Holy Bible," 4to. Glasg. 1786, p. 2. expresses himself in the following language. "The highest eulogiums have been made on the translation of James I., both by our own writers, and by foreigners; and indeed, if accuracy, fidelity, and the strictest attention to the letter of the text, be supposed to constitute the qualities of an excellent version, this, of all versions, must, in general, be accounted the most excellent. Every sentence, every word, every syllable, every letter and point, seem to have been weighed with the nicest exactitude, and expressed, either in the text or the margin, with the greatest precision. Pagninus himself is hardly more literal; and it was well remarked by Robertson, above 100 years ago, that it may serve for a lexicon of the Hebrew language, as well as for a translation. It is, however, confessedly, not without its faults. Besides those that are common to it with every version of that age, arising from faulty originals, and Masoretic prepositions:" it has its own intrinsic and peculiar blemishes, which Dr. Geddes enumerates. From a superstitious attention to render the Hebrew and Greek into literal English, its authors adopted modes of expression which are abhorrent from the English idiom; and perhaps from that of all other modern tongues. There is also a manifest want of uniformity in the mode of translating, which is owing to the variety of persons employed. The books called apocrypha are, in Dr. Geddes's opinion, generally translated better than the rest of the Bible; for which one reason may be, that the translators of them were not cramped by the fetters of the Masora. The translators of this version mistook the true meaning of a great many words and sentences by depending too much on modern lexicons, and by paying too little attention to the ancient versions. For various reasons they incumbered their version with a load of useless Italics; often without the least necessity, and almost always to the detriment of the text. Like other translators of their day, they were too much guided by theological systems, and seem, on some occasions, to have allowed their religious prejudices to have gotten the better of their judgment. Besides, through the constant fluctuation and progress of living languages, there are many words and phrases, in the vulgar version, now become obsolete, of which modern writers have selected a great variety. The construction also is less grammatical than the present state of our language seems to allow; and the arrangement of the words and sentences is often such as produces obscurity and ambiguity. Dr. Campbell, in his preface to "The Four Gospels translated;" Dr. Symonds, in his "Observations on the Expediency of revising the present English version of the Four Gospels, and of the Acts of the Apostles;" Mr. Wakefield, in his "Translation of the N. T.;" and Mr. Ormerod, in his "Short Specimen for an Improvement in some parts of the present Translation of the O. T.;" unite in recommend-

ing a revival of our present translation. Dr. Symonds, in particular, examines the grounds of an opinion advanced by Lowth, in his "English Grammar," p. 93, and also by many others, which is, that the vulgar translation of the Bible is the best standard of the English language. Distinguishing between the terms *one* of the standards, and the *best* standard, which are very different, he allows that the plain and simple turn of expression, resulting from the choice of old English words, may entitle our version to the former appellation, and yet many other circumstances must be united to confirm its claim to the latter. Accordingly, he suggests the following inquiries: "Are the words and phrases, employed by our translators, generally placed in their proper order? Are they so arranged as to preclude all obscurity and ambiguity? Do we always find the antecedent to which the relatives refer? Hath a right attention been paid to the tense and times of verbs? And is there a due propriety observed in the use of particles, upon which the clearness of a sentence chiefly depends?" The want of conformity to these rules, or to the greater part of them, will not allow our version of the Bible to lay claim to the appellation of the *best* standard of our language. Many other opinions of very respectable writers, decidedly in favour of an improved version of the Bible, might be added to those that are above cited. Objections, however, have been urged against it, by Dr. Vicinus Knox, in his "Essays Moral and Literary," and also by others; and they have been examined and obviated by the late primate of Ireland, Dr. Newcome, who avows his opinion, that nothing would be more beneficial to the cause of religion, or more honourable to the reign and age in which it was patronised and executed, than an improved English version of the Scriptures.

It has been said, that a new version of the Bible is quite unnecessary. But although our English translation, or any translation extant, contains all things necessary to salvation, yet in common language a measure is said to be necessary, when it is highly expedient. Let any competent scholar study the Bible in the original languages, and then pronounce whether our authorisation is not capable of amendment and improvement, in numberless places, many of which must be considered as very important. If every part of Scripture be intended to answer some important purpose, as it certainly is, or it would not have been given to us, every part ought to be put into the hands of Christians as free as possible from obscurity and error. Some mistake, among many that may be deemed small, are so considerable as to deprive Christianity of much solid evidence, and furnish the Sceptic with his most formidable weapons. What if it is acknowledged that our present version contains every thing necessary to salvation, it may be alleged that if this be a sufficient reason for not correcting those faulty passages which admit of correction, it would be a sufficient reason for throwing them out of it altogether. But as our heavenly Father has been pleased to favour his creatures with additional light, it would ill become us to permit any of this light to be obscured, or to pretend that it is not wanted. It, according to the confession of some of the objectors to a new version, the faith and practice of illiterate persons are sometimes affected by the present version, and if, in some instances, its obscurity would be removed; religion is a matter of such great concern as to demand from those who watch over its interests, that even the smallest faults should be remedied. It is dangerous to retain any known errors in our national version; they operate differently on different minds; nor is it easy to estimate their degree or effects. The opinions and conduct not only of the unlearned, but of the learned themselves, who do not carefully examine the Scriptures, have in fact been

strongly influenced in matters of acknowledged importance, by corrupt readings or mistranslations of a very few texts.

It has again been objected, that a new translation is an extremely dangerous attempt; that nothing would more immediately tend to shake the basis of the establishment; and that it would be imprudent to shock the minds of some very devout and well-meaning people, by an innovation which they could not help considering as an insult on heaven. A measure of this kind would tend to shake the faith of thousands, to whom it were impossible to demonstrate the necessity of a change, or the principles on which it was conducted. Persons of this class would lose their veneration for the old version, without acquiring sufficient confidence in the new: and the benefits must be great indeed, that can compensate even for the remotest possibility of such an evil. To this mode of objecting it has been replied, that it does not immediately affect the merits of the question, but it arranges the prudence of introducing a correct version, as a measure: from which dangerous effects, and not solid advantages, will be apt to arise on the whole. Whatever tends, it has been said, to the perfection of an establishment, would not shake it, but give it splendour, strength, and security. An accurate version would reflect the highest honour on our national church, and may be ranked in an eminent degree among those measures, which would fix it on a basis as firm as truth, virtue, and Christianity. Such a work would be as natural a subject for the praise of all Protestant countries, as king James's Bible was for the honourable testimony born to it by the synod of Dort. It ought also to be recollected, that after Coverdale's translation had received the sanction of authority, the Bibles of Matthewe, Cramer, Taverner, archbishop Parker, and James I. were all *innovations* in their day; and yet that, considered as different versions, they produced no civil or ecclesiastical commotion, no violent agitation in the minds of men, resembling those which are now apprehended and predicted. Besides, a translation by authority ought to supersede all others from its intrinsic excellence; and it would of course supersede them by the frequency, correctness, and cheapness of its editions, as king James's did that of Geneva, notwithstanding the preference given to it by the Calvinists. Moreover, it is hard to conceive, how the faith of thousands can be shaken by removing stumbling-blocks, instead of retaining them. Absurd belief and corrupt practice arise from an ignorance of the Scriptures; not from the best human inducement and assistance to search and understand them. It is the nature of truth, and especially of divine truth, to captivate those who contemplate it, in proportion as the veil is withdrawn, and its genuine features appear. If ill-founded prejudices should exist among the people, their teachers should seriously labour to remove them. These prejudices are such, as far as they exist, which might be easily removed, or which would not deserve to be regarded. Besides, the public mind might be prepared for it, and disposed to acquiesce in it by previous and frequent recommendation of it on the part of ecclesiastics, who derive weight from their rank, and, which is the highest of all rank, by a private of Ireland, from their reputation. A repeated discussion of the topic, that involved the necessity, expediency, and utility of a new version, in discourse, in the pulpit, and from the press, and the concurrence of the best, the wisest, the most learned, and the greatest in the recommendation, patronage, and conduct of an amended version, would give the bulk of the community as great a confidence in it as they ever possessed in any preceding one.

Some, indeed, may say, "Let us introduce no change; for we cannot tell what further change may be required of us." Had this kind of lukewarm and timid reasoning been

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regarded, neither the reformation, nor the revolution, could have taken place; and we should have been still subject to Romish superstition, and to despotic power. It is certainly not less the part of wisdom and magnanimity to give up what is wrong, than resolutely to maintain what is right.

It has been further argued, that the present translation derives an advantage from its antiquity, greatly superior to any which could arise from a correction of its inaccuracies. Hence it would follow, that the versions of Tindal, Wickliffe, and Jerom, rise in excellence. But no age or prescription can authorise error; and it is obstinacy to defend in any version, however ancient or venerable, what cannot be rationally defended. Although it be desirable that the grave ancient cast should prevail in an English translation of the Bible, a translation may nevertheless become too antiquated; and in fact our own Bible retains words and forms of such remote use, that some of them are not understood, even by intelligent readers, and many of them are rather harsh and uncouth, than venerable and majestic.

But it has been said, that the present translation ought to be retained in our churches, on account of its intrinsic beauty and excellence. The language, though simple and natural, is rich and expressive. Even in the literal translation of the Psalms, there are passages exquisitely beautiful and irresistibly transporting; and where the sense is not clear, nor the connection of ideas obvious at first sight, the mind is soothed, and the ear ravished with the powerful yet unaffected charms of the style. These beauties, it is alleged, on the other hand, are found, in an equal, or partly in a superior degree, in our first version; and must be more or less found in every version of the Hebrew Scriptures, that is not a mere paraphrase. King James's translators found it in their prototype; the diction and phraseology they borrowed from their predecessors in translation. What is beautiful, what is excellent, what is melodious and ravishing in the present version, should unquestionably be retained by all future translators; but is there any reason for retaining its corruptions, its mistranslations, its obscurities, and its other acknowledged imperfections?

The correcting translators, it will be again urged, differ among themselves. Differences must necessarily arise among interpreters of the Scriptures. King James's translators often disagreed as individuals; and adopted in a body what seemed to be most agreeable to the sound rules of interpretation. Let a like number of able judges decide, on the same principles, between biblical critics of the present age. But the new translators recede too far from the common version. This, however, in a new version, is not necessary, nor would it be proper; whilst they recede from its errors and imperfections; they should retain its general diction and manner, nor ever allow themselves to deviate from it without a satisfactory reason.

It has been further intimated, by those who are averse from a new version, that such as wish for additional information may have recourse to those authors, who have explained obscure and erroneous passages. But have all Christians, who meet with difficulties, time and ability to consult these writers? Or if they had, is it in any respect decent or fit that the public Scriptures, confessed to want assistance, should be suffered to depend for support on these extraneous props? The national Bible is the great record of our religion; it is this which the Deist attacks, and this must supply us with our defence.

The objectors proceed with observing, that no translation, even of a single book, has yet appeared, preferable on the whole, to the received one. Let it be considered, however, that the attempts of individuals necessarily labour under great

comparative imperfections; and yet these should be promoted by the natural patrons of sacred learning, and parts of the Scriptures should be assigned to such as are best qualified for the honourable task of translating and explaining them; because these private versions and expositions will form a most useful ground-work for a revised version of the whole Bible by public authority.

After all, it will be said by some, who are convinced that our present Bible should be revised, that this is not a proper time for the undertaking; and that we should wait till, by the further increase of light, and progress of improvement, we shall be able to carry the work to a greater degree of perfection, and, if possible, make future revisions unnecessary. This argument may be always urged; because religious knowledge will increase in proportion as human learning improves, and as new light is obtained from versions and MSS. that are already known, and that may yet be discovered, duly examined, and compared. "But shall we, in the mean time, prolong the difficulties of the Christian, and the fancied triumph of the Infidel? The mistakes already discovered are well worthy of correction. Should others of importance be brought to light in the next or subsequent generation, let them also be corrected. The true rule in this case is, to revise as often as revision is necessary. To defer this longer is an injury to religion; to put it off till it can be done in such a way as to preclude the necessity of future revisions, is in fact to put it off for ever." "The taste of the age for sound logic, sound criticism, and sound philosophy, has acquired sufficient strength to triumph over their opposers."

In favour of an improved version of the Bible, for national use, it has been argued, that such a translation becomes necessary by the unavoidable fluctuation of living languages. The style of Wickliffe's version, and of Tindal's, very widely differs in the course of 148 years; and the English language underwent also a great change between the publication of Tindal's Bible and that of King James's, in an interval of 81 years. Since the year 1611, when the present version first appeared, our language has acquired a great degree of copiousness, of elegance, of accuracy, and perhaps of stability. Many words and phrases which occur in the revised version are become unintelligible to the generality of readers; and many, which are intelligible, are so antiquated and debased, as to excite disgust among the serious, and contempt and derision among libertines. Pilkington (*Remarks on several passages of Scripture*, Camb. 8vo. 1759); Purver (*Translation of the Bible*); Dr. Synonds (*Observations on the expediency of revising the present English version, &c.* Camb. 4to. 1789); Dr. Wells (*Pref. to Comment on the O. T.*); Dr. Campbell (*Four Gospels translated from the Greek*, 4to. Lond. 1789); and Dr. Geddes (*Prospectus*); have selected many words and phrases that require correction, and that admit of obvious improvement. The style of a biblical version is a matter of importance; both as it invites the perusal of a book which the Spirit of God inspired, and as it influences the national language and taste. Whatever merit be allowed to the version now in use, with regard both to its interpretations as well as its style, it must be allowed that, since the period in which it was executed, the biblical apparatus has been much enriched by the publications of polyglotts; of the Samaritan pentateuch; of ancient and modern versions; of lexicons, concordances, critical dissertations, and sermons; books of eastern travels; disquisitions on the geography, customs, and natural history of the East; accurate tables of chronology, coins, weights, and measures. Many Hebrew and Samaritan MSS.; many early printed editions of the Hebrew Scriptures, have been collated by Kennicott and

and De Rossi; the eastern languages, which have so close an affinity with the Hebrew, have been industriously cultivated at home and abroad; the Masoretic punctuation is now ranked among useful assistances, but no longer implicitly followed; and the Hebrew text itself is generally allowed to be corrupt in many places, and therefore capable of emendation by the same methods which are used in restoring the integrity of all other ancient books. With such an accession of helps, with light poured in from every part of the literary world, with such important principles, and with the advancement of critical skill to apply them, it is natural to conclude that many mistakes and absurdities may be removed from the present version, and that the precision, beauty, and emphasis of the original, may be communicated to it in various places. The present state of the Hebrew text in its reference to a new version of the O. T. has been already represented in the commencement of this article: and that of the text of the New Testament will be the subject of a future article; see TESTAMENT.

Dr. Newcome, in his "Attempt towards an improved version, &c. of the Minor Prophets," published in 1785, proposed a variety of rules for conducting a new translation of the Bible. These have been since corrected and enlarged (*ubi infra*); and in order to render this article, the subject of which is highly important and interesting, as complete and as satisfactory to biblical readers as our limits will allow, we shall here subjoin the most material parts of them. The learned prelate proposes, in the first place, that a plan, resembling the regulations prescribed to king James's translators, should be deliberately adjusted by a large committee of judicious and learned men. A more select committee, well acquainted with the original tongues in which the Bible is written, should then be appointed by proper authority, who should invite every scholar to contribute his remarks; who should have their respective parts assigned them; and who, after the performance of their allotted tasks, should amicably unite in advancing the whole to its proper degree of perfection. The *first* of his rules is, that a translation of the Bible should express every word in the original by a literal, verbal, or close rendering, where the English idiom admits of it. This rule admits of some few exceptions; but it excludes unnecessary deviation from the grammatical form of the original words; unnecessary paraphrase, which enervates the force of the original, disguises its manner, and sometimes suggests a wrong idea; sentential renderings; and such as are defective. The *second* rule directs the translator, where the English idiom requires a paraphrase, to endeavour so to form it as to comprehend the original word or phrase; and to express the supplemental part in Italics, except where harshness of language results from the adoption of this method. The *third* rule recommends, in cases where a verbal translation cannot thus be interwoven, the substitution of one equivalent to it, and which implies the rendering in the original, but the idiom in the text should be literally rendered in the margin. By observing the second and third rules, the utmost fidelity to the original will be shown, which is the primary duty of a biblical translator; the customs and manners of the eastern nations will be explained; the peculiar genius of the original language will be exhibited; and the reader unskilled in them will be enabled to interpret for himself. The *fourth* rule requires, that the language of a biblical translation should be pure, or conformable to the rules of grammar. The *fifth* rule directs, that propriety should be a prevailing character in the words and phrases of a biblical translation; that is, they should have the sanction of use and the sanction given to them should be warranted by the best speakers and writers. In order to preserve the ve-

nerable turn of our present version, some few exceptions may be allowed under this general rule. The *sixth* rule enjoins the translators to retain the simplicity of the present version; for which purpose they should exclude foreign words, and the pomp and elegance of modernised diction. The *seventh* rule inculcates perspicuity. The *eighth* rule recommends the same original word, and its derivatives, according to the different leading senses, and also the same phrase, to be respectively translated by the same corresponding English word or phrase; except where a distinct representation of a general idea, or the nature of the English language, or the avoiding of an ambiguity, or elegance of style, or harmony of sound, requires a different mode of expression. In conformity to this rule, it is proposed, that translators should previously agree on the rendering of certain words and phrases. Accordingly, the original word "Jehovah," which expresses the self-existence of the deity, and which, so far from being barbarous, is a grand and magnificent term, should be retained:—that it should be considered, by the help of concordances, whether the same word can always be rendered in the same manner; and that when an English word suits every place, it should invariably be used:—that if the original word cannot always admit of the same rendering, of which many examples occur, the different renderings may be reduced to as few as possible, and those the fittest which the English language affords:—that different words, which have the same, or nearly the same sense, should be distinguished in translating them, when the English tongue furnishes distinct and proper terms:—and that parallel passages should be rendered in the same words. The *ninth* rule requires that the collocation of words should never be harsh and unsuited to an English ear. The *tenth* rule recommends to translators of the Bible a suitable degree of beauty and elegance. This beauty, in its prevailing character, must be easy and natural, simple and severe; free from laboured ornament and artful variety of phrase. The style, like that of the original, must be raised in the poetical parts, but not inflated, and plain in the historical parts, but not abject. "Let nothing," says Dr. Symonds (*ubi supra*) "be admitted into the text, which we cannot read with pleasure, as well as with advantage." In the *eleventh* rule it is required, that dignity should characterize a version of the Bible. The opposite extreme results from the introduction of debased and offensive terms or phrases; of which some are degraded by familiar use, others are colloquial and vulgar Anglicisms; and modern phraseology, as such, is undignified in a translation of the Bible. The *twelfth* rule prescribes energy as another characteristic of a biblical translation. This quality is obtained, in a great degree, by simplicity and propriety in the terms that are selected to represent the peculiar notions conveyed by the sacred writer, and by expressing the senses contained in the original with due conciseness. The forcible style of the Scriptures is enfeebled by epithets and participles; nor does their majesty more disdain the defect of ornament, than the excess of it. A version of the Bible will derive much force by retaining those Hebraisms which the English language easily admits, or to which an English ear is now accustomed. Obscure Hebraisms, such as weaken the signification of the original, and those which misrepresent its meaning, should be avoided. In the *thirteenth* rule it is recommended to continue the old ecclesiastical terms, such as *pontance*, *mystery*, *elect*, *predestinated*, &c. which are now part of our theological language, and of which explanations perpetually occur. Rule *fourteenth*. Metaphors are, in general, to be retained. By observing this rule, the genius of a language, and the nature and customs of a country, will often appear.

Rule *fifteenth*. Proper names should remain as they are now written in those places where they are most correctly represented. Rule *sixteenth*. The best known geographical terms should be inserted in the text; and those of the original in the margin; e. g. Syria, marg. Aram; Ethiopia, marg. Cush. Rule *seventeenth*. The language, sense, and punctuation of our present version should be retained, unless when a sufficient reason can be assigned for departing from them. Rule *eighteenth*. The critical sense of passages should be considered, and not the opinions of any denomination of Christians whatever; so that the translators should be philologists, and not controversialists. Rule *nineteenth*. Passages already admitted into the common version, but which are allowed to be marginal glosses, or about the authenticity of which critics have reason to be doubtful, should be placed in the text between brackets. Rule *twentieth*. In the best editions of the Bible, the poetical parts should be divided into lines answering to the metre of the original; or some other method should be used to distinguish them from prose. But if it should be thought advisable to exclude the poetical distribution from our Bibles, and confine it to the productions of the scholar, some proper mark of distinction for metrical pause, as the Hebrew Rebhiang or two horizontal points placed over a word, may be admitted into the authorized impressions of the Old Testament; or, at least, the contents prefixed may advertise the reader of the passages generally allowed to assume the tone and form of poetry. Rule *twenty-first*. Of dark passages, which exhibit no meaning as they stand in our present version, an intelligible rendering should be made on the principles of sound criticism. Under this head of sound criticism, Newcome includes that which is conjectural, the sober use of which he frequently recommends. But it admits of doubt, whether conjecture can ever be authorized in a translation which is intended for general use; for if it be exercised on slight occasions, it must be in some degree superfluous; if on material ones, it must ever be indecisive. The learned prelate, however, lays down the following canons for this kind of criticism. Never suppose that the text is corrupted without the most cogent and convincing reasons. Never have recourse to conjectural criticism, unless every other source has been tried and exhausted. Let all corrections be consistent with the text, and with one another. Insert no correction, however plausible or even certain, in the text, without warning the reader, and distinguishing it by a proper note. For other instructions, more immediately designed for the editor of such a new version, we refer to the author himself; as well as to his appendix, for a list of the various editions of the Bible, together with an account of the libraries public or private, in which they are to be found. Another more complete list of this kind is prefixed to bishop Wilson's Bible. See Lewis's Translations of the Bible, 8vo. 1739. Johnson's Historical Account of the several English translations of the Bible, in bishop Watson's Collection of Theological tracts, vol. iii. p. 60—100. Newcome's Historical View of the English Biblical Transactions, &c. 8vo. Dublin, 1792.

BIBLES, Welch. There was a Welch translation of the Bible made from the original in the time of queen Elizabeth, in consequence of a bill brought into the house of commons for this purpose in 1563. The act 5 Eliz. c. 28. reciting, that in Wales the people were popishly inclined, and very ignorant, put the direction of this work into the hands of the bishops of Hereford, St. David, Bangor, Landaff, and St. Asaph, who were to inspect the translation, and take care that such a number should be printed as would provide every cathedral, collegiate, and parish-church, and chapel of ease,

within their respective dioceses, where Welch was commonly spoken, with one copy. It was printed in folio, in 1588. Another version, which is the standard translation for that language, was printed in 1620. It is called Parry's Bible. An impression of this was printed in 1690, called Bishop Lloyd's Bible. These were in folio. The first octavo impression of the Welch Bible was made in 1630.

BIBLES, Irish. The New Testament having been translated into Irish by William Daniel, archbishop of Tuam, Bedell, who was advanced to the see of Kilmore and Ardagh, in 1629, first procured the Old Testament to be translated by one King; but the translator being ignorant of the original languages, and having done it from the English, the bishop himself revised and compared it with the Hebrew, the Septuagint, and the Italian version of Diodati. He supported Mr. King to the utmost of his ability, whilst he was engaged in this work; and when the translation was finished, he would have printed it in his own house, and at his own charge, if the troubles in Ireland had not prevented it. The execution of his benevolent design was also impeded in consequence of the notice that was given of it to the lord lieutenant and the archbishop of Canterbury, who thought it disgraceful for a nation to have a Bible published, which had been translated by such a despicable person as King. However, the translation escaped the hands of the rebels, and it was afterwards, viz. in 1685, printed at the expence of the Hon. Robert Boyle.

BIBLES, Gaelic. The Bible was translated and published by the Society in Scotland for promoting Christian knowledge, in the Gaelic language, for the use of their schools, and of the people in the Highlands, at different periods, and in detached portions, as the funds of the society allowed. In 1767, the New Testament in Gaelic was published by itself; and in various successive years, and in separate volumes, the several books of the Old Testament were published. In 1796, the first edition of the New Testament being exhausted, the society published another, consisting of 20,000 copies. And as some of the first printed volumes of the Old Testament have been so much reduced in number, as to be insufficient to supply the urgent demands of the Highlands in general, and of the Society's own school in particular, a new edition of 20,000 copies has been lately undertaken (in 1803), at an expence of 2284l. 16s. defrayed by voluntary subscription. An act of charity, highly important and laudable, as the persons, for whose accommodation it is designed, amount to no less than 335,000; of whom, it is computed, that 300,000 understand no other language than the Gaelic, or at least cannot comprehend a book written, or a continued discourse spoken, in any other.

BIBLE-DOCTORS, in Ecclesiastical History, a denomination by which the Schoolmen of the twelfth and thirteenth centuries were distinguished, who made the Scriptures the chief subject of their studies, and text of their lectures. However, in the course of the thirteenth century, the holy Scriptures, together with those who studied and explained them, fell into great neglect and even contempt. The Bible-Doctors were slighted as men of little learning or acumen; they had few scholars, and were not allowed an apartment, or a servant to attend them, or even a stated time for reading their lectures, in any of the famous universities of Europe. The illustrious Roger Bacon inveighed very bitterly against this abuse; and his excellent friend, Robert Grossethead, bishop of Lincoln, wrote a pathetic letter to the regents in theology in the university of Oxford, on this subject; earnestly intreating them to lay the foundations of theological learning in the study of the Scriptures, and to devote the morning hours to lectures on the Old and New Testaments.

But all these remonstrances and exhortations had little or no effect.

BIBLIA, or **BIBLIA petraria**, in a military sense, denotes a machine used by the ancients for throwing stones or darts.

BIBLIANDER, **THEODORE**. in *Biography*, whose true name was *B. Schramm*, a learned protestant divine, was born in 1504, at Büchzell near St. Gall, in Switzerland. He officiated as professor of divinity at Zurich from 1532 to 1562, when he was declared emeritus, or past service, not because he was incapable of executing his office, but because he had advanced opinions that deviated from the standard of orthodoxy with regard to the doctrine of predestination. He died of the plague, at Zurich, in 1564. He was well acquainted with the oriental languages, and published, in 1550, an edition of the Koran; the text of which, Bayle says, he corrected by a collation of the Arabic and Latin copies; and he added marginal notes, pointing out and refuting its absurdities. But others say, that this edition is faulty, and dispute Bibliander's skill in the oriental languages. To this edition he joined the lives of Mahomet and his successors, and prefixed an apology, by way of preface, which gave great offence by maintaining the lawfulness and utility of a free perusal of books adverse to true religion. He also wrote several other books on theological subjects, some of which are printed, and others remain in MS. in the library at Zurich. He likewise finished the Bible of Leo Juda, called the "Zurich Bible," and printed in 1543, and translated from the Hebrew into Latin the last chapters of Ezekiel, Daniel, Job, Ecclesiastes, the Canticles, and the last 48 Psalms. Gen. Dict.

BIBLIOGRAPHIA, a branch of *archæographia*, employed in the judging and perusing of ancient manuscripts, whether written in book, paper, or parchment. The sense of it is now extended, and it signifies a work intended to give information concerning the first, or best editions of books; and the ways of selecting and distinguishing them properly. In short, it is used for a *notitia*, or description of printed books, either in the order of the alphabet of the times when printed, or of the subject-matters. In which sense, bibliographia amounts to much the same with what is otherwise called *libraria*.

Literary journals afford also a kind of bibliographia.

BIBLIOMANCY, a kind of divination performed by means of the Bible. This amounts to much the same with what is otherwise called *sortes biblicæ*, or *sortes sanctorum*. See **SORTES**. It consisted in taking passages of Scripture at hazard, and drawing indications thence concerning things future; as in Augustin's *tolle et lege*. It was much used at the consecration of bishops. F. J. Davidius, a Jesuit, has published a bibliomancy, under the borrowed name of *Verridius Christianus*.

BIBLIOMANIA, an extravagant passion for books, to a degree of madness; or a desire of accumulating them beyond all reason and necessity.

BIBLIOTHECA, from *βιβλίον*, *book*, and *θησαυρος*, *repository*, from *θησ*, *I lay up*, properly signifies a library, or repository of books. See **LIBRARY**. It is also used for a compilation of all that has been written on a certain subject; or a digest of all the authors who have treated of it. In this sense, we have historical bibliothecæ, as that of Diodorus Siculus; metaphysical bibliothecæ, as that of Apollodorus; theological and sacred bibliothecæ, as those of Ravallius, &c. It is also used for a catalogue of the books in a library; such are the *libraria Caroliniana*, *libraria Caroliniana*, *libraria Thiburtina*, *libraria Bignoniana*, *libraria de Bysana*, &c.

L'Abbe has published a *libraria* of bibliothecæ, or a catalogue of the names of those who have written bibliothecæ,

which has since been continued and improved under another title by Tessier, from 800 writers to the number of no less than 2500. Schrammius has also published a *programmata* on the writers of theological bibliothecæ.

BIBLIOTHECA is a name given to the books of the Old and New Testament, in respect of their excellency, and sufficiency for the uses of the Christian life; and it is also a title given to divers journals, or periodical accounts in French of new books.

BIBLIOTHECA Patrum, or of the *Fathers*, is a collection of the writings of the lesser fathers, printed in one or more volumes. The first of this kind was published at Paris by Marg. de la Bigne in 1576.

BIBLIOTHECARIAN, a library keeper, otherwise called *librarian*.

The word is also used for the author of a bibliotheca, or a catalogue of books.

In this sense, P. L'Abbe has given a bibliotheca, or catalogue of bibliothecarians. Gesner, Lipenius, Struvius, Fabricius, &c. are celebrated bibliothecarians.

BIBLIOTHEQUE MUSICALE. See **MUSICAL Library**.

BIBLIS, in *Entomology*, a species of **PAPILIO**, with black dentated wings, and a band of sanguineous spots on the posterior ones. It is a native of America, and called *papilio hyperia* by Cramer. Gmelin. *Obs.* This must not be confounded with *papilio biblis* of Cramer, which is a very different insect, and seems to be a variety of *papilio penthesilea* of Fabricius.

BIBLIS Fons, in *Ancient Geography*, a celebrated fountain of Ionia, situate E. S. E. of Miletus. It is mentioned by Pausanias and Ovid.

BIBLISTS, *bibliste*, an appellation given by some Romish writers to those who profess to adhere to Scripture alone as the sole rule of faith, exclusive of all tradition and the supposed authority of the church. In which sense, all protestants are, or ought to be, biblists. Biblists, among Christians, answer nearly to Caraites or Textuaries among the Jews. The Christian doctors were divided, towards the close of the twelfth century, into two classes; viz. the *biblici*, and the *scholastici*: the former were called *doctors of the sacred page*, because they explained the doctrines of Christianity in their manner by the sacred writings; however, their reputation declined, and the scholastic theology prevailed in all the European colleges till the time of Luther. See **BIBLE-DOCTORS**.

BIBLUS, in *Botany*, an aquatic plant in Egypt, called also *papyrus*; of the skin whereof the ancient Egyptians made their paper. See **PAPYRUS**, and **PAPER**.

Hence also the Greeks gave the denomination βιβλος to books made of it. See **BIBLE**.

BIBLUS, in *Ancient Geography*, a river in the island of Naxia.

BIBONA, a place of Gallia Aquitanica, in the route from Burdigala to Segodum.

BIBORA RIVER and **BAY**, in *Geography*, lie to the east of Cartago bay, on the main land of Honduras, about N. lat. 14 20. W. long. 83 45.

BIBRA, **BEBRA**, or **BIEBRA**, a town of Germany, in the circle of Upper Saxony, in Thuringia, 10 miles west of Naumburg, and 8 south of Querfurt.

BIBRACTE, in *Ancient Geography*, a citadel of the *Adri*, according to Strabo, but according to Cæsar, a fortified town of Gaul, the capital of which was large and populous, now desolate; about 4 miles to the north-west of Autun, and called *Beurect*, *Bevray*, and *Bray*.

BIBRAX, **PIEVRE**, a town of Belgica, in Gaul, in the country of the *Ruemi*, north-west of *Durocortorum*. This town was attacked with great fury by the other Belgic nations, because it had declared for Cæsar. Cæsar. P. l. Gal. l. 2. c. 7.

BIBRICH, in *Geography*, a town of Germany, in the circle of the Upper Rhine, and principality of Nassau Saarbruck Ufingen, 3 miles S.S.W. of Wisbaden.

BIBROCI, in *Ancient Geography*, an ancient people of Britain, who are supposed to have occupied the south-eastern part of Berkshire, from the Lodden on the west to the Thames on the east. These people undoubtedly came from that part of Gaul, where the town Bibrax was situated, and their name leads us to the discovery of their origin, as well as of the place of their residence in this island. It is not certainly known when this colony of the Bibroci left their native country, and settled in Britain, though it is probable that it was not long before Cæsar's invasion, to whom, perhaps, they were engaged to submit by the influence and example of their friends and countrymen in Gaul. As the Bibroci were but a small nation, they seem to have been subdued by some of their neighbours before the invasion of Claudius, and therefore they are no further mentioned in history. The name of the hundred of Bray, on the Thames, near Maidenhead, is evidently derived from the name of these ancient inhabitants; as the ancient Bibracte, in France, now bears the name of Bray.

BICALCARATUS, in *Zoology*, a species of *PAVO*, of a brown colour, with the head slightly crested, and two spurs on each leg. Gmelin. This is *pavo Chinenfis* of Brisson; *P. eperonnier* of Buffon; *petit paon de Malacca* of Sonnerat; *peacock pheasant* of Edwards; and *iris peacock* of Latham.

This splendid bird is a native of China; in point of size it rather exceeds the common pheasant, and has a blackish bill, with the base of the upper mandible red from the nostrils; the irides are yellow; crest small, though composed of some pretty long feathers, and of a dull brown colour; the face is naked; sides of the head white; neck brown, striated across with dusky; upper parts of the back, scapulars, and wing-coverts dull brown, dotted with pale brown, and yellowish; and near the end of each feather a rich and glossy purple spot, changeable to green, to blue, or gold, in different points of view; lower part of the back and rump brown, spotted with white, and body beneath brown, striated transversely with black; upper tail coverts longer than the tail, and each marked with a fine purple spot near the end, encircled with black and orange; legs and claws brown. This is the description of the male. The female is one third smaller; head, neck, and upper parts brown; head smooth; feathers on the upper parts marked with a dull blue spot, encircled with dull orange; and the legs have no spurs.

BICARI, in *Geography*, a river of Sicily, which runs into the Termini, 2 miles west of Scalfani.

BICARINATA, in *Zoology*, a species of *LACERTA*, with compressed tail of moderate length, and carinated above; on the back four rows of carinated scales. This is of a greyish colour, and inhabits South America and India. Gmel. &c.

BICAUDALIS, in *Anatomy*, an appellation given by some anatomists to a muscle of the external ear, usually denominated the *retrahens*, or *retrahentes auris*, which see.

BICAUDALIS, in *Ichthyology*, a species of *OSTRACION*, of a triangular form, with two sub-caudal spines, and ten rays in the dorsal fin. Gmelin. There is a supposed variety of this fish found in India, and described by Artedi, in which the body is entirely covered with spots and tubercles.

BICE, or **BISE**, among *Painters*, a blue colour, prepared from the *lapis Armenus*, formerly brought from Armenia, but now from the silver mines in Germany. Phil. Trans. N^o 179. p. 26. Doffie, v. i. p. 95. Bice is finally reduced to a fine powder by levigation. See *SMALT*.

The word comes from the barbarous Latin *bifus*, or *bifus*; and that, perhaps, from the French *bis*, *grey*, *grisus*; whence

bifus panis. Vide Du-Cange, Gloss. Lat. tom. i. p. 565. Skin. Etym. in voc.

Bice bears the best body of all bright blues, used in common work; but is the palest in colour. It works indifferently well; but inclines a little to be sandy, and therefore requires good grinding on a very hard stone, and should be washed before it is used. It lies best near the eye of any blue now in use, except ultramarine. Its goodness lies in the brightness and coolness. It was formerly used in oil, and more frequently in water colours; but it is now much out of use. We have also a green bice, made of the blue, with the addition of orpiment; and several compositions of indigo and verditer, with chalk and other cheap substances, are sold under the name of bice.

BICE, in the *Mythology of the Hindoos*, the name of one of their Casts, proceeding from Brahma, the immediate agent of the creation, under the supreme power. It derives its appellation from the belly or thighs, and denotes nourishment, and it was destined by its founder to provide the necessaries of life by agriculture and traffic.

BICEPS, from *bis* and *caput*, in *Anatomy*, is a name common to several muscles, which consist of two distinct portions, called heads. Those which are commonly known at present by that appellation are the following.

BICEPS flexor cubiti. The longer portion, or head, of this muscle, arises by a tendon from the upper part of the glenoid cavity of the scapula; it then passes through the shoulder joint, and descends into the groove in the upper part of the os brachii, afterwards the fleshy fibres begin to be attached to it. The shorter portion arises tendinous and fleshy from the coracoid process of the scapula, in common with the coraco-brachialis muscle; a little below the middle of the os brachii, the heads unite and form a bulky muscle, the fibres of which terminate below in a strong roundish tendon, which is inserted into a tubercle, at the upper end of the radius, at that part which is next to the ulna. At the commencement of the lower tendon of this muscle, an aponeurosis is sent off from it, which soon expands into the fascia of the fore-arm.

The uses of this muscle are numerous, and the consideration of them affords a good demonstration of the impropriety of denominating a muscle from any single office which it may serve, as it tends to limit our ideas of its utility. The action of this muscle tightens the fascia of the fore-arm; it turns the hand supine; it bends the joint of the elbow; it raises the arm towards the shoulder; and occasionally it brings the bones of the shoulder to the arm.

BICEPS flexor cruris. The long portion, or head, of this muscle arises, in common with the semi-tendinosus, from the upper and back part of the tuberosity of the os ischium; the short portion arises from the linea aspera on the back part of the thigh-bone. These two portions having conjoined, produce a strong tendon a little above the external condyle of the os femoris, which forms the outer ham string, and which is attached to the upper part or head of the fibula. The chief use of this muscle is to bend the leg upon the thigh, and when it is brought into that situation, to turn the leg outwards.

BICESTER, in *Geography*, a market-town of Oxfordshire, England, is situated in a valley on the banks of a small river, which falls into the Charwell, at Islip. It is a large respectable town, divided into two parts, called Market-end, a parish, and King's-end, a hamlet. This place and its vicinity have been possessed by the Romans, as its name implies; and many Roman coins, and other memorials of that people, have been discovered here and at Alcester, or Old Chester, at different times. The embankments at the latter place are nearly obliterated by the plough; but from the name, and the antiquities that have been found, it seems evidently

dearly to have been a Roman station. "Alcifer, Alcifer, or Alcifer, the name of a city in Dacia, was a walled town that stood in the north-east parts of Oxfordshire, built, as may be collected from many probabilities, by Caius Allctus, one of the thirty tyrants, who, by favouring his dear friend and emperor Caracalla, obtained the sole government of Britain."

The Oxford canal passes through Lower Reyford, near this town, and carries many articles of trade to and from it. Hence is a large weekly market on Fridays, and six fairs annually; besides two annual markets in spring and autumn for the sale of sheep and cattle. The town has a well-established charity school for 30 boys; and a church, called the fontines. This is endowed with lands, of about 120*l.* yearly rent, which is applied towards the relief of the aged tradesmen. The principal manufactory of this town is cotton shppers; and it is supposed that there are more made here than in any other town in England. Many hands are employed in lace-making. The church is a large handsome building, with a lofty tower, and ornamented with many costly monuments. There is a handsome meeting-house for the dissenters. The parishes of Market-end, and hamlet of Kings-end, contain 470 houses and 1756 inhabitants. Plott's History of Oxfordshire. Camden's Britannia.

BICHE, *Biche de Guene*, in *Zoology*, a name assigned by one French writer (des March. Voy.) to the *Bresilian* wood of Peccant. *myrtus Americanus* of Gmelin.

BICHE *de Bis* is also the name of *cervus Mexicanus* (Gmel.) in Barrer. Fr. equin. 151.

BICHET, a corn measure, containing about a Paris *minot*, chiefly used in Burgundy and the Lyonnais.

BICHET denotes also a certain quantity of land, as much as may be sown by a bichet of corn.

BICHINI, in *Geography*, a town of Persia, in the province of Erivan, 30 miles N.N.E. of Erivan.

BICHON, in *Zoology*, the name given by Buffon to *canis melitans* of Ray.

BICHONNOWY, in *Geography*, a town of Russia, in the government of Mohilef, seated on the Dnieper, 32 miles south of Mohilef. N. lat. 53° 20'. E. long. 30° 50'. This is one of the districts of the government, called also Staroi Bykhof, or Biechow Starov.

BICINCTA, in *Entomology*, a species of *APIS*, described by Schrank Inf. Austr. It is black and villous; mouth and abdomen glossy, with two white belts on the latter. Inhabits Upper Austria.

BICINCTA, a species of *VESPA*, of a black colour, with a spotted thorax, and two yellow bands on the abdomen. A small insect, and inhabits the Cape of Good Hope. Fabricius.

BICINCTA, a species of *TENTHREDO*, with a black body; belts on the abdomen, vent, mouth, and shanks yellow. A native of Europe. Fabricius. Abdominal yellow belts two, from which it is specifically named *bicincta*.

BICINCTA, a species of *MUSCA* (*Syrphus*), found in the north of Europe. It is black; antennæ elongated; sides, dots, and two abdominal belts yellow. Linn. Fn. Succ. &c.

BICINCTA, a species of *SCOTIA*, of a black colour, and hairy; abdomen with two yellow bands; wings bluish black. A native of America. Fabr. Gmel. &c. This insect is *sphex radula* of Sulzer.

BICINIUM, from *bis* and *cano*, *I fig.*, in *Church Music*, the singing of two, either together or alternately. In which sense, the word stands opposed to *monody*.

BICKAGER, in *Geography*, a town of Norway, 70 miles S. S. W. of Dronthem.

BICKANEER, **BICANEER**, or **BEYZANZER**, a town of

Hindoostan, the capital of a circar or district of the same name in Marwar, the north division of Agimere. This country is sandy and desert, and in great want of water. Of this country little is known; it is governed by a rajah, and inhabited by Rajpoots. The town is situated about 42 miles west of Nagore, and 80 W. N. W. of Agimere. N. lat. 27° 12'. E. long. 74° 0'.

BICKERN of an *Anvil*, the pike, or beak-iron.

BICLINIUM, from *bis* and *clinor, bed*, in *Antiquity*, two beds about a table; or, as some say, rather a bed whereon two persons lay to eat.

BICKERTON'S ISLAND, in *Geography*, a name given by Capt. Edwards, in 1791, to an island in the South sea, near the Friendly islands, called by the natives Lattai, and discovered by Maurelle in 1781. It consists chiefly of a vast conical mountain, the summit of which appeared to be burnt, but the sides were covered with trees; and it is surrounded with a lower border, which is very fertile, and affords fresh water. This island supplies cocoa-nuts and bananas. S. lat. 18° 47' 20". W. long. 174° 48'.

BICOCCA, a town of Italy, in the duchy of Milan, near which the French were defeated by the Imperialists in 1552; 2 miles N. E. of Milan.

BICOLOR, in *Conchology*, a species of *Donax*, with an ovate shell marked with elevated stria, which decussate a few transverse ones; rufous, with a white ray on one side. Gualt. Gmel. &c.

BICOLOR, a species of *PINNA* found in the Red sea. This kind is thin, inflected at the lateral margin; yellowish, with black brown rays, and a few longitudinal striae. Chemnitz. This shell is thorny, elongated, with curved striae at the curved margin; and the largest end rotundated.

BICOLOR, in *Entomology*, a species of *APIS* that inhabits Denmark. The thorax villous and ferruginous; abdomen black and immaculate. Fabricius.

BICOLOR, is also an Indian species of *APIS*, of a black colour, with the abdomen hairy; fulvous above, and snowy-white beneath. Fabricius. This bears some resemblance to *apis centuncularis*, but is larger.

BICOLOR, a species of *ATHELABUS* found in Europe. It is of a black colour, with the thorax and wing-cases reddish; scutell, thighs, and shanks at the base, and tip black. Linnæus Fn. Succ.

BICOLOR, a species of *BUPRESTIS*, with pointed wing-cases, of a brassy-green colour, with a yellow spot; breast and abdomen yellow. Fabricius. Inhabits South America.

BICOLOR, a species of *CANTHARIS*, of a yellow colour, with half of the wing-cases blue. Thunberg. Inhabits the Cape of Good Hope.

BICOLOR, a species of *CARABUS* that inhabits North America. It is black above, and ferruginous beneath. Fabricius.

BICOLOR, a species of *CERAMBYX* that inhabits Cayenne. This is ferruginous; thorax with two spines and tubercles; wing-cases beyond the middle, with the abdomen black. Fabricius.

BICOLOR, a species of *CHRYSOMELA*, of a brassy-green above, and violaceous beneath. Fabricius. Inhabits Alexandria.

BICOLOR, a species of *CICADA* (*Cercopis*), of a griseous colour, with the upper part of the thorax sanguineous. Linn. Mus. Lesh. A native of Europe.

BICOLOR, a species of *CRYPTOCEPHALUS* (*Erotylus*). This insect is of a black colour, and brassy above. Fabricius. A native of New Holland.

BICOLOR, a species of *CURCULIO* found in America.

This is of a black colour, with a rufous thorax and wing-cafes. Fabricius.

BICOLOR, a species of DERMESTES, of an oblong form and black colour; beneath testaceous; wing-cafes striated. Fabricius. Inhabits Germany.

BICOLOR, a species of ELATER, of a brownish ferruginous colour; head and thorax brown; wing-cafes striated. Inhabits Europe. Linn. Mus. Lesh.

BICOLOR, a species of GRYLLOUS (*Jocusta*), described by Linnaeus. It is griseous, apterous, with the hinder thighs rufous beneath.

BICOLOR, an African species of ICHNEUMON, of a ferruginous colour; tip of the abdomen, breast, and end of the upper wings black. Gmelin.

BICOLOR, a species of LAMPYRIS (*Pyrochroa*), of a sanguinous colour, with the posterior end violaceous. Fabricius. This is *Cambaris bicolor* of Arago. It inhabits America, and has the antennae flate.

BICOLOR, a species of LEPIDOPTERA, of a pale ferruginous colour, with the eyes, wing-cafes, wings, and upper part of the vent black. Swedens Nov. Act. Stockh.

BICOLOR, a species of LEPIDOPTERA (*Danaus*) that inhabits Europe. It is of a golden colour, with the upper part of the thorax, and the wing-cafes green; the latter striated with imprinted dots; posterior thighs dentred. Gmelin, &c.

BICOLOR, a species of LYTTEA, of a testaceous colour; wing-cafes black at the tip. Geoffroy. Inhabits France.

BICOLOR, a species of MORDELLA, described by Forster (Nov. Inf.). It is of a black colour; wing-cafes testaceous, with the tip and band in the middle black. Very small. Inhabits England.

BICOLOR, a species of NITIDULA found in Europe. This insect is ferruginous, with black wing-cafes, having a ferruginous band at the base, and a spot of the same colour near the apex. Fabricius.

BICOLOR, a species of PHALÆNA (*Bombyx*) found in Saxony. The wings are white, with a large yellow spot, with black marks. Fabricius.

BICOLOR, a species of SCARABÆUS, with the thorax very slightly arched, and on the head a single tubercle; wing-cafes black; abdomen rufous. Fabricius.

BICOLOR, a species of SILPHA, of a brown colour, with rufous legs. Linn. &c. A native of Europe.

BICOLOR, a species of SPHEX that inhabits New Holland. This is of a black colour; head, abdomen at the tip, and wings yellow; the latter brown at the tip. Gmel. This insect was first described by Fabricius from a specimen in the collection of sir Joseph Banks, under the specific name *bicolorata*.

BICOLOR, a species of STAPHYLINUS, of a black colour, with the antennæ, wing-cafes, and legs ferruginous. Linn. A native of Europe.

BICOLOR, a species of TENTHREDO, of a bluish black, with the abdomen and base of the wings yellow; a band of black. Schrank. Inhabits Austria.

BICOLOR, a species of VESPA that inhabits China; and in size and appearance resembles the common wasp. It is yellowish; antennæ above, crown, thorax, and vent brown. Fabricius, &c.

BICOLOR, in *Ichthyology*, a species of GobiUS, found in the Mediterranean sea. It is of a brown colour, with all the fins black. Brün. pisc.

BICOLOR, in *Ornithology*, a species of ALCEDO, of a green colour, and golden rufous beneath; a black and white waved band on the breast; wings and tail spotted with white. Gmelin. This bird is a native of Cayenne. Buffon calls it *Martin pêcheur vert et roux de Cayenne*; pl. enl.; and Latham

the *rufus and green kingfisher*. Length eight inches; bill black; legs reddish; breast of the female not banded.

BICOLOR, a species of FRINGILLA, that inhabits the woods of Jamaica and Bahama islands, and is called by English writers the *Bahama sparrow*. The head and breast are black; back, wings, and tail, greenish. Gmelin. The length of this bird is four inches; its note very monotonous. Buffon calls it *Chloris Bahamensis*; and Buffon *Verdinere*.

BICOLOR, a species of LANIUS, of a blue colour; white beneath; frontlet black. Linn. &c. This is *Lanius Madagascariensis* of Linn. Syst. Nat. edit. 12; *Lanius Madagascariensis caruleus* of Buffon; *Pic-grieffe bleue de Madagascar* of Buffon; and *Blue shrike* of Latham. It is about six inches and a half in length, and, as the synonyms imply, is a native of Madagascar.

The bill, head, margin of the quill-feathers, two middle tail-feathers, and exterior margin of the four next blue; legs and claws black. Female, torrid white beneath.

BICOLOR, a species of LOXIA found in the East Indies. Gmelin very briefly describes it as being of a fuscous colour, and red beneath. This is *Fringilla rubra minor* of Buffon; *Brunor* of Buffon; *Little brown bulfinch* of Edwards; and *Orange-breasted greyfinch* of Latham. There is likewise a variety of this kind of a brownish colour, white beneath, and chin inclining to brownish. About three inches and a quarter in length; bill whitish; legs fuscous.

BICOLOR, a species of MUSCICAPA, of a black colour; front, space round the eyes, throat, rump, superior wings, band on the greater wing-coverts, tip of the tail, and under parts of the body, white. Gmelin. Buffon calls this *Cobe mouche à ventre blanc de Cayenne*; and Edwards and Latham *Black and white fly-catcher*. A variety of this bird is white, except the hind part of the head, and neck, rump, wings, and tail, bill, and legs, which are black. The female is of an uniform grey colour. Inhabits the moist meadows of Guiana.

BICOLOR, a species of PICUS, called by Latham, after Buffon, the *Erceada woodpecker*; *Epiche ou pic varié de Encennadi*, Buffon. This is varied with greyish and white; head crested, white on the sides; quill-feathers brown, spotted with white. Gmelin, &c.

The length of this beautiful bird is about six inches; bill lead colour; irides white; plumage brownish-grey and white finely blended; above, the colours are intermixed transversely, and beneath in a perpendicular direction; crest on the sides intermixed with crimson; sides of the head white, verging to brown; legs lead colour. The female has no crest, and is entirely brown.

BICOLOR, a species of TROCHILUS, of a smaragdine-golden colour, with the head and throat blue. Gmelin. This is of the middle size, and inhabits Guadalupe. It is *Colibri* Nr. 2. of Fermin. Surin.; *Saphir-emer aude* of Buffon; and *Sapphire and emerald humming-bird* of Latham.

BICOLOR, a species of TURBUS, of a brown colour, tinged with green; abdomen and vent white. This inhabits the Cape of Good Hope; and is ten inches long. Buffon calls it *Merle brun du cap de Bonne espérance*; and Latham the *White-rumped thrush*.

BICOLORA, in *Entomology*, an African species of PHALÆNA (*Noctua*). Wings yellow, with a broad brown posterior margin.

BICOLORATA, a species of PHALÆNA (*Geometra*) with the wings bluish and striated; anterior black at the tip, and spotted with white. Inhabits Surinam. Cramer, &c.

BICOLORATA, a species of SCARABÆUS (*Nelobantha*) found at the Cape of Good Hope. It is glabrous green, beneath

charter of Edward I. and afterwards represented in several parliaments, seems to have been greatly reduced at the time when Leland visited it, for he merely mentions the river and the bridge. Camden, however, speaks of it as "remarkable for its populousness." At the time of the latter antiquary, Biddeford assumed a commercial consequence, and carried on some trade with America and Newfoundland. Queen Elizabeth granted it a charter of incorporation, which vested the government in a mayor, five aldermen, seven capital burgeses, a recorder, town-clerk, and two sergeants at mace. By this charter the inhabitants are empowered to hold a weekly market, and three annual fairs. Another charter was however obtained in 1610, which confirmed the former, and granted the townsmen some additional powers and liberties. The patronage and residence of sir Richard Granville and sir Walter Raleigh proved highly favourable to Biddeford; for after these worthy knights had discovered Virginia and Carolina, they returned to, and settled here. In the time of the civil wars, the inhabitants of this place declared themselves very early in favour of the parliament; but their success did not prove equal to their zeal, for in attempting to relieve Exeter, they experienced a severe and total defeat, and immediately resigned Biddeford, Barnstaple, and their appendages, to the royalists.

In the year 1646, Biddeford was ravaged by a plague, which appears to have been occasioned by the landing of a cargo of Spanish wool: an article which at that period constituted a principal part of the trade of the town. The credulity and superstition that characterized the English in the seventeenth century are strikingly exemplified by an occurrence which happened here in 1682. Three poor females were accused of witchcraft, and so direct and positive was the evidence adduced against them, at several examinations before the magistrates, that they were committed to Exeter gaol, and soon afterwards tried, and executed for their alleged crime.

About the middle of the last century, the export trade of Biddeford to Newfoundland was so considerable, that only two other ports in the kingdom employed an equal number of vessels, and in the export trade only one port excelled it. During the unwise administration, and injurious wars of queen Anne's reign, these commercial transactions materially suffered, and the French privateers obtained so many valuable prizes from Biddeford bay, that it was emphatically termed the *Golden bay*. The number of vessels now belonging to this port is almost one hundred; these vary in burthen from twenty to two hundred and fifty tons, and are chiefly employed in the conveyance of coal and culm; in the exportation of oak bark to Ireland and Scotland; in the herring trade, and in the importation of fish from Newfoundland. The quay is conveniently situated near the centre of the town, and the body of the water at high tides will bring up vessels of 500 tons burthen. The chief manufacture of this place is that of coarse brown earthenware, which is made with clay brought from Fremington near Barnstaple. The price of this is only two shillings and sixpence per ton. The bridge at Biddeford, built of stone, consists of twenty-four irregular arches, and was constructed about the middle of the fourteenth century. It is 677 feet in length, and was constructed at the expence of sir Theobald Granville, kn. and at the instigation of the bishop of the diocese, who granted indulgences to such persons as gave money in aid of the work. The church, a spacious building, was erected in the form of a cross about the middle of the fourteenth century. A house of industry has lately been erected here; and a free school, and free grammar school are ranked among the charitable foundations of the town. The market-place is spacious, and

the town-hall is a large convenient building with two prisons beneath it. In the parish of Biddeford are 606 houses and 2987 inhabitants. This town is 211 miles S.W. from London.

Thomas Stucley, a descendant of the celebrated chaplain to Oliver Cromwell, was a native of Biddeford, and was distinguished for many eccentricities of character. John Shebbear M.D. an author of some eminence, was also born here in the year 1709.

About five miles east of this town is Tawstock, the seat of sir Bouchier Wrey, Bart. This place is mentioned by different authors as remarkable for embracing at one view "the best manor, best mansion, finest church, and richest rectory in the county." Bishop's Tawton, near Tawstock, is said to have been the first seat of the bishop of this diocese. Watkins's History of Biddeford. Maton's Tour through the western Counties. Prince's Worthies of Devonshire. Beauties of England and Wales, vol. iv.

BIDDEFORD, a port of entry and post-town of America, in York county, and district of Maine, on the south-west side of Saco river, on the sea-coast, 14 miles S. W. from Portland, 24 N.E. from York, and 105 from Boston. It contains 1018 inhabitants, and the county-courts are held here and at York. N. lat 43° 26'. W. long. 70° 25'. The bay of Biddeford lies at the mouth of the river Saco, and has Black point for the N.E. point, and cape Porpoise for the S.W. point.

BIDDING, is used for proclaiming or notifying; also for offering a price for goods put up by auction.

BIDDING of the beads, a charge or warning which the parish priest gave to his parishioners at certain special times, to say so many pater-nosters, &c. on their beads.

Bishop Burnet (Hist. Ref. vol. ii. p. 20.) has preserved the form, as it was in use before the reformation, which was this: after the preacher had named and opened his text, he called on the people to go to their prayers, telling them what they were to pray for; "Ye shall pray (says he) for the king, for the pope, for the holy catholic church, &c." When this was done, all the people laid their heads in a general silence, and the minister kneeled down and likewise said his: they were to say a pater-noster, an ave-maria, Deus misereatur nostri, domine salva fac regem, gloria patri, &c., and then the sermon proceeded.

BIDDLE, JOHN, in *Biography*, a distinguished person among the Socinians, and reckoned the father of the English sect bearing this denomination, and lately assuming that of Unitarians, was born at Wotton-under-Edge in Gloucestershire, in 1615; and after a previous grammatical education, in the course of which he exhibited specimens of his talents and improvement, admitted, in 1632, a student of Magdalen-Hall, in the university of Oxford. Here he acquired great reputation for learning and prudence, both as a student and a tutor: and having taken his degrees of bachelor of arts in 1638, and of master of arts in 1641, he was, in this latter year, recommended by the principal persons in the university to the magistrates of Gloucester, and appointed by them master of the free school of St. Mary de Crypt, in that city. In this office he completely answered the expectations of his constituents, and gave great satisfaction to the parents of the young persons who were entrusted to his care. But he did not long enjoy, without molestation, the advantages of this situation; for he was led, by a diligent study of the scriptures, to adopt notions that were deemed heretical, concerning the Trinity, and more particularly to deny the deity of the Holy Spirit. Failing to give satisfaction to the magistrates, before whom he was summoned, by his confession in 1644, he drew up a more explicit account and defence

defence of his sentiments on this subject in a tract, entitled "Twelve arguments, drawn out of the scriptures, wherein the commonly received opinion touching the deity of the Holy Spirit is clearly and fully refuted." A copy of this treatise, which he had shewn to some of his friends, having been, by the treachery of an acquaintance, delivered to the magistrates of the city, and to the parliament committee then residing there, he was committed, in December 1645, to the common gaol. He was released, however, on giving security for his appearance when called for. Six months after he had obtained his liberty, he was summoned to appear before the parliament at Westminster, and examined by a committee. As he freely professed his disbelief of the commonly received opinion concerning the divinity of the Holy Spirit, he was committed to the custody of one of the officers, and kept in that state of restraint for five years. In the mean while, his book, entitled "Twelve arguments, &c." was published, and being declared blasphemous against the divinity of Christ, the house, in 1647, ordered it to be burnt by the common hangman. In the following year, the author, persisting in his opinions, and avowing his sense of their importance, published two other tracts of a similar nature; one entitled, "A confession of Faith touching the holy Trinity, according to the scripture;" and another entitled, "The testimonies of Irenæus, Justin Martyr, Tertullian," and of several other early writers, relating to the same subject. These books excited an alarm, and were the means of procuring a severe ordinance of parliament, issued in May 1648, at the solicitation of the Assembly of divines, who acted in this instance in a manner that entails disgrace on their memory, and denouncing the penalty of death against those who held opinions contrary to those that were established respecting the Trinity, and some other doctrines, accounted blasphemies and heresies; and severe penalties on those who differed in lesser matters. By this infamous and execrable decree the fate of Biddle seemed to be inevitable. But he escaped in consequence of a dissension in parliament, supported by a party in the army, to whose case this ordinance would have extended. After the death of the king, the Independents acquired influence, and introduced a kind of general toleration, under which Biddle was allowed to go to Staffordshire, where he was hospitably received by a justice of the peace, who, at his death, left him a legacy. From this retired asylum, however, he was removed by general Bradshaw to closer confinement, in which state he continued for several years, under an imputation of blasphemy and heresy, which deprived him of all society, and reduced him to such lamentable indigence, that his whole support for a considerable time was a draught of milk morning and evening. The only divine who visited him, during this period, was Mr. Peter Gunning, afterwards bishop of Ely. In these circumstances he obtained temporary relief by being employed in correcting the press for a Greek Septuagint, printed in London by Roger Daniel; and in 1651, he regained his liberty by the general act of oblivion, published by the parliament in this year. Of this liberty he availed himself, by instituting a Sunday's lecture for reading and expounding the scripture, and thus propagating his opinion. The Presbyterian ministers were rendered uneasy by his zeal and success, more especially as they could derive no assistance for restraining him from the secular power. Not satisfied with the opportunities he enjoyed of disseminating his sentiments from the pulpit, and in the intercourse of private friendship, he had again recourse to the press, and in 1654, published his "Twofold Scripture catechism;" one larger and more comprehensive, and the other more brief, for the use of children. For this publication he was called

to the bar of Cromwell's parliament, and committed to the Gaol-house, where he was debarred the use of pen and ink, and the access of any visitor; and his books were also ordered to be burnt. Although a bill was brought in to parliament for punishing him, he obtained his liberty after six months' confinement, by due course of law. Some time after, he had a dispute with a baptist teacher; in the course of which he made use of some expressions, for which he was thrown into Newgate, and tried for his life at the next sessions, on the ordinance above-mentioned. On this occasion, counsel was at first denied him, but afterwards granted, and the trial deferred. In the mean while Cromwell interfered, and disapproving of this kind of intolerance, contented himself at first with retaining him in prison; but afterwards, in order to silence the clamours and petitions that were preferred against him, banished him for life to St. Mary's castle in the island of Scilly, assigning him an annual subsistence of 100 crowns. In this place of exile Biddle continued three years, applying himself to close study, and particularly to that of the Apocalypse. His friends at length prevailed with Cromwell to recall him; and in 1658, as no charge appeared against him, he was liberated. He then became pastor of an independent society in London, and propagated his opinions without molestation, till the fear of the presbyterian parliament assembled by Richard Cromwell, and the advice of his friends, induced him to retire into the country. On the dissolution of that parliament, he returned to his former station. After the restoration of Charles II. he withdrew from public service, and exercised his ministry in private assemblies with his select friends. However, in June 1662, their meeting was discovered, and both he and his friends were apprehended and committed to prison; and at length, by process of law, each of his hearers was fined 20l. and Biddle himself 100l.; and they were ordered to remain in prison till these fines were paid. The close confinement and foul air of a prison, within five weeks, brought upon him a distemper, which terminated his life, September 22, 1662, in the 47th year of his age: and thus was his death hastened by the intolerance which persecuted him during the greatest part of his life. Mr. Biddle possessed a considerable degree of learning; and with the Scriptures he was so conversant, that he could repeat the New Testament from memory, both in English and in Greek, as far as the 4th chapter of the revelation of St. John. He possessed also, with this retentiveness of memory, powers of reasoning, which eminently qualified him for disseminating his peculiar opinions, and gaining proselytes. In his private character he was distinguished by his piety and devotion, by his moderation and temperance, by his condescension and benevolence, and by his irreproachable virtue. As he differed in some respects from Socinus and the foreign Unitarians, his followers were for some time denominated "Liddellians;" but the name did not subsist after his death. Biog. Brit. Toulmin's Life of Biddle, in Unitarian tracts, vol. iv. 1791. Neal's Hist. of the Puritans, vol. ii. p. 470, 471.

BIDDLES, in *Geography*, a settlement on a branch of Licking river, in Bourbon county, Kentucky, about 6 miles N.W. from Millers on the N.E. side of the same branch, and 32 miles N.N.E. from Lexington.

BIDENS, so named from the seed being terminated with two teeth or awns, in *Botany*. Lin. gen. n. 932. Reich. n. 1012. Schneb. 1267. Tournef. t. 262. Juss. 188. Dill. Elth. 43. 47. Gærtn. t. 167. *Ceratoccephalus*. Vaill. Act. Gall. 1720. f. 47, 48, 49. Class. *syngenesia polygamia equalis*. Nat. Ord. *compositæ oppositifoliae*. *Corymbifera*, Juss. Gen. Char. *Calyx* common, imbricate, erect; leaflets often equal,

B I D E N S.

equal, oblong, channelled, concave. *Cor.* compound, uniform, tubular; corollules hermaphrodite, tubular. Preper. one-petalled, funnel-form; border five-cleft, erect. *Stam.* filaments five, capillary, very short; anther cylindrical, tubular. *Pist.* germ oblong; style simple, the length of the stamens; stigmas two, oblong, reflex. *Per.* none: calyx unchanged. *Seeds* solitary, obtuse, angular; down with two or more awns, oblong, straight, acute, rough-hooked & downwards. *Rec.* flat, chaffy; chaffs deciduous, flattish. *Obj.* In most of the species an expanding five-leaved calycole surrounds the compound flowers. *Verbena* differs from *Bidens* only in having a ray. Sometimes the corolla has one or two radial florets. Reich.

Ess. char. *Cal.* imbricate. *Cor.* sometimes but seldom with a floret or two in the ray. — *Seed* crowned with erect, scabrous awns. *Recept.* chaffy.

Species 1. *B. tripartita*, trifid water-hemp-agrimony, or bur-marygold. Lin. sp. pl. 1165. Hudf. 355. With. 706. Full. 181. Relh. 308. Sibth. 248. Abbot. 177. Curt. Lond. fasc. 4. t. 57. Smith. Fl. Brit. 357. 1. *Verbena* seu *cannabinum aquatica*, flore minus pulchro, elatio: et magis frequens. Raii Synop. 18. *Eupatorium cannabinum femina*. Ger. em. 711. *B. Conyza palustris*, fol. tripartito divisis. Loes. pruff. 53. ic. 10. "Leaves trifid, calyxes somewhat leafy, seeds erect." Root annual; stem from one to three feet high, with opposite, reddish branches, patent, leafy, obtusely quadrangular, furrowed and smooth; leaves opposite, smooth, deep serrate, trifid or quinquefid: flowers terminating, solitary, somewhat erect, with undivided patent leaves; leaflets of the calyx unequal, plane, smooth, streaked with brown; the floscules uniform, tubulose, yellow; seeds compressed, two or three angled, the angles backward rough, two or three awns, terminating, somewhat erect, yellow, three-cornered, prickly backward; the chaffs of the receptacle resembling the leaflets of the calyx, but narrower. It is frequent in places inundated, and on the banks of ditches: flowers in August and September. This plant dyes a deep yellow; for which purpose the thread or yarn must be first steeped in alum water, then dried and steeped in a decoction of the plant, and afterwards boiled in the decoction. As by a chemical analysis it is found to possess much the same qualities as *verbena acemella*, it may probably have the same good effects in expelling the stone and gravel. 2. *B. minima*, nodding bur-marygold. Lin. sp. pl. 1165. Reich. 3. 703. Hudf. ed. 1. 310. Fl. Dan. t. 312. Abbot. 178. With. 883. v. Curt. Lond. 3. 55. *B. tripartita*. β . Hudf. 355. *B. Cernua*. γ . Smith. Fl. Br. 357. *Verbena minima*. Dill. in Rai Syn. 188. t. 7. f. 2. Giff. 167. App. 66. "Leaves lanceolate sessile; flowers and seeds erect." This was first marked by Dillenius for a distinct species. Haller thought it to be no more than a variety of the *cernua*, in which he has been followed by all our British botanists. Found in dried marshes. 3. *B. nodiflora*, sessile-flowered bidens. Lin. spec. 1165. Dill. elth. t. 44. f. 52. Reich. 3. 704. "Leaves oblong, quite entire, one-toothed, stem dichotomous, flowers solitary, sessile." An annual plant, rising with stems eight or nine inches high, round, rough, with white hairs, purple at the base. A native of the East Indies; cultivated at Eltham by Dr. Sherard, in 1732. 4. *B. tenella*. Lin. Spec. 1166. Reich. 3. 704. Amoen. 6. afr. 47. "Leaves linear, peduncles capillary, calyxes mostly four-leaved, seeds erect, five-fold." Stem filiform, purplish, subtrichotomous, six or seven inches in height. An annual, and a native of the Cape of Good Hope. 5. *B. cernua*, drooping water-hemp-agrimony, or bur-marygold. Sp. pl. 1165. Hudf. 356. With. 705.

Hall 180. Relh. 309. Sibth. 248. Abbot. 177. Curt. Lond. fasc. 3. t. 55. Fl. Dan. t. 841. Smith. Fl. Brit. 357. 2. Pet. herb. t. 20. f. 6. Raii list. 361. n. 2. 3. *Verbena pulchrior* flore luteo. Raii syn. 187. Bauh. hist. v. 2. 1074. *Conyza bidens*. Sp. pl. 1281. *Chrysanthemum cannabinum bidens*, foliis integris. Morif. hist. t. 6. t. 5. f. 22. *Eupatorium cannabinum chrysanthemum*. Barrel. ic. t. 1209. *Conyza palustris*, foliis ferratis. Lous. pruff. 54. t. 11. "Leaves lanceolate, stem clasping, flowers nodding, seeds erect." Root annual; stem from one to two feet high, or more, upright, branched, a little hairy, purplish, dotted with red, round at bottom, striated at top, with branches opposite, nearly upright, leaves opposite, moderately coarsete, undivided, or with distant serratures, spreading, smooth on both sides; peduncles striated; flowers yellowish-green, finally drooping, generally radiate; calyx consisting of about seven leaves, finely serrate at the edge, ribbed, turning back, and longer than the corolla; with eight corolllets in the circumference, hermaphrodite, like the central ones, but with the tube more tumid and depressed. In places overflowed for a long time, they change into ligulate neutral corolllets; receptacle pyramidal, four-cornered; seeds with four awns, two of which are larger; the prickles pointing downwards. This flowers a month later than the *tripartita*; and in this state has a strong smell, not very disagreeable. A native of most parts of Europe. Haller observes, that *cernua bidens* of Linnæus differs in no respect from *B. cernua*, except in having radiate florets in the circumference: hence Dr. Stokes concludes, that *bidens* and *cernua* form one genus. Found at Ditchingham in Norfolk, and Tarpley in Cheshire; frequent in Ireland. 6. *B. frondosa*, smooth-stalked bidens. Linn. Spec. 1166. Gartn. fruct. 2. 412. Reich. 3. 704. Berkh. diff. 1. 5. f. 5. *Chrysanthemum*, &c. Mor. list. 3. 17. f. 6. t. 5. f. 20. "Leaves pinnate, serrate, marked with lines, smooth; seeds erect; calyxes leafy; stem polished." The stem rises about three feet high, sending out many horizontal branches, from the ends of which are produced clusters of yellow flowers. It grows naturally in Virginia, Maryland, and Canada, where it is often a troublesome weed. It was cultivated by Mr. Miller in 1752. 7. *B. pilosa*, hairy bidens. Lin. Spec. 1166. Syst. 732. Reich. 3. 705. Dill. elth. t. 43. f. 51. Thunb. jap. 307. Lour. cochinch. 488. Gartn. fruct. 2. 42. β . *B. Chinensis*. *Agrimonia Molluca*. Rumph. Amb. 6. 38. t. 15. f. 2. "Leaves pinnate, somewhat hairy, stem with bearded joints, calyxes with a simple involucre, seeds diverging." A native of America, and of Tongataboo in the South Seas. *B.* of China resembles the American; but in the latter the leaflets are united, in the former they are distinct; and the seeds of the American have from two to five awns, and in the Chinese always four. The American form was cultivated in 1732 by Dr. Sherard. 8. *B. bipinnata*, hemlock-leaved bidens. Lin. Spec. 1166. Reich. 3. 705. Lour. cochinch. 488. *Chrysanthemum*. Herm. par. t. 123. Mor. list. 17. n. 24. f. 6. t. 7. f. 23. "Leaves bipinnate, gashed, calyxes involucred, corollas half-radiated, seeds diverging." An annual plant; a native of Virginia; cultivated in Kew garden in 1699. Loureiro says it is a native of China and Cochinchina. 9. *B. nivea*, snowy bidens. Lin. Spec. 1167. Reich. 3. 706. Dill. elth. t. 47. f. 55. Swartz obs. 296. β . Dill. elth. t. 47. f. 55. 3. γ . Dill. elth. t. 46. f. 54. "Leaves simple, cordate-ovate, acuminate, branches trichotomous, serrate, flowers hemispherical, peduncles elongated." A native of Jamaica, in elevated pastures, and on the sea-coast of the southern parts. Mr. Miller says, it grows naturally in South Carolina, and also at Casapachy; cultivated at Eltham in

that inhabits America. The abdomen is brown, with five whitish belts; vent bidentated. Fabricius.

BIDENTATA, a species of *PHALÆNA* (*Noctua*). This is a native of Europe, and has brown wings; stigmatè spot on the first wings, and inner margin white; a bidentated streak in the middle. Lin. Mus. Lelk.

BIDENTATA, a species of *CHRYSIS*, that inhabits Europe. This insect is glabrous; shining blue; thorax armed with two teeth, and with the two first segments of the abdomen golden. Fabricius. At the vent are three very short teeth.

BIDENTATUS, a species of *BOSTRICHUS*, described by Fabricius, Herbit, &c. It is black, and testaceous, retuse at the extremity, and armed with two hooked spines.

BIDENTATUS, a species of *CRYPTOCEPHALUS* (*Crioceris*), of a yellow colour; wing-cases black, yellowish at the tip. Fabricius. Inhabits Africa.

BIDENTATUS, a species of *CERAMBYX*, that inhabits South America. The thorax is slightly spinous; wing-cases bidentated, rough, cinereous, and brown. Fabricius.

BIDENTATUS, a species of *ICHNEUMON*, that inhabits Europe. It is black, scutel, and posterior part of the thorax yellow; on the latter two teeth, and the two first segments of the abdomen ferruginous. Linn. &c. The four anterior legs are rufous brown; rest black; tips white.

BIDENTATUS, a species of *CIMEX* (*Spinosus*), found in France. This is long and brown; snout bent; thorax beneath armed with two teeth on the anterior part. Geoffroy, Gmelin.

BIDENTATUS, a species of *TABANUS*, that inhabits Austria. This is of a ferruginous colour, with two yellow spots on each side, and front bidentated. Fabricius.

BIDENTES, in *Middle Age Writers*, denote two yearlings, or sheep of the second year. The wool of these bidentes, or two year old sheep, being the first sheering, was sometimes claimed as a heriot to the king, on the death of an abbot. Among the ancient Romans, the word was extended farther to any sort of beasts used for victuals, especially those of that age, whence we meet with *jues bidentes*.

BIDENTI *Similis*, in *Botany*. See *SIEGESBECKIA*.

BIDET, a nag, or little horse, formerly allowed each trooper and dragoon, for his baggage, and other occasions. Bidets are now disused, on account of the expences of them, and the disorders frequently arising from those who attended on them, &c.

BIDETTO, in *Geography*, a town of Italy, in the kingdom of Naples, and country of Bari, the see of a bishop, suffragan of Bari; 118 miles east of Naples.

BIDGOST, or **BIGDSEZ**, a town of Prussia, in Pomerelia, 64 miles south of Dantzick.

BIDLÆI, in *Antiquity*, an order of magistrates at Sparta, five in number, whose business it was to superintend the *ephebi*, and be present at their exercises, wrestlings, &c.

BIDI-BIDI, in *Ornithology*, one of the synonymous names of the Jamaica rail, *rallus Jamaicensis* of Latham.

BIDJIGUR, in *Geography*, a town of Hindoostan, in the country of Benares, seated on the river Soane, 45 miles south of Benares, and 128 S.W. of Patna. N. lat. 24° 30'. E. long. 83° 26'.

BIDIN. See **WIDIN**.

BIDIS, in *Ancient Geography*, now *S. Giovanni de Bidini*, a town of Sicily, south-west of Syracuse, and about 25 miles from it. It is mentioned by Cicero, and also by Steph. Byz. who calls it *Bidos*. The people who inhabited the eastern part of the island, at some distance from Syracuse, were hence called *Bidini*.

BIDLOO, **GODFREY**, in *Biography*, a celebrated Dutch anatomist, born at Amsterdam, 1649, applied early to the study of surgery, which he practised several years at his native city; he was also surgeon to the army, and at length physician to William III. with whom he continued in great favour to the time of his death, which happened in 1702. In 1694, he was made professor of anatomy and surgery at Leyden. He was a man of considerable learning, Haller says, but more attached to the pleasures of the table than to study, to which he attributes the numerous errors and inaccuracies in his otherwise splendid and valuable anatomical tables, which were criticised, perhaps, with too much severity by Ruysch, who had been his pupil. Our countryman, William Cowper, purchased 300 copies of the plates, in the life-time of Bidloo, and published them as his own, only giving new explanations, of which our author, with reason, complained in his "Guilielmus Cowper citatus coram tribunal," Leyden, 1700, 4to. Besides his great anatomical work, consisting of 105 tables, with explanations, fol. 1685, and his controversial papers, he published, "Observationes de animalculis in hepate ovillo detectis," 1698, 4to. "De oculis et visu variorum animalium," 1712, 4to. "Exercitationes anatomico-chirurgicæ," 1780, 4to. These, with various other dissertations, were collected, and published in 1715, 4to. two years after his death. Haller. Bib. Anat. Chirurg. et Med. His nephew, Nicholas Bidloo, was physician to the great czar Peter I.

BIDON, a liquid measure of about five quarts English measure; seldom used except among ship's crews.

BIDOURLE, in *Geography*, a river of France, which passes by S. Hippolyte, Sauve, Sommieres, &c. and runs into the lake of Peraut, 3 leagues east of Montpellier.

BIDOUZE, a river of France, which runs into the Adour, near the junction of that river with the gaves of Pace and Oleron.

BIDUMI, a country of Asiatic Turkey, the south part of Syria, bounded on the north by Palestine, on the west by Egypt, and on the east and south by Arabia; it is nearly desert, and has only a few scattered villages.

BIE, **ADRIAN DE**, in *Biography*, a painter of portraits and ornamental architecture, was born at Liere, in 1594, and after being initiated in the rudiments of his art by Wouter Abts, became the disciple of Rodolph Schoof, a painter of considerable reputation at Paris. He perfected himself at Rome, where he spent six years in the study of the best masters, and received great encouragement from persons of the first distinction. He so much excelled in the neatness of his pencilling, and in the delicacy of his touch and colouring, that he was frequently employed to paint on jasper, agate, porphyry, and other precious materials. The place and time of his death are not ascertained. Pilkington. See **BYE**.

BIEBER, in *Geography*, a town of Germany, in the circle of the Upper Rhine, and county of Hanau Munzenberg, 16 miles east of Hanau. Near this town are a mine of copper and silver, and some works of iron and cobalt, in which the latter is prepared into a beautiful smalt.

BIEBERICH, a small but handsome town of Germany, seated on the borders of the Rhine, and in the vicinity of Mentz. It belongs to a prince of the same name.

BIEBERSBACH, a town of Germany, in the circle of Franconia, and principality of Bayreuth.

BIEBRA, a river of Poland, which runs into the Narew, near Wiezna, in Masovia.

BIECZ, a town of Poland, in the palatinate of Cracow, seated on the river Wafaloke, and famous for its mines of vitriol. N. lat. 49° 50'. E. long. 21° 40'.

BIEDA, a town of Italy, in the state of the church, and province of Patrimonio, 10 miles W. of Sutri.

BIEDBURG, anciently *Beda*, a small town of Germany, in the circle of Burgundy, and duchy of Luxemburg, which was flourishing till the year 1663, but soon afterwards laid waste by the French.

BIEDENKOPF, or **BIEDENCAP**, a small town of Germany, in the circle of the Upper Rhine, and principality of Upper Hesse, seated on the Ahills, 16 miles N.W. of Marburg, and formerly famous for its iron works and foundery.

BIEFVERSKOW, a district of Zealand, belonging to Denmark, including 12 churches.

BIEKA, **BIEQUE**, **BORIQUEN**, or **CRAB'S ISLAND**, one of the Virgin Islands in the West Indies, about 23 miles in length, and not 6 in breadth, where it is widest. It is distant about 6 miles S.S.E. from Porto Rico. The soil is rich, and it has a good road on the south side, called Great Harbour. It is claimed by the Spaniards, whose interest it is to let it remain desolate. N. lat. 18° 2'. W. long. 64°. See *VIRGIN ISLANDS*.

BIEKOW, or **JEZOW**, a town of Poland, in the palatinate of Lenczicz, 24 miles S.E. of Lenczicz.

BIEL, a town of Spain, in Aragon, 6 leagues S.W. of Jaca.—Also, a river of Spain, which joins the Ores at Exea. See *BIENNE*.

BIELA, a town of Bohemia, in the circle of Czaflau, 6 miles N.E. of Teutsch Brod.

BIELA, or **BIELLA**, a town of Italy, in Piedmont; the capital of a small country, bounded on the north by the Alps, on the west by the duchy of Aosta, on the east by the Vercellois and the Mafferan, and on the south by the Canaveze; the town is rich and populous, containing about 7000 inhabitants, and is divided into the Upper and Lower, and has four churches and four monasteries. It is famous for an image of the Virgin Mary; distant 13 miles N. from Ivrea, and 24 N. W. from Vercelli. N. lat. 45° 22'. E. long. 8° 3'.

BIELACH, a river of Germany, in the archduchy of Austria, which runs into the Danube, near Melck.

BIELAIA, a river of Russia, which rises in the Uralian mountains, and after traversing the government of Ufa, discharges itself into the Kama, on the borders of the government of Casan.

BIELASTENA, a town of Croatia, 10 miles north of Bihacs.

BIELAY, a town of Bohemia, in the circle of Koniggratz, 4 miles S. W. of Branau.

BIELSKOI, a town of Siberia, 40 miles south of Eniseisk.

BIELCOPOL, a town of Poland, in the palatinate of Kiof, 48 miles west of Bialacerkiew.

BIELEF, a town and district of Russia, in the government of Tula, seated on the Oeca, 50 miles W.S.W. of Tula.

BIELEFELD, a town of Germany, in the circle of Westphalia, and county of Ravensberg, divided by the Lutterbach into the old and new town, seated at the foot of a mountain, and containing about 800 houses. The inhabitants are partly Lutherans, and partly Roman Catholics. The old town has two churches, the new a convent and a chapel. This town received municipal privileges in 1287, and was formerly Hanseatic; it is distant 22 miles north from Lippstadt.

BIELGOROD, a town formerly called *Sarkel*, and district of Russia, in the government of Kurfk, seated on the Donetz; 50 miles S.S.W. from Kurfk. N. lat. 50° 55'. E. long. 36°. This town was built in 990, by the great

duke Wladimir, and is an archbishop's see; it submitted to the arms of Potemkin, in 1790.

BIELGOROD. See *AREKMAN* and *MOSCOW*.

BIELGRAD, a town of Croatia, 40 miles S. E. of Bihacs.

BIELIAN, a town of Russian Tartary. N. lat. 43° 20'. E. long. 66° 4'.

BIELICA, or **BILIZIN**, a town of Lithuania, in the province of Vilna, seated on the Niemen, 10 miles south of Lida. N. lat. 53° 35'. E. long. 25° 40'.

BIELISKI, a town of Poland, in the palatinate of Kiof, 41 miles S.W. of Kiof.

BIELITZY. See *BELITZY*.

BIELLA. See *BIELA*.

BIELLE, a town of France, in the department of the Upper Marne, and chief place of a canton, in the district of Chaumont, 6 miles E.S.E. of Chaumont.—Also, a town of France, in the department of the Lower Pyrenées, and chief place of a canton, in the district of Oleron, 14 miles south of Oleron.

BIELOI, a town and district of Russia, in the government of Smolensko, on the small river Vobisna, falling into the Melsa or Meza, which discharges itself into the Duna; 50 miles N.N.E. of Smolensko. N. lat. 55° 40'. E. long. 34°.—Also, an island in the Karfko sea, about 70 miles in circumference, 20 miles from the continent of Russia. N. lat. 73° 40'. E. long. 69° 14'.

BIELOKAMESKOI, a fortress of Russia, in Siberia, on the east side of the Irtysh, 12 miles S.E. of Semipolatoi.

BIELO-OZERO, or **WHITE LAKE**, a lake of Russia, in the government of Novgorod, about 50 versts long, and 30 broad, which receives into it several small streams. The only one that flows out of it, is the Shekna, which falls into the Volga. The water of this lake is clear, having a bottom partly of clay, and partly of stone. The clay is generally of a white colour, and in stormy weather causes a strong white foam upon the surface of the water. From this circumstance, the lake first obtained its name *Bielo*, or *White*. It contains plenty of fish and crabs. N. lat. 59° 42' to 60° 20'. E. long. 36° 30' to 37° 18'.

BIELOPOLIE, a town and district of Russia, in the government of Karkof, seated on a rivulet falling into the Seim, 85 miles N.N.W. of Karkof.

BIELOVITZ, a town of Croatia, 11 miles S.W. of Damianovitz.

BIELOVODSK, a town and district of Russia, in the government of Voronetz, seated on the Derkul, which falls into the Donec, 130 miles south of Voronetz. N. lat. 49° 42'. E. long. 39° 10'.

BIELOW, a town of Poland, in the palatinate of Volhinia, 36 miles east of Lucko.

BIELOZERSK, a town and district of Russia, in the government of Novgorod, on the south side of the lake Bielo-Ozero, near the efflux of the river Shekna, 64 miles N.E. of Vologda. N. lat. 59° 40'. E. long. 37° 10'.

BIELSA, a town of Spain, in Aragon, 6 leagues from Ainsa.

BIELSK, a town of Poland, and capital of the palatinate of Podlachia, where the dietine for the district is held. It is little better than a miserable village, though called in the geographical descriptions of Poland, a large town. N. lat. 52° 48'. E. long. 23° 28'.—Also, a town of Poland, in the palatinate of Ploczko, 10 miles N. E. of Ploczko.

BIELT'SCH, a town of Bohemia, in the circle of Chrudim, 16 miles north of Chrudim.

BIELUGA, in *Zoology*, *Delphinus Leucas* (*Gmelin*) in Steller's *Kamptschatka*, &c.

BIENAISE, **JOHN**, in *Biography*, born in 1601 at Mazerès,

Mazeris, a city in France, where he practised surgery with such success, as to attract the notice of his sovereign, Lewis XIV., by whom he was made surgeon to the army in Flanders. He acquired great reputation, Haller says, by introducing the future of the tendon, and by curing a puncture of the brachial artery in a young nobleman. He gives excellent cautions, on taking up the artery, after amputating a limb, to avoid including the nerve in the ligature. He performed the paracentesis of the thorax successfully, and appears to have been a bold and expert operator, and to have made considerable improvements in his art. He died 1681, aged 80 years. A few years after his death, viz. in 1688, a posthumous work was published, containing an account of these operations, under the title of "Operations de Chirurgie, par une methode courte et facile," 12mo. Paris. Haller Bib. Anat. Eloy. Dict. Hist.

BIENENBUTTEL, in *Geography*, a town of Germany, in the circle of Lower Saxony, and principality of Lunenburg, 10 miles S.S.E. of Lunenburg.

BIENNE, a small district of Swisserland, lies between a lake of the same name and a chain of the Jura mountains. It is surrounded by the cantons of Berne and Soleure, the bishopric of Basle, and the principality of Neufchatel. The bishop of Basle is the sovereign of this little state, but his power, even before the French revolution, was exceedingly limited; and its constitution was neither a limited monarchy nor an independent republic, but a kind of mixed government, partaking in some degree of both. The bishop of Basle, upon his promotion to the see, received the homage of the citizens and militia of the town of Bienne, with attendant tokens of absolute submission, but at the same time he confirmed, in the strongest manner, all their privileges and franchises. The mayor appointed by him was his representative, to whom it belonged to convoke and preside in the little council, as the chief court of justice, to collect the suffrages, and to declare the sentence; but without giving any vote himself. Although justice was carried on, and executed in the name of the bishop, yet neither that prince, nor the mayor, had the prerogative of pardoning criminals, or of mitigating the sentence. All causes, civil and criminal, were brought before the council in the first instance; and in more important proceedings, an appeal lay to the sovereign council. In both cases, each party chose a member of the council to act as his advocate, which office he discharged without fee or recompence. The sovereign's revenue amounted only to about 300l. a year, nor did he possess the least share in the administration. The legislative authority resided in the great and little councils combined: the former consisting of 40 members, and the latter, to which the executive power belonged, being composed of 24; and it was required that the members of each council should be married men. Both councils elected their respective members; and therefore the constitution was altogether aristocratical. The burgo-master, or chief of the regency, was chosen by the two councils, and presided at their meeting, and retained his office during life; but it was necessary that he, as well as the several magistrates, should be confirmed annually by the two councils. The salaries annexed to these posts were small, and the general expences of government so inconsiderable, that the revenues of the state were sufficiently ample.

This republic, though a Protestant one, under the sovereignty of a Catholic bishop, enjoyed in the fullest extent the power of imposing taxes, contracting alliances, declaring war and peace; and, in short, of exercising every other act of absolute and independent legislation. Its singular constitution was guaranteed by Berne, Friburg, and Soleure, with which the town was closely allied, having connected itself with the former in 1352, with the second in 1496, and

with the latter in 1382; in consequence of which union it became a member of the Helvetic confederacy. This alliance between the cantons and the town of Bienne was paramount to that of the same cantons with the bishop of Basle: for the town enjoyed the right of sending deputies to every general diet, ordinary or extraordinary, a privilege not possessed by the bishop. The language of the country is a provincial German; but, as the territory borders on the principality of Neufchatel, the inhabitants speak also a corrupt French. The extent of the town and territory of Bienne is estimated at 144 square geographical miles, and its population at 5,500, or nearly 6000 persons; the people are very active and industrious. Bienne forms an important pass into the Swiss territories; accordingly, it was occupied by the French on the 8th of February 1798, and annexed to France as subject to the bishop of Basle, whose rights they assumed in consequence of having seized his territories.

BIENNE, called by the Germans *Biel*, the capital of the above district, is situated at the foot of mount Jura, and at a little distance from the lake of the same name. Between the town and the lake is a plain, which the sovereign council, by a kind of Agrarian law, that was honourable to the legislature, allotted, by distinct portions, to each burgher for his own distinct use: and it is entirely laid out in small kitchen gardens. Several manufactures have been established in the town, which, considering its size, carries on a tolerable trade. The government, by adopting the liberal policy of conferring the burghership at an easy rate, has contributed to increase the population of the town, and to extend its commerce. N. lat. 47° 8'. E. long. 1° 4'.

BIENNE, *lake of*, lies to the north-east of that of Neufchatel, with which it is connected by the Thielle, which separates the country of Neufchatel from the canton of Berne. It is about 9 miles long, and 4 broad; its borders are pleasing and picturesque, as it is skirted with agreeable walks and country houses; and the town of Nidau forms a very beautiful object upon its eastern side. Towards the southern extremity of this lake is the island of St. Peter, sometimes called the island of La Motte, and sometimes Rousseau's island, from its having been the place of Rousseau's retirement and residence, when by the violence of the populace he was obliged to withdraw from Moitier, where Frederic king of Prussia had ensured to him protection. Mr. Coxe, when he visited this island, landed on the south side of it, and passed through an agreeable meadow, skirted with vineyards, to a large farm house, formerly a convent, and secularised at the reformation, but inhabited, at the time of Mr. Coxe's visit, by the steward of the general hospital at Berne, to which the island belongs. "The island," says Mr. Coxe, "is about 2 miles in circumference, and richly wooded with various shrubs and trees, particularly with large oaks, beech, and Spanish chestnuts. Its surface is gently undulating; the southern shore, covered with herbage, forms a gradual slope to the lake; the remaining borders are steep and rocky; in a few places their summits are thinly fringed with shrubs; in others their perpendicular sides are clothed to the water's edge with hanging woods. The views from the different parts of the island are beautiful and diversified; that to the north is the most extensive and pleasing. It commands the lake of Bienne, which is of an oval form: its cultivated borders spotted with villages and castles, with the towns of Nidau and Bienne standing on the further extremity. Agreeable walks are carried through the woods, and terminate at a circular pavilion placed in the centre of the island. During vintage, particularly, and on Sunday, which is the usual day of festivity, the island is filled with parties, who take refreshment at the farm-house, stray about the woods, or dance in the circular building, and animate these romantic but solitary scenes."

cees." "Rousseau occupied an apartment in the farmhouse, the only dwelling in the island. He lived with the steward and his family, who are the present inhabitants (1785). The woman informed me, that he paid for his board and lodgings 40 shillings a month; that he usually rose at six, dined with the family at twelve, and after a slight supper retired to rest at nine. She added, he was extremely cheerful and agreeable; conversed with the family with the greatest ease and complacency, and conformed to their hours and manner of living; he amused himself entirely in wandering about the woods, and searching for plants, which he used to explain to them with singular satisfaction. Rousseau mentions his residence in this delightful island with the highest terms of rapture, and with his usual proneness to exaggeration." "I was permitted," says he, "to remain only two months in this delightful island; but I could have passed there two years, two centuries, all eternity, without suffering a moment's ennui, although my whole society consisted of the steward and family, good, but plain people. I esteem those two months the most happy period of my life; and so happy, that I could have passed my whole existence without even a momentary wish for another situation." *Coxe's Travels in Switzerland, &c.* vol. ii. p. 152, &c.

BIENNIAL PLANTS, in *Botany*, denote such, as the epithet imports, that are of two years' duration. Of this tribe there are numerous plants, which, being raised one year from seed, generally attain perfection in the same year, or within about twelve months, shooting up stalks, producing flowers, and perfecting seeds in the following spring or summer; and soon after commonly perish, or apparently decay and dwindle, so that they soon die off. Biennials are, therefore, always in their prime the first or second summer. They consist both of esculent and flower plants. Those of the former sort are the cabbage, fenny, carrot, parsnip, beet, onion, leek, &c.; and those of the latter are the Canterbury bell, French honey-suckle, wall-flower, stock-july-flower, sweet-william, China-pink, common-pink, matted-pink, carnation, scabious, holly-hock, tree-mallow, vervain-mallow, tree-primrose, honesty, or moon-wort, &c.

BIENTINA, in *Geography*, a town of Italy, in the duchy of Tuscany, on the side of a lake, called the "lake of Bientina," or the "lake of Seffo;" which lake is about 6 miles long, and 5 wide; 12 miles east of Pisa, and 28 west of Florence. The territory of Bientina lies in the middle of a marsh, in the centre of a valley, not very spacious, bounded by the high mountains of Pisa, and by those of Lucca and Valdinievole, which interrupt the wind, and prevent a renewal of air; and it is, therefore, as one would imagine by its situation, peculiarly unwholesome and unfavourable for inhabitants. It is nevertheless very populous, and sufficiently healthful even in summer. The principal causes of this salubrity are said to be, the numerous population, the extensive commerce, and the extreme attention that is paid to the continual discharge of the rain-waters, but, above all, the advantage of an abundant spring, which descends from the hills of St. Colombe, by means of long aqueducts, and supplies the inhabitants with excellent water. The situation of Bientina, therefore, duly examined, shews how far the art of man is capable of rendering habitable, and even salubrious, places naturally pestilential.

BIENVILLE, D. T. DE, M. D. in *Biography*, born in France, practised medicine many years at the Hague, and is only known by the following works, which bear his name: "La Nymphomanie, ou Traité de la fureur uterine," Amst. 1771, 8vo.; "Recherches theoriques et pratiques sur la Petite verole," 1772, 8vo.; "Traité des erreurs populaires, sur la santé," La Haye, 1775, 8vo.

BIER, a kind of wooden carriage, on which the bodies of the dead are borne to their grave. The word comes from

the French *biere*, which signifies the same. It is called in Latin *feretrum*, a *ferendo*. Among the Romans the common bier, upon which the poorer sort were carried, was called *sandapila*; that used for the richer sort, *lectica*, *lectica funebri*, sometimes *lectus*. The former was only a sort of wooden chest, *villus arca*, which was burnt with the body: the latter was enriched and gilded for pomp. It was carried bare, or uncovered, when the person died a natural and easy death; when he was much disfigured or distorted, it was veiled or covered over.

BIER, is more particularly used for that on which the bodies of saints are placed in the church to rest, and exposed to the veneration of the devout. This was often enriched with gold, silver, and precious stones; and furnished temptations, in many instances, to pillage.

BIERG, in *Geography*, a herred, or district, of the diocese of Funen in Denmark, including 12 churches, and several noblemen's seats.

BIERLING, GASPAN THEOPHILUS, in *Biography*, took his degree of doctor in medicine at Padua, about the middle of the 17th century, whence he returned to Magdeburg, his native city, where he was in considerable estimation. He published "Adversariorum curiosorum Centuria prima," June, 1679, 4to. He describes the effects of eating the hyoscyamus (henbane), drowsiness, and delirium, which are cured, he says, by taking the extract of castor, and the effects from the bite of a viper, cured by eating the flesh of one of those reptiles. He had the merit of recommending the cool treatment; and even bleeding, in the small-pox, contrary to the then generally received opinion. For the remainder of his works, which are numerous, but in little estimation; see Haller's Bib. Med. Eloy. Dict. Hist.

BIERNE', in *Geography*, a town of France, in the department of Mayenne, and chief place of a canton, in the district of Chateau-Gonthier. The place contains 810, and the canton 8225 inhabitants: the territory includes 205 kilometres and 12 communes.

BIERVLIET, a small town of Flanders, on the west side of the Scheldt, which has been much reduced by frequent inundations, and the fortifications of which were destroyed in 1688. William Beukelzoon, or, as others have written his name, Beukelings, who taught the Dutch the art of curing herrings, was a native of this place, and died here in 1397. The town is 7 leagues north of Ghent, and 4 E. N. E. of Sluys. N. lat. 51° 25'. E. long. 3° 42'.

BIESBOS, a large lake in the Merwe, between Dort and Gertudenburg, formed by the irruption of the banks or dykes.

BIESE, a river of Germany, which rises 8 miles south-west from Stendal, in the Old Mark of Brandenburg, and pursuing its course to Seehaufen, changes its name to Aland.

BIESENTHAL, a town of Germany, in the circle of Upper Saxony, and Middle Mark of Brandenburg, 20 miles N. E. of Berlin.

BIESIUS, NICHOLAS, in *Biography*, born at Ghent in Flanders, March 27, 1516, studied medicine at Louvain; thence he went to Valencia in Spain, and afterwards to Sienna, in Italy, where he took his degree of doctor. Returning to Louvain he was advanced to the chair of professor in medicine, which he filled with credit several years, expounding to his pupils, as the custom then was, the works of Galen. He was thence called by the emperor Maximilian II. to Vienna, and appointed his physician, which post he held until April 1572, when he was suddenly cut off by a fit of apoplexy. His works are, "Theoreticæ Medicinæ libri sex," Ant. 1558, 4to.; "In Artem medicam Galeni Commentarii," 1560, 8vo.; "De Methodo Medicinæ," 1564, 8vo.; "De Natura libri quinque," 1573, 8vo.; the two last works have been several times reprinted.

BIESMES, in *Geography*, a place of France, where is a pass across the Aine, from the department of the Meuse to that of the Marne; 3 miles from St. Menehold, and 12 from Grand Pre.

BIESNIN, a town of Poland, in the palatinate of Ploczko. N. lat. 53°. E. long. 20° 8'.

BIETIGHEIM, a town of Germany, in the duchy of Wurtemberg, at the conflux of the Ens and Metterbach; 10 miles N. of Stuttgart, and 30 S. S. E. of Heidelberg.

BIEVRE, a river of France, which rises a little to the south of Versailles, and passing towards Paris, changes its name for that of Gobelins, on account of its water being used in that manufacture, and soon after it joins the Seine.

BIEUZI, a town of France, in the department of Morbihan, and chief place of a canton, in the district of Pontivy; 2 leagues S. S. W. of Pontivy.

BIEZOW, or **BIDSCHOW**, a town of Bohemia, in the circle of Koningingratz; 3 miles east of Koningingratz.

BIFARIA, FOLIA, in *Botany*, denote leaves that point two ways.

BIFASCIANA, in *Entomology*, a species of **PHALÆNA** (*Toxix*). The anterior wings are testaceous; two oblique bands, spot, and arched mark at the apex brown. Linn. Mus. Lesk. &c. Inhabits Europe.

BIFASCIATA, in *Conchology*, a species of **BULLA**, the shell of which is somewhat tapering, erect, and white, with two broad reddish bands at the aperture. Lister. Gmelin. Native place unknown.

BIFASCIATA, a species of **VOLUTA**, described by Lister and Martini. This shell is thin, transversely striated, and flesh coloured, with two white bands and a single tooth on the pillar. It is rather less than an inch in length; and has a long narrow aperture. Native country unknown.

BIFASCIATA, a species of **CYPRÆA**, of an oblong form and purplish, with a straw-coloured band, and a narrower white one, a brown border. Gmelin. Length nearly four inches. Country unknown.

BIFASCIATA, a species of **NÉRITA**, of a blackish colour, with two hoary bands and white tip. A native of India. Gmelin. Chemnitz, &c.

BIFASCIATA, in *Entomology*, a species of **SILPHA**, found in Saxony. This is black, with two bands and a spot at the apex of ferruginous colour. Fabricius. This is a small insect.

BIFASCIATA, a species of **CASSIDA**, that inhabits South America. It is pale with two brown bands. Gmelin.

BIFASCIATA, a species of **COCCINELLA**, of a ferruginous colour, with two bands and four dots of black. Fabricius. This insect inhabits the cape of Good Hope; and is *Coccinella flexuosa* of Thunberg.

BIFASCIATA, a species of **CHRYSOMELA** of a large size, that is found at Cayenne. It is testaceous: wing-cases brassy and shining: two spots and two bands of yellow. Fabricius, &c.

BIFASCIATA, a species of **CICADA** (*Cercopis*), of a yellowish colour, with brown wing-cases, and two white bands. Fabricius. This is *Cicada fusca, fasciis alarum binis albis*, of Linn. Syst. Nat. XII. and *Cicada trifasciata*, of Degeer. Inhabits the north of Europe.

BIFASCIATA, a species of **PHALÆNA** (*Geometra*), described by Linnæus as a native of Europe. The anterior wings are cinereous, clouded, with two bands; posterior pair white.

BIFASCIATA, a species of **LIBELLULA**, that inhabits America. The wings are hyaline, with a brown spot at the base, and two bands of the same colour. Fabricius. Obi. This is *Libellula trimaculata* of Degeer; and *Libellula pulchella* of Drury.

BIFASCIATA, a species of **TENTHREDO**, that inhabits Eu-

rope. The general colour is brown; thorax black; mouth scutell, and four spots white: on the abdomen two interrupted yellow bands; margin of the wings and legs yellow. Linnæus. Mus. Lesk.

BIFASCIATA, a species of **MUTILLA**, that inhabits New York. The colour is black; upper part of the head and thorax, and two bands on the abdomen red: wing violaceous-black. Swederus. Nov. Act. Stockh. Entirely downy, and twice the size of *M. Europæa*.

BIFASCIATA, a species of **TIPULA**, of a yellowish colour, with transparent wings palely fasciated with brown. Schranck Inf. Austr. Of the middle size, with the eyes black.

BIFASCIATA, a species of **MUSCA**, that inhabits South America. It is rufous, with two golden bands on the abdomen. Fabricius, &c.

BIFASCIATA, a species of **SCOLIA**, that inhabits New York. This insect is of a black colour; two dots on the anterior part of the thorax, scutell, and two interrupted bands on the abdomen ferruginous. Swederus. Nov. Act. Stockh.

BIFASCIATUS, in *Conchology*, a species of **CONUS**, figured by Born. This kind is white with angulated chestnut lines, and two orange bands: spire rather prominent: base surrounded with orange lines, and the intermediate spaces with tessellated spots. Country unknown.

BIFASCIATUS, in *Entomology*, a species of **SCARABÆUS**, that inhabits Coromandel: on the thorax is a triple protuberance, with an erect horn on the head; wing-cases black, with two rufous bands. Fabricius.

BIFASCIATUS, a species of **DERMESTES**, of a black colour, with two waved yellow bands: thorax tessellated with cinereous colour. Thunberg. A native of the Cape of Good Hope.

BIFASCIATUS, a species of **BOSTRICHUS**, found in Siberia. It is of a black colour: wing-cases yellow, with two blueish-black denticulated bands. Gmelin. This is *Dermestes bifasciatus* of Lepech. it.

BIFASCIATUS, a species of **CRYPTOCEPHALUS**, that inhabits Africa. It is rufous, with two spots on the thorax, and two bands on the wing-cases of black. Fabricius.

BIFASCIATUS, a species of **CERAMBYX** (*Prionus*), found in South America. The thorax is denticulated: body black: wing-cases red, with two black bands: antennæ short. Gronovius, Fabricius, &c.

BIFASCIATUS, a species of **ATTELABUS** (*Clerus*), of a brassy-green and downy: wing-cases blue, with two scarlet lines. Fabricius. A native of Siberia.

BIFASCIATUS, a species of **GRYLLUS** (*Bulla-Acridium*), of a fuscous brown with white spots, and two lateral ochreous-bands. *Herbst apud Fuestli*. Inhabits sandy places.

BIFASCIELLA, a species of **PHALÆNA** (*Tinea*), with fuscous glossy wings; with two bands of white, the hinder one interrupted: head rufous. Fabricius. Inhabits Denmark.

BIFERÆ, in *Botany*, denote plants that flower twice a year, or in spring and autumn.

BIFERNO, in *Geography*, a river of Italy, which runs into the Adriatic, not far from Termini.

BIFFA, in *Middle Age Writers*, a machine for casting stones and darts, having a moveable counterpoise, which turned round its yard.

BIFID LEAF, in *Botany*. See **LEAF**.

BIFIDUS, in *Entomology*, a species of **CIMEX** (*Reduvius*), of a black colour: wing-cases with a rufous band; an erect bifid spine on the scutell. Inhabits China, and is of a large size. Fabricius. Donov. Inf. China.

BIFOLIUM, in *Botany*. See **OPHRYS**.

BIFORIS, in *Natural History*, a species of **ECHINUS**, having at the base five furrows, and ten flexuous radiated lines;

lines; and near the vent two oblong perforations. *Leske apud Klein.* Its habitation unknown.

BIFORMIS, an appellation given to Bacchus, either because he is represented sometimes as a young man, sometimes as old; sometimes with a beard, and sometimes without one; or because wine, of which he is the symbol, renders men sorrowful and frantic, or gay and pleasant.

BIFRONS, a person doubled-fronted, or two faced.

BIFRONS is more peculiarly an appellation of Janus, who was represented by the ancients with two faces, as being supposed to look both backwards and forwards; though other reasons for it are recited by Plutarch. Sometimes he was painted with four-faces, *quadrifrons*, as representing the four seasons.

BIFRONS, in *Entomology*, a species of **BRENTUS**, that inhabits Cayenne. This insect is black, with striated wing-cases, having glabrous yellow spots. Fabricius.

BIFRONS, a species of **ICHNEUMON**, described by Linnaeus: it is an European insect of a black colour, with the front white, with a black spot beneath the antennæ: tip of the petiole, and two first segments of the abdomen, with the legs reddish. *Muf. Lesc.*

BIFRONS, in *Natural History*, a species of **NEREIS**, described by O. Fabricius, and Müll. as a native of the north sea. It is depressed; peduncles with a simple fetigerous papilla, cirrated above; those in the middle also branched. This creature is continually in motion; about an inch long, and of a fulvous or brownish colour: head white: eyes four: cirri seven: body attenuated at both ends, and consisting of fifty-six joints.

BIFURCATUS, in *Entomology*, a species of **CIMEX** (*Oblongus*), that inhabits Germany. It is blackish: abdomen pale yellow, and bifurcated. Schæffer. Antennæ consist of four joints.

BIGA, a chariot for racing, drawn by two horses abreast. The word ought rather to be written *bigæ*, in the plural; q. d. *bijugæ*, two horses being joined by a *jugum*, or yoke. *Bigæ* stands contradistinguished from *trigæ*, *quadrigæ*, &c. *Bigæ* are of very ancient standing: all the heroes in Homer, Hesiod, Virgil, &c. fought in them. The invention of *bigæ* is attributed by Pliny (N. H. vii. 56.) to the Phrygians; by Isidore, (xvii. 35.) to Cyritenes of Sicily, who first yoked two horses together. They were first introduced into the olympic games in the 93d olympiad, or about the year 468 B. C. It appears, however, that the Greek heroes who celebrated the first Nemean games in honour of Archemorus, were borne on *bigæ*. *Bigæ* were the chariots first used in the Circensian games; then *trigæ*, and afterwards *quadrigæ*. The moon, night, and the morning, are by mythologists supposed to be carried in *bigæ*, the sun in *quadrigæ*. Statues in *bigæ* were at first only allowed to the gods, then to conquerors in the Grecian games; under the Roman emperors, the like statues, with *bigæ*, were decreed and granted to great and well-deserving men, as a kind of half triumph, being erected in most public places of the city. Figures of *bigæ* were also struck on their coins, and those on which were a *bigæ*, and a Janus with a double face, were termed *Bigati nummi*.

The drivers of *bigæ* were called *bigarii*; a marble bust of one Florus, a *bigarius*, is still seen at Rome.

BIGA, or *Bigata*, in *Writers of the Middle and Barbarous Age*, a cart with two wheels, drawn often with one horse. It was more frequently called *birra*.

BIGA, in *Geography*, a town of Asiatic Turkey, in the province of Natolia, 16 miles S. of Artaki.

BIGA, a river of North Wales, which joins the Severn in the county of Montgomery.

BIGAMY, a double marriage, or the possession of two

wives at the same time. Among the ancient Romans, those convicted of bigamy were branded with a note of ignominy; and, in France, they were anciently punished with death. See **POLYGAMY**.

BIGAMY, in the *Canon Law*, is where a person either marries two virgins successively; or once marries a widow. The former kind of bigamy they call *real*, and the latter *interpretative*. Each of these the canonists account impediments to be a clerk, or to hold a bishopric without a dispensation: a point of discipline founded on that of St. Paul, "Let a bishop be the husband of one wife," 1 Tim. ch. iii. ver. 2. Apost. Const. 17, 18. By a canon of the council of Lyons, A. D. 1274, held under pope Gregory X. such were esteemed "omni privilegio clericali nudati et coercioni fori secularis addicti." 6 Decretal, i. 12. This canon was adopted and explained in England by stat. 4 Edw. I. st. 3. c. 5; and bigamy, in consequence of it, became no uncommon counter-plea to the claim of the benefit of clergy. M. 40 Edw. III. 42. M. 11 Hen. IV. 11. 48. M. 13 Hen. IV. 6. Staunf. P. C. 134. The cognizance of the plea of bigamy was declared by stat. 18 Edw. III. st. 3. c. 2. to belong to the court Christian, like that of bastardy. But by stat. 1 Edw. VI. c. 12. §. 6. bigamy was declared to be no longer any impediment to the claim of clergy. See Dal. 21. Dyer, 201.

The Romanists make a third kind of bigamy, by *interpretation*; as, when a person in holy orders, or that has taken on him some monastic order, marries.—This the bishop can dispense withal, at least on some occasions.

There is also a kind of spiritual bigamy; as when a person holds two incompatible benefices, v. gr. two bishoprics, two vicarages, two canonries *sub eodem teſto*, &c.

By the ecclesiastical law of England, a second marriage, while the former husband or wife is living, is simply void, and a mere nullity; nevertheless, the legislature has thought it just to make it felony, by reason of its being so great a violation of the public economy and decency of a well-ordered state. For the circumstances attending this crime, and the punishment of it, see **POLYGAMY**.

BIGARELLA, in *Botany*. See **PRUNUS**.

BIGARELLA, in *Geography*, a town of Italy, in the duchy of Mantua, 7 miles E.N.E. of Mantua.

BIGATI, in *Antiquity*, a kind of ancient Roman silver coins, on one side whereof was represented a *biga*, or chariot drawn by two horses. The *bigatus* was properly the Roman *denarius*, whose impression, during the times of the common-wealth, was a chariot driven by Victory, and drawn either by two horses, or four, according to which it was either denominated *bigatus*, or *quadrigatus*. *Bigati* therefore were of different values, according to the species of *denarii*, &c. Several of those called consular medals are also *bigati*. In lieu of horses, the chariot is represented on some *bigati*, as drawn by two deers, especially in the medals of the family of Aſſia: on those of the family of Crepereia, by two *hipopotami*, who draw, or rather bear Neptune on their tails.

BIGBERRY, or *BIGBURY bay*, in *Geography*, lies on the south coast of Devon, and is formed by the Bolt Tail on the east, and Stoke-point on the west, in the direction nearly of N.W. by W. The entrance into Plymouth found is round Stoke-point to the N.W.

BIG-BONE CREEK, an American creek in Woodford county, Kentucky, which falls into the Ohio from the east, in about N. lat. 39° 17'. W. long. 85° 54'. It is small, but has three branches; the north-westernmost interlocks with Bank Lick creek, which falls into Licking river. It is noticed on account of the large bones and salt licks in its vicinity.

BIG-BONE Licks lie on each side of the above-mentioned creek,

creek, a little below the junction of the two eastern branches, about 8 miles from the mouth of the creek. These, and also the other salt springs, in the western country, are called *licks*, because the earth about them is furrowed up in a very curious manner, by the buffaloes and deer which lick the earth, on account of the saline particles with which it is impregnated. A stream of brackish water runs through these licks, the soil of which is of a soft clay. The large bones found here, and in several other places near salt licks, and in low soft grounds, thought to belong to the Mammoth, have perplexed naturalists, in their investigation of the animals to which they belong. See *BONES fossile*, and *MAMMOTH*.

BIGEMINATE LEAF, in *Botany*. See *LEAF*.

BIGERRA, in *Ancient Geography*, a town of Spain, which, according to Livy, was attacked by the Carthaginians, because it was allied to the Romans, but it was succoured by Scipio. Ptolemy assigns it to the Bastitani, in *Tarragorensis*.

BIGERRONES, a people of Gaul, so called by Cæsar, and denominated by Pliny, *Bigerri*; and by Aufonius, *Beheritani*. M. d'Anville places them at the foot of the Pyrenæes, to the west of the Convenæ. Their name exists in that of Bigorre.

BIGGAR, the name of a town and parish of Lanarkshire, in Scotland. The parish includes an area of land, measuring about 6 miles, by $3\frac{1}{2}$, in transverse diameter. The surface is partly hilly, and is appropriated, in nearly equal parts, to pasture and arable. The population of the parish in 1790 was 937, but this was 161 less than when a return was made 36 years anterior. From the improved state of the roads, and of agriculture, it was found to contain 1216 persons in the year 1800. The town of Biggar has 389 inhabitants. Here are three annual fairs. At the west end of the parish are the vestiges of a large tumulus, and three encampments. Tradition says, that a desperate battle was fought here between the Scots under Sir William Wallace, and the English army, when the slaughter was very great. Sir John Sinclair's *Statistical History of Scotland*.

BIGGE, a river of Germany, which runs into the Lene, 3 miles north of Allendorf, in the duchy of Westphalia.

BIGGEL, in *Zoology*, *Antelope Tragocamelus* of Gmelin, in *Mandell's* it.

BIGGLESWADE, in *Geography*, is a large improving town of Bedfordshire, England, pleasantly situated in a fertile valley, on the eastern bank of the river Ivel. This has been rendered navigable to the town by act of parliament, and considerable quantities of coals, timber, corn, and some other commodities, are brought by this channel. An extensive weekly market, and four annual fairs, also attract various merchandize to the town. The manor belongs to the king, and the parish includes, besides the town, the small hamlets of Stretton and Holme. These together contain a population of 1650 persons, who occupy 301 houses. The church, an ancient and strong edifice, was partly built in the year 1230, and was formerly collegiate. The inhabitants, being free tenants, have all equal rights in the church. In this town are two charity-schools; also a Baptist meeting-house; and being seated on a great public road, it contains several large inns. Biggleswade suffered very materially by fire, which happened on the 16th of June 1785. In a few hours 150 dwelling-houses were reduced to ashes, besides some malt houses, corn-chambers, &c. which were situated round the market-place, near the centre of the town. The damages sustained by this fire were estimated at 24,000*l*. Since the conflagration several new houses have been erected, and the town has assumed a more modern and

improved appearance. On the 25th of February 1792, a shock of an earthquake greatly alarmed the inhabitants of this place, and its concussion was so powerful as to throw down some old houses. It lasted several seconds, and was found to extend northward into Yorkshire, and towards the sea-coast of Lincolnshire. In the manor of Stretton, at a short distance south-east of Biggleswade, as a carter was ploughing the land, he discovered a yellow earthen pot, which was found to contain about 300 gold coins of Henry VI. They were nearly the size of half crown pieces each, but being very thin did not equal the weight of a guinea.

About 4 miles west of Biggleswade, are the remains of Warden-abbey, which was formerly a very extensive and considerable foundation. It was founded in 1135, by Walter Espec, for Cistercian monks; and at the dissolution its revenues were valued at 38*l*. 16*s*. 6*d*. per annum. *Lealand's Itinerary*. *Camden's Britannia*. *Beauties of England and Wales*, vol. i.

BIGGS BAY, lies on the south side of Jamaica, and to the east of north from Portland-point, which is the most southerly point of the island.

BIG-HILL CREEK, an American creek, which runs west into the Kaskaskias river, 25 miles below Beaver creek, 17 above Blind creek, and 26 northerly from the mouth of Kaskaskias.

BIGGIN SWAMP. See *Santee River*.

BIGHT, in the *Sea Language*, denotes any part of a rope, as it is taken compassing, coiled up; or the double part of a rope, when it is folded, in contradistinction to the end. It signifies also a small bay between two points of land.

BIGINI, in *Geography*, a town of Sicily, in the valley of Mazara, 10 miles east of Mazara.

BIGIS, in *Ancient Geography*, a town of Asia, placed by Ptolemy in Drangiana.

BIGLA, in *Geography*, a town of Lithuania, in the palatinate of Wilna, 40 miles E. N. E. of Wilcomirz, near a lake from which the river Drisna issues. N. lat. 55° 26'. E. long. 20° 24'.

BIGLOBATUS, in *Entomology*, a species of *CUREULIO*, found at the Cape of Good Hope. This is of a black colour, with a canaliculated snout; thorax globose, very rough with punctured dots; wing-cases with scabrous dots, and two rows of tubercles on each side. *Sparrm. Nov. Act. Stockh.*

BIGLUMIS, a species of *VESPA*, with four dots on the scutellum; margin of the abdominal segments white, with two white dots on the second. Gmelin. *Vespa Rupestris* of Linn. *Syst. Nat.* is deemed a variety of this kind.

BIGNAN, in *Geography*, a town of France, in the department of Morbihan, and chief place of a canton in the district of Josselin, 3 leagues S.W. of Josselin.

BIGNI, in *Conchology*, a name under which Adanson describes *Voluta Tringa* of Gmelin.

BIGNON, JEROM, in *Biography*, was born at Paris in 1590, and educated by his father, who was an advocate in the parliament of Paris, and distinguished by his learning and character. Having made a surprising progress under his father's tuition, he was placed, about the age of ten years, near the person of the young prince of Condé, and about this period published, "A Description of the Holy Land," more accurate than any extant. In 1604, he composed for the use of the young duke of Vendome, a "Treatise on Roman Antiquities." These works were compilations; but his work on the "Election of the Popes," said to be composed in his fourteenth year, but not published till 1608, was of a more original kind, and displayed a degree of erudition that surprised the most learned men of the age. *Bign*

non was regarded by Scaliger, Casaubon, Grotius, Pithou, de Thou, Le Fevie, and other eminent scholars, as a prodigy of literature, and his acquaintance was eagerly cultivated. By Henry IV., who knew his extraordinary talents and attainments, he was appointed page of honour to the dauphin, afterwards Lewis XIII.; and at court his manners were distinguished by an easy politeness, though he unremittently prosecuted his literary studies. His next treatise was a refutation of Valdez, a Spanish writer, who published a folio volume to establish the precedence of the kings of Spain over the other sovereigns; it was entitled "On the Excellence of the Kings and Kingdom of France," dedicated to Henry IV. and published in 1610, 8vo. Upon the death of Henry, he withdrew from court, and acquired an additional reputation by a new edition of "The Formularies of Marculphus," published with learned notes, in 1613. In the following year he took a journey to Italy, where he was honourably received by pope Paul V., Father Paul at Venice, and other persons, who had already heard of his fame. Upon his return he devoted himself to the bar, and, in 1620, was appointed advocate-general to the great council; and having acquitted himself with credit in this office, he was nominated by the king a counsellor of state; and, in 1626, created advocate-general to the parliament. In this high station he maintained the parliamentary rights with firmness and vigour, and manifested the most ardent zeal for justice. In 1641, he resigned this honourable office to his son-in-law, Stephen Briquet; nor did he resume it till after his death in 1645. In 1642, cardinal Richelieu, though far from being his friend, appointed him royal librarian, which his taste for literature induced him to accept, whilst he declined the lucrative post of superintendent of the finances. Queen Anne of Austria, during her regency, availed herself of his advice on many interesting occasions, and he was employed in many delicate negotiations. Having through life maintained a character, which was universally respected and esteemed, he terminated his course of useful service in the exercise of those sentiments of piety by which his conduct had been governed, in the 67th year of his age, April 7, 1656. Amongst his papers were found some fragments of notes on Gregory of Tours, and of a work on the origin of the French law, which he had not leisure to finish. The abbé Perrault has given a good account of his life, in one volume; 2mo. 1757. *Nouv. Dict. Hist. Gen. Dict.*

BIGNONIA, so named by Tournefort, in honour of the abbé Bignon, Eng. *trumpet flower*, or *scarlet jasmine*, in *Botany*. Lin. gen. n. 759. Reich. 817. Schreb. 1018. Tourn. 72. Juss. 139. Gærtn. t. 52. Clafs and Order, *didynamia angiospermia*. Nat. Ord. *Personate. Bigoniæ*. Juss. Gen. char. *Cal.* perianth one-leaved, erect, cup-form, five-cleft. *Cor.* monopetalous, campanulate; tube very small, the length of the calyx; throat very long, ventricose beneath, oblong-campanulate; border five-parted, the two upper divisions reflex, lower patulous. *Stam.* filaments four, subulate, shorter than the corolla; two longer than the other two; another reflex, oblong, as it were doubled. *Pist.* germ oblong; style filiform, situation and form of the stamens; stigma capitate. *Per.* Siliqua two-celled, two-valved; partition membranaceous, parallel, thickened at the futures. *Seeds* very many, imbricate, compressed, membrane-winged on both sides. *Obs.* *Catalpa* has only two perfect stamens, and three very small rudiments of stamens, with a five-leaved calyx. Four, however, and even all five perfect, have been observed by Cyrilli. The form of the siliqua in this genus is indeterminate. The seeds are always winged, though some on one side only.

Ess. Char. *Cal.* five-cleft, cup-form. *Cor.* throat bell-

form, five-cleft, ventricose beneath. *Siliqua* two-celled. *Seeds* membrane-winged.

Species, 1. *B. Catalpa*, common Catalpa tree. Lin. *Spec.* 868. Reich. 3. 155. hort. cliff. 317. 1. Ait. hort. Kew. 2. 346. Duham. Arb. t. 104. t. 41. Catefb. Car. t. 49. t. 29. "Leaves simple, cordate; stem erect; seeds winged with membranes." A deciduous tree, with an upright stem, covered with a smooth brown bark, 30 or 40 feet high; with lateral branches, ovate leaves placed opposite at every joint, flowers in branching panicles towards the end of the branches, of a dirty white colour, with a few purple spots, and faint stripes of yellow on their inside, which flowers are succeeded by long taper pods not yet produced in England. Found by Mr. Catesby growing naturally on the back of South Carolina, brought into England about the year 1726, and now not uncommon in our nurseries and plantations. In our climate the leaves come out very late; and the tree requires a sheltered situation. It flowers in August, and is known in the nurseries by its Indian name "Catalpa." The branches dye wool a kind of cinnamon colour. Thunberg mentions that the Japanese lay the leaves on parts of the body affected with pains, on a supposition that they are beneficial to the nerves; and that a decoction of the pods is serviceable in the asthma. 2. *B. tomentosa*. Lin. Syst. 563. Thunb. Jap. 252. "Leaves simple, cordate, tomentose beneath; flowers axillary, panicled." A native of Japan. 3. *B. sempervirens*, Carolina yellow jasmine, Lin. *Spec.* 869. Reich. 3. 155. Gelseminum. Park. 1465. n. 5. Raii hist. 1769. Catefb. Car. 1. t. 53. Syringa. Pluk. Alm. t. 112. f. 5. "Leaves simple, lanceolate, stem twining." Rising with slender stalks, that twist themselves round the neighbouring plants, and mount to a considerable height, with single opposite leaves at every joint, that remain green throughout the year; growing naturally in South Carolina, where it spreads over the edges, and, at the season of flowering, perfuming the air to a great distance; and also found in some parts of Virginia: called yellow jasmine, probably from the sweet odour of its flowers. Cultivated in 1640, in Kew garden, by Parkinson. 4. *B. unguis*. Lin. *Spec.* 869. Reich. 3. 156. Apocyno affine. Sloan. jam. 1. 268. Clematis. Plum. Amer. t. 94. Pluk. Alm. t. 163. f. 2. "Leaves conjugate; tendril very short, bowed, three-parted." A native of the West Indies. 5. *B. aquinoëialis*. Lin. *Spec.* 869. Reich. 3. 156. Sabb. hort. 2. t. 85. Plum. *Spec.* 5. ic. 55. f. 1. "Leaves conjugate, cirrhose; leaflets ovate and lanceolate; peduncles two-flowered; filiques linear." Received by Mr. Millar from La Vera Cruz, in New Spain. 6. *B. paniculata*. Lin. *Spec.* 869. Syst. 563. Reich. 3. 156. Jacq. amer. t. 116. Picl. 91. t. 175. Plum. *Spec.* 5. ic. 56. f. 1. "Leaves conjugate, cirrhose; leaflets cordate-ovate; flowers racemed; peduncles three-flowered." Sent to Mr. Miller from La Vera Cruz, by Dr. Houstoun. Observed about Carthagea by Jacquin. 7. *B. crucigera*. Lin. *Spec.* 869. Reich. 3. 157. Vir. cliff. 60. Hort. cliff. 317. 3. Gron. virg. 1. 73. 2. 95. Plum. ic. 48. t. 58. Pseudo-Apocynum. Mor. hist. 3. 612. n. 6. f. 15. t. 3. f. 16. "Leaves conjugate, cirrhose; leaflets cordate; stem mucicated;" deriving its trivial name from a section of the stem which represents a cross. Sent to Mr. Miller from Campeachy. 8. *B. capreolata*, four-leaved trumpet-flower. Lin. *Spec.* 870. Syst. 563. Reich. 3. 157. Vir. cliff. 59. Hort. cliff. 317. Breyn. ic. 33. t. 25. Duham. Arb. 1. 104. t. 40. Catefb. Car. 2. 82. Clematis. Bocc. sic. 31. t. 15. f. 3. Zan. hist. 74. t. 2. ed. 2. 49. t. 33. Raii hist. 1329. "Leaves conjugate, cirrhose; leaflets cordate-lanceolate; bottom-leaves simple." Sent to Mr. Miller from Campeachy. A native of Virginia and Carolina; and cultivated

in Kew garden in 1730. 9. *B. pubescens*. Lin. Spec. 870. Reich. 3. 157. "Leaves conjugate, cirrhose; leaflets cordate-ovate, pubescent beneath." Growing naturally in Virginia, and several other parts of America. 10. *B. triphylla*, three-leaved trumpet-flower. Lin. Spec. 870. Reich. 3. 157. "Leaves ternate; leaflets ovate, acuminate; stem shrubby, erect." Sent to Mr. Miller from La Vera Cruz, by Dr. Houffoun. 11. *B. pentaphylla*, hairy five-leaved trumpet-flower. Lin. Spec. 870. Reich. 3. 158. Hort. cliff. 497. 0. "Leaves digitate; leaflets quite entire, obovate." Sent to Mr. Miller from Jamaica, by Dr. Houffoun; and introduced into Kew garden before 1733. 12. *B. Leucoxydon*, smooth five-leaved trumpet-flower, white-wood, or tulip-flower. Lin. Spec. 870. Reich. 3. 158. Swartz obs. 233. Pluk. alm. t. 200. f. 4. Brown jam. 263. n. 1. Sloan. jam. 2. 62. n. 47. Raii dendr. 114. 2. "Leaves digitate; leaflets quite entire, ovate, acuminate." According to Sir Hans Sloane, this tree is as large as any in the island of Jamaica, having a large straight trunk covered with a smooth whitish bark, and a very hard white wood. According to Browne, it grows in a kind soil to a large size, and is considered as good timber-wood; but when its growth is not luxuriant, fit only for smaller and subordinate implements. Its juice and tender buds are said to be an antidote to the poisonous juice of the manchineel. Mr. Miller says, that it rises with an upright stem to the height of 40 feet, in the natural country of its growth; and that the seeds, dispersed by the winds to neighbouring lands, supply plants in great plenty. Cultivated by Mr. Miller in Kew garden, in 1759; and received by him from Barbadoes under the denomination of "white wood." 13. *B. radiata*, ray-leaved trumpet-flower. Lin. Spec. 871. Reich. 3. 158. Feu. peruv. 2. 731. t. 22. "Leaves digitate; leaflets pinnatifid." Stem three inches high; corolla pale yellow, with red dots. A native of Peru, in very dry sand. 14. *B. radicans*, rooting or ash-leaved trumpet-flower. Lin. Spec. 871. Reich. 3. 158. Hort. cliff. 317. 4. Upf. 178. Gron. virg. 73. 94. Duham. arb. 1. 103. 1. Sabb. hort. 2. t. 84. Pseudo gelsemium siliquosum. Riv. mon. 101. Pseudo-Apocynum. Mor. hist. 3. 612. n. 1. f. 15. t. 3. f. 1. Park. 1679. and 385. n. 6. Gelsemium hederaceum Indicum. Corn. can. t. 103. Raii hist. 1768. β . B. fraxini fol. cocineo fl. minore. Catesb. car. 1. t. 65. Mill. fig. 43. t. 65. Duham. arb. 103. 2. "Leaves pinnate; leaflets gashed; stem with rooting joints." Stems rough, branches trailing, fastening by the roots, issuing from their joints, to the trees in their natural place of growth, and climbing to a great height; in Europe, where it is generally planted against walls, striking into the mortar of the joints, so as to support the branches, and rising to the height of 40 or 50 feet: flowers produced at the ends of the shoots of the same year, in large bunches, with long swelling tubes, shaped somewhat like a trumpet, whence the plant has the appellation of "trumpet-flower;" corolla of an orange colour, and opening at the beginning of August. Cultivated in Kew garden in 1640. The seeds of β . were sent from Carolina in 1724, by Mr. Catesby; and since that time many plants have been raised in England, by seeds sent from that country. 15. *B. flans*, branching-flowered trumpet-flower. Lin. Spec. 871. Reich. 3. 159. Jacq. Amer. pict. 91. t. 176. Brown. jam. 264. 3. Plum. Spec. 5. ic. 54. Sloan. jam. 2. 63. n. 49. *B. frutescens*. Mill. dict. n. 3. "Leaves pinnate; leaflets ferrate; stem erect, firm; flowers racemed." An upright shrub from four to eight feet in height; flowers yellow, with red lines on the inside of the tube; siliques half a foot long, with winged seeds. A native of all the sugar islands in the West Indies, chiefly in a dry, rocky, or gravelly soil. Mr.

Miller says, that he received this sort first in 1729, from La Vera Cruz, where Dr. Houffoun found it in great plenty; since which time he obtained the seed from the island of Bermuda, by the title of "candle-wood." 16. *B. grandiflora*. Lin. Syst. 564. Thunb. jap. 253. Kæmpf. ic. fol. 21. "Leaves pinnate; leaflets ovate, acuminate, ferrate; stem twining; calyx femiquinquefid." Stem shrubby, climbing, four-cornered; calyx five-cornered; corollas purple, the size of a rose: differing from the *radicans* in having a stem not at all rooting, a larger flower, and a femiquinquefid calyx. A native of Japan. 17. *B. chelonoides*. Lin. Syst. 564. Suppl. 282. Padri. Rheed. Mal. 6. 47. t. 26. "Leaves unequally pinnate; leaflets ovate, quite entire, acuminate, pubescent; corollas bearded, with the rudiment of a fifth stamen." A large tree, with a whitish ash-coloured bark; leaves spreading, petioled; panicle terminating; pedicels opposite, dichotomous; flowers solitary, from the divisions; calyx hoary; border of the corolla a little arched, rough with hairs, red, five-cleft; the two upper segments yellow, with red dots; lower segments rough with hairs, curled at the edge, disk waved, white, veins red, throat rough with hairs; the rudiment of a fifth stamen, inserted into the tube of the corolla, barren; siliques linear, flat, bent, streaked. The fresh flowers, immersed in water, give it a pleasant odour; and in the East Indies, of which it is a native, they sprinkle it over the temples in a morning, to correct the stagnant air. 18. *B. spatulacea*. Lin. Syst. 564. Suppl. 283. Nür Pongelion. Rheed. Mal. 6. 53. t. 29. "Leaves unequally pinnate; leaflets ovate, rough with hairs; calyx one-leaved, spotted; corolla salver-shaped." A large tree, differing in the structure of the flower from the other species, but having didynamous stamens, and a pod filled with winged seeds. It is evidently of this genus. The timber is ash-coloured, or red, smooth, and much used for a variety of utensils in India. A native of Malabar, Java, and Ceylon, in woods near waters. 19. *B. peruviana*. Lin. Spec. 871. Reich. 3. 159. Hort. cliff. 317. 5. "Leaves decomposed; leaflets gashed; stem with tendrils at the joints." A native of America. 20. *B. indica*, Indian trumpet-flower. Lin. Spec. 871. Reich. 3. 159. fl. zeyl. 236. Lour. cochinch. 379. Palega pajaneli. Rheed. Mal. 1. p. 77. t. 43. Raii hist. 1741. β . Pajaneli. Rheed. 79. t. 44. Raii hist. 1741. n. 2. "Leaves bipinnate; leaflets quite entire, ovate, acuminate." A large tree with ascending branches. A native of the East Indies, and Cochinchina. Introduced in 1795 by Dr. Solander. A variety occurs near Mozambique, in Africa. 21. *B. caerulea*. Lin. Spec. 872. Reich. 3. 160. Catesb. car. 1. t. 42. "Leaves bipinnate; leaflets lanceolate, entire." Grows naturally in the Bahama islands, whence Mr. Catesby sent the seeds, in 1724; and many of the plants were raised in the gardens near London. In the country where it grows naturally, it rises to the height of 20 feet. 22. *B. longissima*, wave-leaved trumpet-flower. Ait. Hort. Kew. 2. 347. Jacq. Amer. 182. t. 176. f. 78. Swartz Prodr. 91. Brown. jam. 264. 2. Plum. ic. 47. t. 57. *B. Quercus Lamarck* Encycl. 1. 417. "Leaves simple, oblong, acuminate; stem erect; seeds woolly." An elegant, upright tree, 40 feet high and upwards. A native of the West Indies; cultivated and growing luxuriantly in many parts of Jamaica, especially in the low lands and favannahs, where it grows to a considerable size, and is considered as an excellent timber-tree. Its numerous flowers, and slender siliques, add a peculiar grace to its growth. In Jamaica it is known by the name of "French oak;" and in the French West India islands it is called "Chêne noir." 23. *B. echinata*. Gærtn. fruct. 1. 240. t. 52. Jacq. Amer. 183. t. 176. f. 52. Aublet. Guian. 2. 648, t. 263, 264.

Swartz prodr. 91. "Climbing; lower leaves ternate; upper bijugous, cuneate; fruit echinate." A rambling shrub climbing to the tops of trees by its very long and numerous branches. A native of the West Indies, Carthage, and Guiana. 24. *B. pentandra*, Lour. Cochinch. 379. "Leaves bipinnate; ramens five, with two anthers in each; calyx flesh-coloured, five-toothed." A middle-sized tree, with ascending branches. A native of Cochinchina, near rivers. Loureiro has another species under the name of *B. longissima*, which is a native of Cochinchina, by rivers, and which is not the *B. longissima* of Jacquin (N^o 22.); agreeing, according to Loureiro, with the "lignum equinum" of Rumphius (vol. iii. p. 73. t. 46.), or *B. spathacea* of the younger Linnæus in the length and form of the corolla, but not in the spathaceous calyx and pinnate leaves. But Retzius observes, that Rumphius's plant is not the same with Linnæus's, and it is very different from the "Nur-Pongelion" of the Hortus Malabaricus. Loureiro also remarks, that the three Asiatic species which he has described can by no means be adapted to the generic character formed by Linnæus from the American species, except in the fruit; and even that is not always two-celled in the Asiatic species. 25. *B. allacea*. Swartz prodr. 91. Aubl. guian. 659. 14. Barr. gall. aquin. 23. "Leaves conjugate; leaflets elliptic, entire, coriaceous; peduncles five-flowered, axillary; calyxes entire." This plant has a strong smell of garlic, whence its trivial title, and its French name "Liane à l'Ail." A native of the West Indian islands, and the forests of Cayenne and Guiana. 26. *B. cassinoides*. Vahl. Symb. 2. 68. Lamarck. Encycl. "Leaves simple, elliptic, coriaceous; raceme terminating." A native of Rio Janeiro, having the appearance of an "Echites." 27. *B. bijuga*. Vahl. Symb. 2. 69. "Leaves abruptly pinnate, bijugous; leaflets elliptic, quite entire." A native of Madagascar.

The *Bignonias* are trees or shrubs, inhabitants of the hot climates, of the East and West Indies, and eminently beautiful. The leaves are opposite; in some species unequally pinnate or ternate; in others, conjugate, with a two-leaved petiole between the leaflets, frequently furnished with a tendril for climbing. Flowers in panicles, large and handsome, of various colours, red, blue, yellow, or white. The calyx should be observed, whether it be simple or double; the corolla, whether it be regular or irregular; the stamens, whether they be fertile or barren; the fruit, whether it be bony or capsular, in form of a siliqua, or ovate. There are many species, particularly from Brazil, not yet sufficiently known to admit of arrangement under this genus. *B. sempervirens* does not belong to this genus, says Mr. Martyn, but to that of *lisanthus*.

Propagation and Culture.—These are exotic trees or shrubs, and may be raised from seeds sown on a moderate hot-bed in the spring. They should be soon aired to the open air, to prevent their being drawn up weak. They may be also increased by cuttings, and some of them by layers. The seeds of the common Catalpa tree are annually brought over from South Carolina. The seedling plants should be placed abroad in the beginning of June, in a sheltered situation, till autumn, and then placed under a summer frame, to guard them from the winter frost; exposing them in mild weather to the open air. In the following spring they should be taken out of the pots, and planted in a nursery-bed in a warm situation, where they may remain two years, and then planted where they are to remain. This tree may be also propagated by cuttings which, in the spring, should be planted in pots, and plunged into a moderate hot-bed, shading them from the mid-day sun, and occasionally, but sparingly, refreshing them with water. In about six weeks,

when they have taken root, and made shoots above, they should have plenty of air, and accustommed to bear being exposed to the open air; and afterwards treated like the seedling plants. The Catalpa delights in a rich moist soil, where, in a few years, it will produce flowers. The plants of the third species, not bearing cold, when young, should be sheltered in winter, planted against a warm wall, and protected from frost by coverings of mats, and by tan covering the soil about their roots. The fourth and fifth species will live in the open air, when planted against a wall with a south aspect, and sheltered in a very severe frost. The sixth, seventh, eighth, tenth, eleventh, and twelfth sorts, are tender, and will not thrive in this country out of the bark-love. If the ninth species be planted in the full ground against a wall, the roots should be covered in the autumn with some old tanners' bark, to keep out the frost in winter; and in very severe frost they should be covered with mat. The twelfth sort will take root from cuttings planted during summer in pots, or plunged into a bark-bed: it has flowered several years in the Chelsea garden, in August. The fourteenth sort is so hardy as to thrive in the open air; but the trailing branches should be supported; and as they spread much and rise to a great height, they will serve to cover un-fightly buildings; and also trained against the stems of trees, they make a fine appearance when in flower. It is propagated by seeds, but the young plants thus obtained will not flower in less than seven or eight years; and therefore those propagated by cuttings or layers are most esteemed, because they will flower in two or three years after planting. The necessary culture for these plants, after they are established, is to cut away all the small weak shoots of the former year in winter, and shorten the strong ones to the length of about two feet; and thus young shoots will be obtained for flowering in the following summer. These plants are of long duration: some of them remain vigorous after 60 years, and produce plenty of flowers every season. The fifteenth species is propagated by seeds sown on a hot-bed, and by transplanting the plants into separate small pots, filled with light fresh earth, and plunged into a fresh hot-bed; by removing them in autumn into the bark-love, giving them but little water during winter, and in summer refreshing them with it sparingly; and they should remain constantly in the bark-love, and be treated like other tender plants from the hot countries. The third year from seed they will flower; but they do not produce seeds in England. The other sorts have not been cultivated in England. Martyn.

BIGORNO, in *Geography*, a town of Corsica.

BIGORRE, a country of France, in the province of Guyenne before the revolution, but now forming a part of the department of the Upper Pyrenées. Its capital was Tarbes. It is bounded on the N.E. by Armagnac and the country of the four vallies, Nebouzan and Astarac; on the south, by the Pyrenées; and by Bearn, on the west. It has been sometimes divided into the country of Ruffin, the Plain, and the Vallies; and estimated at 16 leagues in length from north to south; and in its greatest breadth at 7 leagues. From its general situation, this country might be expected to enjoy the same mild climate that is experienced in the neighbouring provinces, under the same latitude; but from local circumstances the case is very different. The Pyrenées intercept the warmth of the more southern country of Spain; while, from its elevated situation, it is exposed to the chilling blasts of the north. On this account Bigorre is deprived of many fruits and vegetables, such as the orange and olive; however, the laurel, fig-tree, and myrtle, are not injured by the climate. The air of the mountains is cold and chilling, but that of the plains and

vallies more mild and salubrious. This country produces wood in considerable quantities, excellent wine, rye, barley, and millet; but not much wheat. It has good pastures, quarries of marble, and medicinal springs. The mountains of Bigorre consist of schist, marble, and granite. See PYRENEES. The inhabitants of this district possess a peculiar and characteristic physiognomy, in which they all resemble one another; they are healthy and active, lively and cheerful, and unite impetuous courage with strength and agility. The impetuosity of their temper renders their language rapid, passionate, and full of protestations; and they sometimes sink the voice an octave below the natural key, that they may suddenly raise it to the sharpest note. Their ideas abound with imagery; and their gestures are quick and violent. They are distinguished by their generosity and beneficence. They practise the sling from their infancy, and can draw a bow before they speak; and those persons are regarded as the most accomplished, who are most skilled in leaping, riding, and throwing the bar. The education of the Bigorrese, who are not husbandmen, is conducted with a view to the church; and they boast of many eminent persons in science and literature.

BIGOT, a person foolishly obstinate, or perversely attached to an opinion. The word is formed from the German *hey*, and *Got*, or the English *by-God*. Camden relates that the Normans were first called *Bigots*, on occasion of their duke Rollo; who receiving Gissa, daughter of king Charles, in marriage, and with her the investiture of the dukedom, refused to kiss the king's foot in token of subjection, unless he would hold it out for that purpose; and being urged to it by those present, answered hastily, "No, by God;" whereupon the king, turning about, called him *Bigot*; which name has passed from him to his people.

BIGOT, EMERIC, in *Biography*, an eminent promoter of literature, was born at Rouen in 1626; and forming an early attachment to literature, he declined all public business, and employed himself in augmenting a large library bequeathed to him by his father, and in correspondence and conversation with persons of learning. Few persons conciliated, by the modesty of his temper, by the friendship and suavity of his manners, and by his love of peace and endeavours to maintain it, a greater number of friends, who respected and esteemed him. In various parts of Europe, through which he travelled, he formed connections with literary men; but his most intimate friends of this description were Menage and Nicholas Heinsius. Although he distinguished himself by aiding others in their literary performances, the only work he published in his own name was the Greek text of Palladius's life of St. Chrysostom, found in the grand duke's library at Florence, to which he annexed a Latin translation. Having entailed his valuable library on his family, in order to prevent its dispersion, he died at Rouen in 1689. However, notwithstanding his precaution, his library was publicly sold at Paris in 1706. Gen. Dict.

BIGOT, in Italian *bigontia*, in *Commerce*, is used to denote a Venetian liquid measure, containing the fourth part of the *amphora*, or half the *boot*.

BIG ROCK, in *Geography*, a large rock on the S. E. bank of Au Vaze river in America; about 3 miles N. E. from its mouth in the Mississippi, and about 8 miles S. E. from cape St. Antonio on that river.

BIG ROCK BRANCH, the north-eastern head branch of Alleghany river. The branch called Big Hole Town joins it, and forms the Alleghany, 85 miles N. E. from and above Venango fort.

BIG SALT LICK, a garrison in the state of Tennessee, near the Salt lick, on Cumberland river, 115 miles from Knoxville; 80 from S. W. point on Clinch river, 32 from Bledsoe lick, and 68 from Nashville.

BIG SANDY RIVER, or *Totterwy*, rises near the source of Cumberland river, and separating Virginia from Kentucky, discharges itself into the Ohio, opposite to the French purchase of Galiopolis, in about N. lat. 33° 30'. Vancouver's and Harmar's forts stand on this river. On its banks are several salt licks and springs. *Little Sandy* is a short small river, which falls into the Ohio, about 20 miles west of Big Sandy river, in the county of Mason, Kentucky.

BIGUBA, a town of North Africa, seated on the river Rio Grande. N. lat. 11° 15'. W. long. 13° 35'.

BIGUTTATA, in *Entomology*, a species of *SILPHA*, met with at Upsal. This is totally ferruginous, with a pale line and spot on the wing-veins. Thunberg. Nov. Act. Stockh.

BIGUTTATA, a species of *CASSIDA*, with a yellow thorax; reddish wing-veins; black margin, and two yellow spots. Fabricius. This insect inhabits Cayenne.

BIGUTTATA, a species of *COCCINELLA*, described by Fabricius. It is rufous, with two yellow spots. The country is unknown. Size small; thorax glossy and black, with the sides yellow.

BIGUTTATA, a species of *CANTHARIS*, found in gardens in Europe. The thorax is black in the middle; wing-veins short, black, and yellow at the tip. Linn. Fn. Suec. Fabricius. This is *Telephorus niger*, *femoribus flavis*, *elytris apice luteis* of Degeer.

BIGUTTATA, a species of *BUPRESTIS*, with very entire, linear, green wing-veins, with a white dot; abdomen blue, with three white dots. Fabricius, &c. Inhabits England.

BIGUTTATA, a species of *CICADA* (*Cercopis*), of a black colour, spotted with yellow; wing-veins brown, with a white marginal spot. Inhabits Germany. Fabricius.

BIGUTTATA, a species of *CICADA* (*Ranatra* Fabr.) that is found in Europe. It is black, with a patch of sanguineous red on each side of the thorax. Fabricius.

BIGUTTATA, a species of *VESPA*, of the small size, that inhabits China. It is black, and spotted with yellow; margin of the segments, and two dots of yellow on the second one. Fabricius.

BIGUTTATA, a species of *SCOLIA*, of a black colour, with two transverse white dots on the abdomen; wings black. A small species, and inhabits Spain. Fabricius.

BIGUTTATOR, a species of *ICHNEUMON*, described by Thunberg. It is black, with two dots on the scutellum. Found at Upsal.

BIGUTTATUS, a species of *CURCULIO*, that is found in Germany. It is black, with elevated dots on the wing-veins; abdomen and posterior legs yellow. Fabricius.

BIGUTTATUS, a species of *CRYPTOCEPHALUS*, of a black colour, with the head, tip of the wing-veins, and legs yellow. Gmelin. A native of Austria.

BIGUTTATUS, a species of *CARABUS*, that lives under the bark of trees in Sweden, and is described by Thunberg. The head is roundish and brassy; wing-veins black, with a pale spot at the apex.

BIGUTTATUS, a species of *DYTISCUS*, described by Linnæus as a native of Europe. This is black; legs, end of the abdomen, antennæ, mouth, two dots between the eyes, thorax, and wing-veins testaceous, the latter spotted with brown; in the middle of the thorax two black spots.

BIGUTTATUS, a species of *STAPHYLINUS*, that inhabits some shores of the Baltic sea. It is of a black colour, with a fulvous spot on each of the wing-cases. Linn. Fabr. &c.

BIGUTTATUS, a species of *CIMEX* (*Rotundatus*), described by Linnæus in his *Fauna Suecica*, by Scopoli, &c. It is black, with all the margins white, and a white spot on the wing-cases.

BIGUTTULUS, a species of *GRYLLUS* (*Locusta*), with a cruciate thorax; wing-cases clouded, and marked with an oblong white spot near the tip. Linn. Fn. Suec. &c. This is *Acrydium biguttulum* of Degeer. Very common on some barren lands in the north of Europe.

BIHACS, **BIHATZ**, **BIHITZ**, or **VIHITZ**, in *Geography*, a town of Croatia, seated on the river Unna, belonging to the Turks; 60 miles south of Carlstadt, and 180 west of Belgrade. N. lat. 44° 42'. E. long. 16° 20'.

BIHAL, in *Botany*. See *STRELITZIA*.

BIHAMATA, in *Entomology*, a species of *HISPA*, of an oblong, depressed shape, that inhabits India. It is specifically described as being unarmed, black, spotted with red; shells truncated and hooked. Gmelin.

BIHAMATA, a species of *FORMICA*, found in the island of Joanna, having four spines on the thorax, and two curved ones on the petiole scale. Fabricius, &c.

BIHAR, in *Geography*, an ancient town of Hungary, giving name to a district, in which are also Debretzen, Great Varadein, &c.

BIHOREAU, in *Ornithology*, the name of *Ardea nycticorax*, or *Night heron*, in Buffon's Hist. Birds. *Femelle de Bihoreau* of Buffon, is *Ardea grisea*; and *Bihoreau de Cayenne* of Buff. is *Ardea cayennensis* of Gmelin.

BIHRI, in *Geography*, a town of Persia, in the country of Larissan, in the route from Ispahan to Ormus, 30 miles N.W. of Lar.

BIJINAGUR. See *BISNAGUR*.

BIJORE, called also *Bejour* and *Bajour*, the *Bazira* of Alexander, a province of Hindoostan, bounded on the south by Paishawur, on the north by Kuttore, on the east by Sewad and Beneer, which are separated from it by the Penjekoreh river, and on the west by Guznoorgul. This province, according to the dimensions stated in the *Ayen Acharee* (vol. ii. p. 192, &c.) extends 25 cosses north and south, and 10 east and west; distant about 20 cosses beyond the Cabul river, and on its western extreme about 30 cosses from the Indus. Bijore, as well as Sewad, is very mountainous, and abounds with passes and strong situations; so that their inhabitants have not only held themselves generally independent of the Mogul emperors, but have occasionally made very serious inroads into their territories. In this province there is at this day a tribe of Afghans, denominated Yuzuf-zyes, which traces its origin to certain persons left there by Alexander the Great, when he passed through this country. Both Abul Fazil, the author of the *Ayen Acharee*, and Soojan Rae, an eastern historian of good reputation, report this tradition without any material alteration. The latter, indeed, adds that these Europeans, if we may call them so, continued to preserve that ascendancy over their neighbours which their ancestors may be supposed to have possessed, when they first settled here. Although we should reject this pedigree as fabulous, yet the bare claim argues the belief of the natives, for which there must have been some foundation, that Alexander not only conquered Bijore, but also transferred that conquest to some of his own countrymen. The people of Bijore had likewise an high idea of Alexander's extensive authority; and they denominated him the "Two-horned," agreeably to the striking emblem of power in all the eastern

languages. (*Ayen Acharee*, xi. 194.) These Yuzuf-zyes, says Mahomed Cazim, quitted their ancient habitations between Ghizni and Candahar, and after various unsuccessful attempts to obtain a settlement in Cabul, at the time when Mirza Ulug Beig, surnamed Cabulee, ruled that kingdom, finally established themselves in Sewad and Bijore; which at this period were governed by a dynasty of princes styled "Sultani," who derived their lineage from Alexander the Great. The Yuzuf-zyes possess, in addition to Sewad and Bijore, the tracts situated between those provinces, and the rivers of Cabul and Indus; the greatest part of which is described as a desert in the *Ayen Acharee*, but by Bernouilli as a forest. In the time of Achar, Zine Khan was sent to chastise them; and he overran their whole territory, and even penetrated to the borders of Cashgar, and took the strong fort of Kushal, or Gushal, seated on a mountain 17 marches north of Bijore. About the year 1670, Aurungzebe found it necessary to chastise these Yuzuf-zyes; since which period the return of Nadir-Shah, in 1739, again brought them into notice. To him they appeared formidable; but he reduced them to submission; and if they really engaged to supply his army with 30,000 men, the tribe must have increased since the time of Achar, when Bijore contained only 39,000 and Sewad 40,000 families. Rennell's Mem. p. 159, &c.

BIJORE, the capital of the above-described province, situated about 6 marches, or about 66 geographical miles, from Nilab or Attock, and at 50 of the same miles, north a little east from Paishawur, and at the same distance east a little north from Lalalabad. N. lat. 34° 7'. E. long. 70° 44'.

BIJORE, the name of a river which rises in the mountains, N.E. of Bijore, and passing by it, forms a junction with the Penjekoreh, Sewad, and Kamelo, and falls into the Nilab, or Sinde, at Attock.

BIISK, a town and district of Siberia, in the government of Kolyvan, seated on the river Bi, or Bia, which, by uniting with the Katunia, forms the river Oby; 150 miles S.S.E. of Kolyvan. N. lat. 53° 31'. E. long. 84° 14'.

BIJUGUM, FOLIUM, in *Botany*, denotes a winged leaf, bearing two pair of *foliola*.

BIKBUŁAKOVA, in *Geography*, a town of Russia, in the government of Ufa, on the river Ik, 80 miles N.E. of Orenburg.

BIKILLAM, or **BECKALEN**, a small island in the Red sea, 8 leagues from the coast of Arabia. N. lat. 16°. E. long. 42° 25'.

BIKOU, a town of Poland, in the palatinate of Braclaw, 50 miles north of Braclaw.

BILA, a river of Bohemia, which runs into the Moldav near Auffig.

BILA, Alt, a town of Bohemia, in the circle of Leitmeritz, 10 miles W.S.W. of Kamniz.

BILÆNA, or **BILBANA**, in *Ancient Geography*, a town of Arabia Felix. Ptolemy.

BILAN, in *Geography*, a town of Bohemia, in the circle of Chrudim, 5 miles west of Chrudim.

BILANCIIS DEFERENDIS, in *Law*, a writ directed to a corporation, for the carrying of weights to such a haven, there to weigh the wool, which persons by our ancient laws were licensed to transport. Reg. Orig. 270.

BILANDER, in *Navigation*, a small merchant-ship with two masts: distinguished from other vessels of the same kind by the form of the main-sail, which resembles a fettee-sail. The head is bent to a yard, similar to the mizen-yard of a ship, and hangs to the main-mast, as a ship's does to the mizen-mast. This method of rigging has proved inconvenient, and is now seldom used, except by the Dutch.

BILANUS, in *Botany*. See CRATÆVA.

BILARIUS, PORUS. See BILIARI *Pori*.

BILATERAL COGNATION, denotes kinship, or kindred, on both sides; that of the father as well as mother.

Such is the relation of brothers, sisters. Bilateral stands contradistinguished to unilateral.

BILBA, in *Ancient Geography*, a town of Asia, in Babylonia. Ptolemy.

BILBAO, sometimes called *Bilboa*, in *Geography*, a port-town of Spain, in the province of Biscay, seated on the banks of the river Ybaizabal, about 6 miles from the sea. On the water-side is a large square, well shaded with pleasant walks, extending to the outlets on the banks of the river, and containing a number of houses and gardens, which form an agreeable prospect, particularly in sailing up the river. The number of houses in this town is about 800, some of which are built on piles; they are solid and lofty; the streets are well paved and level; and as they may be washed at pleasure, Bilboa is one of the neatest towns in Europe. The tide that flows into the river forms a secure and much frequented harbour; and a considerable commerce is thus carried on in iron, wool, of which, it is said, 60,000 bags are annually exported to Great Britain, France, and Holland, saffron, and chestnuts. Towards the close of the 10th century, the people of Biscay, having maintained their independence, together with their profession of Christianity, even when the Moors gained possession of the other parts of Spain, and having about this time obtained some advantages over them, began to direct their attention to the manufacture of their own excellent iron, not only for their own use, but for the supply of other nations; and their port of Bilboa began to have shipping, and to engage in foreign trade, perhaps before any other nation to the west of the Mediterranean sea, at least in a very considerable degree. In the last year of the 13th century, this town was refounded, or new built, by Didacus Lopez, then prince, or lord of the province; and as it was the staple port for the iron and wool of Spain, its commerce rapidly increased; and it appears from Rymer's *Fœdera*, that in the reign of king Edward IV. A.D. 1474, the merchants of Guipulcoa carried on, probably by the port of Bilboa, a considerable trade with England. It appears, also, that the Biscayners, availing themselves of the advantage of their shipping and port, were concerned in the whale-fishery at an earlier period than any other nation of Europe, Norway excepted. The town is supplied with flesh and poultry, and also with fish of various kinds, and particularly with a sort of eels in winter, which are small, of a pale colour, about three inches long, and without a back bone, caught in prodigious quantities at low tides, and in summer with the cuttle-fish. The shambles are a Tuscan building, in the centre of the town, with an open court, and a fountain in the middle, by means of which it is kept clean, and free from offensive offals and scents. The environs abound in gardens, which are fertile in legumes and fruits. This town has five churches, and several religious houses; and in its police it has one law of a peculiar kind, which renders ingratitude criminal, and subject to a penalty. Although the air is generally damp, the town is remarkably healthy, and the inhabitants are robust, cheerful, and long-lived; so that the hospital is frequently without a patient. The women are capable of enduring labour as well as the men, and are employed in unloading the ships, carrying burdens, and performing the business of porters. At the close of the day they return to their habitations, without any appearance of lassitude, dancing and singing to the pipe and tabor. Their music is defrayed at the expence of the town; and on holidays it is performed in the midst of a great concourse of persons under the trees

in the great square. The women of Bilbao, though constantly exposed to the air, have good complexions, lively eyes, and fine black hair, which they curiously braid, and which they reckon peculiarly ornamental. Married women wrap a white handkerchief round their heads, so knotted as to fall down in three plaits behind, and over this they wear the Montera cap. Those who understand their language say it is very soft and harmonious, as well as energetic. N. lat. 43° 15'. W. long. 2° 45'. See BISCAY.

BILBERRY, in *Botany*. See VACCINIUM.

BILBILINÆ AQUÆ, in *Ancient Geography*, Alhama, mineral and medicinal waters of Spain, 24 miles from Bilbilis, according to the Itinerary of Antonine. The name Alhama, given by the Arabians to this place, has the same meaning with the aquæ calidæ of the Latins. See ALHAMA.

BILBILIS, BAMBOLA, a town of Hispania Tarragonensis, belonging to the Celtiberi, south of Turiasco; seated on a mountain surrounded by the waters of Salo or Xalon. Bilbilis was a municipal town, and bore the title of Augusta, which is found on several medals. The poet Martial was of this city, called by Ptolemy *Bilbis*.

“Municipes Augusta mihi quos Bilbilis acri
Monte creat, rapidis quos Salo cingit aquis.”

Martial, l. 10, epig. 103.

On most of the medals of Bilbilis, we perceive, on one side a head of Augustus, and, on the other, a cavalier, armed with a lance and a helmet.—Also, a river of Spain, the waters of which were famous for tempering iron; called also *Salo*.

BILBOWS, in *Sea-phrases*, a punishment answering to the stocks at land.

They consist of long bars, or bolts of iron, with shackles sliding on them, and a lock at the end, used to confine the feet of prisoners, in a manner similar to the confinement of the hands in handcuffs. See STOCKS.

BILCOCK, in *Ornithology*, one of the synonymous English names of *Rallus aquaticus*, or water-rail.

BILDERWERTSCHEN, in *Geography*, a town of Prussia, in the province of Lithuania, 4 miles W.N.W. of Stalluponen.

BILDESTON. See BILSTON.

BILDGE, or BILGE of a *Ship*, denotes the bottom of her floor; or the breadth of that part which she rests on, when she is a-ground.

Hence, when a ship receives a fracture in this place, by striking on a rock, or otherwise, she is said to be *bilged*, or *bilged*.

BILGE-WATER, is that which, by reason of the flatness of the ship's bottom, lies on her floor, and cannot go to the well of the pump. This water is always, if the ship does not leak, of a dirty colour, and disagreeable smell.

The Dutch, whose ships are often of this form, use a sort of pumps, called “bildge-pumps,” or, as we call them “burr-pumps,” to carry off the bildge-water.

BILE, in *Physiology*, is the fluid prepared from the blood by the liver of animals. The colour of healthy bile in the human subject is probably of a deep yellow brown. In oxen, it is frequently of a yellowish green. In the gall bladder, it is of a thickish consistence, of an unctuous feel, or like that of mucus, of a bitter taste, and peculiar smell. Its specific gravity is about 1.027. It readily mixes with water, but will not incorporate with oil, yet it takes grease out of cloths. Albumen may be precipitated from it by alcohol and acids; and Cadet ascertained its proportion in 100 parts of ox bile to be about 0.52. (Cadet, Mem. Par. 1767.) If a solution of bile in muriatic acid be concentrated by heat, a copious precipitate takes place, and the solution changes its colour from a
grass

grate green to a brown. This precipitate has the properties of a resin. From 100 parts of bile, 1.87 of crystallized soda has been obtained, and some was probably lost in the process. Cadet also obtained from bile a salt of a sweetish taste. There are other substances found in bile in small quantities: sulphuretted hydrogen gas, which is emitted on the addition of muriatic acid; a little muriate of soda, phosphate of lime, and phosphate of soda and of iron. Of course water is the vehicle for all these substances, and forms the largest share of the ingredients in the composition of bile. For an account of the secretion of bile, see the article LIVER, *functions of*.

BILE, in Chemistry. This fluid may justly be considered as equally important to the chemist as to the physiologist; and accordingly it has been examined with extreme minuteness by a great number of eminent chemists, in various countries, with a general parity of result which is highly satisfactory. Indeed the analysis of bile, as far as relates to the detection of its leading constituent parts, is neither very complicated nor remarkably difficult.

Chemists have not been able to detect any considerable difference between the bile immediately secreted from the liver, and that which is found in the gall-bladder, excepting that the latter appears on the whole to be somewhat less watery, more bitter and more viscid than the former. The age of the animal makes a greater difference, the bile or gall of oxen being more viscid than that of calves. On account of the ease with which ox-gall is procured in considerable quantity, this has generally been selected for experiment; but its analysis does not essentially differ from that of the bile of any other animal.

Bile is a homogeneous fluid, in some animals of a deep yellowish brown, in others of various shades of green, so viscid as not to pour by drops; of a peculiar faint smell, but not ungrateful when fresh, and not from a diseased animal; intensely bitter to the taste, even when very largely diluted with water, and somewhat pungent. It is considerably heavier than water; its specific gravity being from about 1.02 to 1.025, varying according to the age and health of the animal, and probably to the time that it has remained within the gall-bladder. When agitated, bile lathers like soap water.

When bile is gently heated, an aqueous vapour arises, which, when condensed, appears by the most delicate reagents to be nothing but water, strongly impregnated however with the odorous part of this fluid, and somewhat fetid. Bile loses about seven eighths of its bulk of mere water by this evaporation; and the residue gradually thickens into the consistence of a tenacious extract, which, on carefully drying, becomes a hard brittle shining resin-like mass, of a dark colour, and intensely bitter.

If this extract of bile be slowly heated in a retort to decomposition, the products are, a watery fluid fetid with sulphuretted hydrogen gas, a brown fetid liquor containing ammonia, a tenacious stinking empyreumatic oil, with more carbonated ammonia, and a copious emission of carbonic acid, and carburetted with sulphuretted hydrogen. The mass in the retort swells up prodigiously in the process, and leaves a puffy coal easy to incinerate, the ashes of which contain a notable quantity of carbonated soda, with some muriated soda, phosphate of soda and lime, and a little iron. Fontana obtained from a pound of ox-gall 43 grains of carbonated soda, and 6 grains of common salt.

The residue, therefore, of calcined bile contains alkali in excess; and hence water, with which it has been lixiviated, readily turns syrup of violets green. The same test of an

alkali is given with fresh bile, diluted with water, that the change of colour may be more apparent.

The action of acids on bile throws much light on its composition. Muriatic acid, strong or dilute, added to bile, immediately produces a coagulation, and, at the same time, renders the whole liquor of a fine light green. The coagulum, however, is partly redissolved, if the acid is concentrated. Examined chemically, it is found to be albumen, but intensely bitter. In the clear green liquor, though retaining the muriatic acid, the bitter taste also strongly predominates. Evaporated slowly, it deposits in about an hour's time another precipitate, very green, intensely bitter, and soft and tenacious like turpentine. The clear liquor is now yellowish, and, on further evaporation, yields a number of cubical crystals of muriated soda, formed chiefly, if not entirely, by the soda originally contained in the bile and the acid added. As a proof that this is the case, if the experiment is made with nitrous or sulphuric acid, instead of the muriatic, the salt will be nitrated or sulphated soda. The above decomposition is more perfect, if bile and dilute muriatic acid are at first boiled together for a few minutes; the result then is a total separation of a dark green glutinous bitter mass, and a liquid now colourless and scarcely bitter, from which the muriated soda may be procured by evaporation.

This glutinous coagulum, when dry, burns like a resin. Alcohol heated upon it dissolves one part, and leaves another untouched, thus entirely separating it into two distinct principles: the insoluble, which is albumen; and the soluble, which retains the colour and taste of bile, is totally precipitated from the spirit by water, is highly inflammable, insoluble in water, and has been considered as a species of resin or concrete oil, and is termed by some the *resin of bile*. Fourcroy, however, supposes it to be more of the nature of *adipocire*.

Alcohol alone is another important re-agent for the analysis of bile. When these two fluids are mixed together, a coagulum is immediately formed of a whitish tenacious substance, scarcely bitter when well washed, and exhibiting all the properties of albumen. The remaining liquor is green, and contains, mixed with the alcohol, the resinous, saline, and colouring matter of the bile. Alcohol equally separates albumen from bile, inspissated by evaporation, and dissolves the remainder. The alcoholic solution of bile, not previously treated by an acid, differs considerably from that which has undergone this treatment. In the latter case, as before mentioned, the solution is decomposable by mere water, and by evaporation is converted into a very resinous product. In the former case, the solution mixes uniformly with water, yields by evaporation a transparent extract like gum-arabic, of a sweetish taste, a little mixed with the natural bitterness of bile, and easily soluble in water. The reason of this difference is doubtless owing to the separation of the soda from the resin of bile by the oxyd in one instance, whereas in the other they remain united in the form of a natural soap. Hence it is that the affusion of an acid upon the latter alcoholic solution decomposes it, and separates an unctuous substance, which again dissolved in alcohol is *now* precipitable from this solvent by simple water, and resembles a pure resinous solution.

Some chemists have thought that they could also detect a saccharine matter in bile, but the experiments to this purpose are not conclusive.

The oxygenized muriatic acid gas passed through bile diluted with a little water, soon destroys its yellow green colour, and precipitates the albumen in white flocculi; the saponaceous

resin continues in solution without colour or smell; but the bitterness remains. A further quantity of this acid separates the resinous oil as the muriatic acid does, but white and concrete. Any acid poured upon bile already bleached by the oxymuriatic acid, separates unctuous white concrete matter much resembling *adipocire*, but the precise nature of the change produced by the oxymuriatic acid has not been properly ascertained.

Bile therefore may be inferred from the present state of chemical analysis to contain,

1. A large proportion of water,
2. A substance closely resembling animal albumen.
3. A peculiar resinous inflammable matter, naturally and intimately with
4. Soda, into a kind of soap, or saponaceous extract.
5. Some neutral salts.
6. A small quantity of oxyd of iron.

Besides these constituents, there is a colouring and odorant matter, but it is not yet ascertained whether these are properties of any of the above-mentioned ingredients, or whether they belong to a peculiar substance.

Some chemists have also supposed a kind of saccharine mucilage, resembling the sugar of milk, but the existence of this, in recent unaltered bile, is very doubtful.

Bile has been supposed to be a powerful antiseptic, and its effects in the animal economy have been attributed to this quality, but without much foundation. Bile, left to itself in a moderate temperature soon becomes putrid (though not so speedily as blood); it then exhales a very fetid odour, but after this point it decomposes but very slowly, and at last assumes a strong, not very unpleasant mulky smell. This partial resistance to putrefaction is probably owing to the resinous ingredient, which last, when separated by acids and alcohol, in the way already mentioned, is absolutely incapable of putrefaction. M. Cadet asserts, that at no time during this process is any acid generated.

The *saponaceous* quality of bile, which is very characteristic, and is owing to the intimate union of its resin with soda, renders it miscible with milk, with oil, myrrh, aloe, and other gum-resins, by trituration, without curling, or ready decomposition. It is also owing to an intimate mixture with this natural soap that the albumen which bile contains is not coagulable by heat; even if an additional quantity of albumen (white of egg for example) is mixed with bile, heat will not coagulate it. Hence too, alcohol on y part ally separates the albumen, unless an acid is previously applied to engage the soda, and the alcoholic solution of the resin retains the soda so as to render the resin not separable by mere water.

Bile, or ox-gall, is employed in various ways as a cleanser of wool, cloth, &c. to get out grease-spots, to take off the greasiness of ivory in preparing it for receiving colours; and in China it is mixed with some of their varnishes. Gall a little putrid may be preserved a long time from further alteration by being boiled for a few minutes.

M. Fourcroy asserts, that he has obtained a substance, resembling bile in every property, by mixing blood with a third of water, coagulating it by heat, and slowly evaporating the serum. This experiment has, however, been repeated by others without success. See Cadet in the Mem. de l'Acad. des Sciences, for 1767 and 1769. Van Bochante, Professor at Louvian, in the Jour. de Phys. tom. 13. Suppl. An. Chim. tom. 4, 5, and 6. Fourcroy Systeme de Conn. Chim. &c.

BILE, in *Medicine*, a yellowish-green fluid, more or less viscid, and of a bitter taste, secreted in the liver, and conveyed from

that viscus, by the so called *ductus communis choledochus*, into the duodenum. It is a very compound fluid, being resolved by chemical analysis into a variety of ingredients: such as water, albumen, resin, soda, muriate of soda, phosphate of soda, phosphate of lime and iron, besides a sweetish matter analogous to sugar of milk. In its general properties, it may be said to partake of the nature of a soap, although it will not intimately mix with oil. The cystic bile, or that which is contained in the gall bladder, possesses more viscosity and bitterness, (i. e. is more concentrated) than that which flows directly from the biliary ducts into the duodenum, and which is termed hepatic bile.

When we see an organ of such magnitude as the liver, appropriated to the secretion of the bile, we are naturally led to infer that the fluid so secreted, must answer some useful purposes in the animal economy; but respecting the number and kind of purposes which it answers, physiologists do not exactly agree. It may, perhaps, concur with the pancreatic juice, to the separation of the refuse part of the alimentary pulp (chyme) from the proper chyle; but, as Dr. G. Fordyce has remarked, in his treatise on the digestion of food, the bile does not unite with the chyle itself, and pass along with it, through the lacteals into the blood. Mixed with the feculent matter, and colouring it, the bile seems to prevent that matter from running into fermentation, by virtue of its alkaline nature; and perhaps, also, in consequence of the bitter principle which it contains, it may, in some degree, resist putrefaction; but its principal and most obvious use is, as a stimulus to the intestines, serving to keep up a due degree of peristaltic action, and thereby to produce a regular and natural evacuation of their contents. Hence a diminished secretion, or obstructed passage of the bile, is always accompanied with costiveness.

From this view of the nature and composition of the biliary secretion, and of its action upon the living body in a state of health; we proceed to the consideration of its morbid conditions, which may be reduced to four heads; viz.

1. *Deficiency.* 2. *Obstruction.* 3. *Excess.* 4. *Vitiation.*
 1. *A deficiency of Bile.* This is known by a pale and languid habit of body, indigestion, flatulency, acidity, costiveness, and pale or clay-coloured stools. It is occasioned by a sedentary mode of life, by intemperance, and by depressing passions of the mind. It occurs in chlorosis, hypochondriasis, and chronic hepatitis. (See what is said of these diseases under their respective titles.) To whatsoever cause it may be owing, it is always attended with indigestion and costiveness; two symptoms which should be especially attended to in the cure. A well regulated diet should be prescribed, wherein spirituous drinks, high-seasoned meats, flatulent vegetables, and crude and acid fruits, should be forbidden. Much stress should at the same time be laid on a plan of regular exercise; and the injurious effects of cold and damp upon the gastric and hepatic systems, should be counteracted by suitable cloathing. As a further aid to digestion bitters and chalybeates (especially the chalybeate mineral waters), should be prescribed; and costiveness should be remedied by occasional doses of rhubarb, neutral salts, and aloetics; and sometimes by the stronger cathartics. Acidity should be counteracted by alkalies, among which soda or natron præparatum answers best. Where the diminished secretion of bile has appeared to be connected with a diseased structure of the liver, and particularly where such a change of structure has arisen from inflammation, mercury (Dr. Saunders observes), has been found useful, even carried to the degree of producing a slight salivation; moderating the violence, however, of its operations by plentiful dilution,

with gum arabic, and other vegetable demulcents. In these cases, the same author has found a tepid bath, of 90 degrees of Fahrenheit, to produce manifest good effects.

2. *Obstruction of Bile.* After it is secreted, the bile is sometimes prevented from passing into the duodenum. This may happen from various causes; viz. from an obliteration of the cavities of the biliary ducts, either by a thickening of their coats, or by a tuberculous state of the liver, the consequences of inflammation; from pressure produced by enlargements of the neighbouring parts; and from a too viscid and consistent state of the bile itself; but, more than all, from gall-stones impacted in the common duct. Whenever in any of these ways, the bile, after being secreted, is hindered from passing into the duodenum, it is either taken into the circulating system by what is termed *regurgitation*, or by absorption; producing great languor and oppression, together with a yellowness of the skin, and tunica conjunctiva of the eyes, &c. i. e. giving rise to *jaundice*. (See GALL-STONES and JAUNDICE.) The treatment must be varied, according to the variety of conditions on which the obstruction depends. In this place, it will be sufficient to remark, that saline purgatives, mercurials, saponaceous and alkaline medicines, with tepid dilution, and warm bathing, will be found suited to the majority of these cases.

3. *Excess, or redundancy of Bile*, is a morbid affection, of very frequent occurrence. Among its exciting causes may be mentioned intemperance in living, the summer and autumnal heats of our own latitudes, and more especially the high temperatures of the tropical climates; in a word, whatever produces a hurried circulation, or irritates the vascular and secreting system of the liver. A redundancy of bile makes itself known by "a general languor of the body, together with nausea, foul tongue, loss of appetite, and indigestion: or, by being directed to the intestines, excites a painful diarrhoea, ultimately tending to weaken their tone, and disturb their regular peristaltic motion. It generally happens, that, during the excess and prevalence of bile in the first passages, some absorption of it takes place into the habit, so that the skin becomes yellow, and the urine is sensibly impregnated with it. The pulse is quicker than natural, and there is a considerable degree of thirst, with an increase of heat; the usual symptoms of fever. The body becomes emaciated, and the general aspect of the patient is extremely unhealthy." It may be added, that most of the fevers of hot climates, whether intermittent, remittent, or continued, are accompanied by an overflow of bile. (See FEVERS.) When the increased secretion of bile affects the stomach and bowels in such manner as to excite both vomiting and purging to a violent degree, it gives rise to that form of disease which is termed *cholera*; of which a particular description will be found under that title; when it produces vomiting, joined with constipation and acute pains about the umbilical region, the disease is termed *bilious colic* (see COLIC); and lastly, when the evacuation of bile is frequent and copious by stool only, without frequent vomiting, it constitutes *bilious diarrhoea*. (See DIARRHOEA.) It is the remark of that judicious writer, to whose work we have more than once referred in this account of bilious disorders, that it is more difficult to supply a deficiency of bile, than to carry off its excess. In fact, little more is required for the fulfilment of this last intention, than to promote the discharge of the redundant bile by gentle saline evacuants, (for the bile has generally of itself a purgative tendency), and to prevent fresh accumulations, by diluting freely with water heated to a proper temperature. For this purpose, the patient should drink every morning (according to the excellent directions of Dr. Saunders), from half a pint to a pint of

water, of a temperature from 50° to 114° of Fahrenheit's thermometer, and use moderate exercise before breakfast. With the same view; the Bath and Buxton waters, (provided their use be not contra-indicated by visceral disease), and the Cheltenham water also may be recommended. At the same time, a proper diet should be prescribed, consisting of food that is easy of digestion, not over-stimulating, and free from flatulency; and spirituous drinks and malt liquors should be forbidden. Pastry is particularly improper. Water, or wine and water, will be the best beverage. When the bile has been sufficiently evacuated, bitters and chalybeates may be given with advantage. But where these complaints are the consequence of residing in the tropical regions, the only effectual remedy is to remove to a temperate climate. People, who have suffered in these respects from the heat of climate, and to whom it is necessary to return to this country for the recovery of their health, should endeavour (as Dr. Lind has suggested), to arrive in the beginning of summer, as they will find the winters of Great Britain, on their first arrival, too piercing and severe for their constitutions.

4. *Vitiation of the Bile.* In almost all cases wherein the secretion of bile exceeds the natural quantity, it is at the same time vitiated in its quality. Thus in bilious fevers, bilious diarrhoeas, bilious colic, and cholera morbus, it is often vitiated both in colour and taste, appearing wholly of a pure green colour, and possessing a sharpness or acidity which sets the teeth on edge, and produces a burning and corroding sensation in the stomach, oesophagus and fauces, and at the same time violent twitchings in the intestinal canal. Such vitiations of the bile are common to infants, as well as to adults. The remedial treatment consists in evacuating the offending biles by the means specified under the preceding division (3), and correcting its vitiated qualities by the employment of alkalies, and by copious dilution with aqueous and mucilaginous liquors. After due evacuations, the stomach and bowels may be protected from the irritating action of the remaining bile by opiate medicines. Lind, Clark, Winterbottom, and other writers on the diseases of hot climates, may be referred to for many excellent observations on bilious disorders; but the best and most comprehensive treatise on this subject is that of Dr. Saunders.

BILEDGIK, in *Geography*, a town of Asiatic Turkey, in the province of Natolia, 32 miles N.W. of Erki-Shehr.

BILEDULGERID, a country of Africa, comprehending, according to some geographers, the southern part of Algiers, together with the whole tract of land that lies in this direction between the Atlantic ocean and Egypt, and in this extent, including eight large tracts or provinces, viz. Barca, Biledulgerid proper, Segelmessa, or Sijlmissa, Tasslet, Tigoarin, Zeb or Zab, Darka or Darah, and Tessel, beside several inferior districts, mentioned under the names of Oguela, or Augela, Fassan or Fenzan, and Gadamis or Gadamis, &c. It was known to the ancients under the name of *Numidia*. But in a more confined and proper sense, according to the arrangement of De Lisle, and several modern geographers, Biledulgerid includes that tract of land which lies south of Algiers and Tunis, and is bounded on the east by a ridge of lofty mountains, which separates it from Tripoli and part of Gadamis, on the west by the countries of Zibard Mezzab, and on the south by the province of Verghela, or Weigela. Its dimensions are not accurately ascertained; but it is somewhat of a square form, supposed to extend about 60 or 80 leagues every way, or from about 31° 15' to 34° 15' N. lat.; and from 5° 30' to 10° E. long. Some have derived the appellation Biledulgerid from *Beld el gerid*, or the "land of dates," under which denomination it is distinguished in Rennell's map of North Africa; but others, with

Dr. Shaw, deduce it from *Blaid el Jeride*, or the "dry country." The whole province of Biledulgerid, bordering to the south on Sahara, or the Great Desert, is mountainous, sandy, and barren, producing little or no sustenance but dates, which grow in such abundance, that various parts of it are covered with palm-trees bearing this fruit. The climate is hot and unhealthy; the people are meagre, swarthy, and shrivelled in their complexions, and their eyes are inflamed by the reflection of the sun-beams, from the white hard soil, and by clouds of dust and sand driven by the high winds at some seasons in such abundance, as to bury men and cattle under their collected masses. They are also subject to a scorbutic complaint, of which they can assign no probable cause, but so inveterate, that their teeth drop out, and their bodies become loathsome. In other respects they are healthy and vigorous, and live without sickness or disease to a great age. The plague of Barbary is scarcely ever heard of in this province, notwithstanding the contiguity of the two countries, and the frequent intercourse of their inhabitants. Biledulgerid, properly so called, has few rivers and towns. The natives of Biledulgerid are represented as a lewd, treacherous, thievish, and savage people, that delight in murder, blood, and rapine. They are, in general, a mixture of old Africans and wild Arabs; the former of whom lived with some degree of regularity and civil order, in a kind of villages composed of a number of little huts, whilst the latter inhabited moveable tents, and ranged from place to place in quest of food and plunder. These Arabs value themselves on their superiority with regard to birth and talents above the primitive inhabitants; and whilst they are wholly independent and free, they occasionally hire themselves to serve in the wars of the neighbouring princes, and hence arises the chief part of their public revenue; the rest pursue no other occupations besides plundering and hunting, and particularly hunting ostriches, the flesh of which they dress for food, and the feathers they barter for corn, pulse, and other necessaries. The other parts of these birds they use in their religious rites, as ornaments of dress, or as pouches and knapsacks. Besides dates and ostriches, they likewise subsist on the flesh of goats and camels; and for their drink, they use either the broth in which the flesh is boiled, or the milk of their camels, for they seldom taste water, which is not only scarce, but brackish and unwholesome. For the character and manners of those who inhabit that part of Biledulgerid, taken in its former extent, and bordering on the Atlantic ocean; see **MONSELEMINES** and **MONGEARTS**.

BILEFELD. See **BIELFELD**.

BILGE. See **BILDGE**.

BILGUER, **JOHN ULRICK**, in *Biography*, born at Coire, in the country of the Grisons, in Swisserland; after passing through the usual course of education, practised surgery at Berlin, where he soon acquired such reputation, as to engage the attention of king Frederic the Great, who made him surgeon to one of his regiments, and, in progression, surgeon-general to the Prussian army. In the course of an extensive practice in this post, he had an opportunity of observing how very small a proportion of the men recovered from fractures, where the lost parts were greatly bruised, and the bones shattered, when the limb had been amputated, which in such cases was the general practice. This induced him to try more lenient methods, which he practised with such success, as to enable him to reduce the cases in which amputation should be declared to be necessary to a very small number. In 1761, he was admitted to the degree of doctor in medicine, by the university of Hall, in Saxony, when he read for his thesis "De membrorum amputatione

rarissime administranda, aut quasi abroganda." This work was translated into French, and highly commended by Tissot, then in the zenith of his reputation, which gave the work such credit, and so quick a circulation, that it was soon naturalized in every country of Europe, and its diffusion has been attended with the most beneficial consequences. The methods recommended by the author for preserving fractured limbs, even in cases that have been before thought hopeless, succeeded so often, as very much to diminish the frequency of the operation. He also published at Glogau, in 1763, "Instructions for Surgeons of Hospitals," in German. In this work, he further defends and illustrates the doctrine contained in the thesis. In cases where amputation cannot be avoided, he advises leaving a portion of the integuments, a practice now become general. There are also other works published by this author on the practice of surgery, for the titles and accounts of which, see Haller's *Bib. Chirurg. Eloy. Dict. Hist.*

BILGHY, in *Geography*, a town of Hindoostan, in the Myfore country, and in that district ceded to Britain in 1799, 58 miles W.S.W. from Harponully, and 35 N.N.W. from Bednore. N. lat. 14° 8'. E. long. 74° 50'.

BILIARY Calculi. Some of the concretions found in the gall bladder or ducts, and which are generally of an oval form, are composed of a white substance like spermaceti, crystallized in brilliant plates or stræ. These concretions float in water, and are inflammable. They dissolve in heated alcohol, in oil of turpentine, and in alkalies; in the latter case, the solution has the properties of a soap.

Other biliary concretions are of a polygonal form, and generally very numerous; they are of a brownish colour, and are formed of concentric layers, of a substance resembling inspissated bile.

In some biliary concretions, there is a mixture of both the substances above described.

There are also sometimes found in the gall bladder dark-coloured small brittle concretions, which are insoluble in alcohol, or oil of turpentine, and which are not inflammable. (See **GALL-STONES**.) For a detail of experiments relative to Bile and these calculi, consult Cadet, *Mem. Par.* 1797. Fourcroy, *Ann. de Chimie*. Gren & Vauquelin, *ibid.* Ramsay in the *Theaur. Med. Edin.* and MacLurg. See **CALCULI, Biliary**.

BILIARII Pori, the excretory ducts of the liver, now commonly termed *vasa biliaria*. See **LIVER**.

BILICH, a town of Siberia, 8 miles S.E. of Vercholenst.

BILIHAN, a town of Persia, in the province of Irac, 100 miles S.S.W. of Amadan.

BILIKOWKN, a town of Poland, in the palatinate of Kiev, 50 miles west of Kiev.

BILIMBI, in *Botany*, a species of the *Averrhoa* (see **AVERRHOA**); which is carefully cultivated in the gardens of the East Indies, where it flowers throughout the year. The juice of the root is drank as a cure for fevers. The leaves boiled, and made into a cataplasm with rice, are famed in all sorts of tumors, and the juice of the fruit is used in almost all external heats, dipping linen rags in it, and applying them to the parts. It is drank, mixed with arrack, to cure diarrhœas; and the dried leaves, mixed with betel leaves, and given in arrack, are said to promote delivery. The fruit is pleasant to the taste when fully ripe, and is commonly eaten; when smaller, and unripe, it makes a very pleasant pickle.

BILIN, in *Geography*, a town of Bohemia, in the circle of Leitmeritz, 14 miles west of Leitmeritz. This place has a fine citadel, and a spring of acid water; and holds annual fairs.

BILINEATA, in *Entomology*, a species of **LEPTURA**, of a blackish-brown, with two lines on the thorax, and scattered dots on the wing-cafes yellowish. Scopoli, Gmelin. Inhabits Carniola.

BILINEATA, a species of **CANTHARIS**, with a yellow thorax, with a spot, and four brown dots: wing-cafes yellow, with a fuscous line. Thunberg, &c. This is a native of the cape of Good Hope.

BILINEATA, a species of **CHRYSOMELA**, that inhabits Scandinavia. It is green, glossed with gold; anterior part of the thorax excavated; and a double blue line on the wing-cafes. Gmelin.

BILINEATA, a species of **PHALÆNA** (*Geometra*), with yellowish testaceous wings, waved with a broad stripe across, having a brown and a white margin. Linn. Fr. Succ. &c. A very common insect in hedges during the summer months; and is called in England sometimes the *elm moth*.

BILINEATA, a species of **PHRYGANEÆ**, of a blackish colour, with brown wings, and two white lines on each margin. Inhabits the north of Europe.

BILINEATUM, in *Conchology*, a species of **BUCCINUM**, described by Lister. The shell is transversely striated; spire obtuse; the whorls with a spotted band and two lines. Its native country is unknown.

BILINEATUM, in *Entomology*, a species of **PHALANGIUM**, of a pale colour, with two dorsal lines and black dots. Fabricius. Inhabits Norway.

BILINEATUS, a species of **CURCULIO**. This insect is brown, with two white lines on the wing-cafes. Inhabits Germany.

BILINEATUS, a species of **CERAMBYX** (*Prionus*), with crenated thorax, marked with two white-lines; wing-cafes ferruginous, speckled with white, and bordered with yellow. Inhabits America. Fabricius, &c.

BILINEATUS, a species of **CRYPTOCEPHALUS**, of a minute size, that is found in Europe. This insect is black, with two yellowish lines on the wing-cafes, and ferruginous legs. Gmelin. A native of Europe, and described by Linnæus as *chrysomela bilineata*.

BILINEATUS, a species of **ICHNEUMON**. It is black, with two yellow lines in front; abdomen depressed; legs red; tips of the posterior ones brown. Linn. Mus. Lesh.

BILINEATUS, in *Insectology*, a species of **PLEURONECTES**, found in China. It is thin, long, above yellow, with a brown margin; beneath reddish-white; entirely covered with very small scales. This is specifically distinguished by having the lateral line double. Bloch.

BILINEATUS, in *Zoology*, a species of **COLUBER**, of a rufous colour, with two yellowish stripes: *la double-raie* of count de Ceppe, and *bilineated snake* of Dr. Shaw. This kind, according to the former writer, measures two feet one inch in length, of which the tail is six inches and a half; colour rufous, each scale bordered with yellow; and from the back of the head are two bright golden-yellow stripes extending to the end of the tail; scales on the head large, those on the body smooth; native country unknown; abdominal scuta 205, subcaudal scales 99.

BILINGUIS, in *Law*. See **MEDISTAS Lingue**.

BILINGUIS, properly denotes a person who has two tongues in his mouth; an instance of which is given by Doleus. It is also used for a person who speaks two languages.

BILIOUS Complexion. See **COMPLEXION**, and **TEMPERAMENT**.

BILIOUS Colic. See **COLIC**.

BILIOUS Diarrhœa. See **DIARRHœA**.

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BILIOUS Fever. See **FEVER**.

BILIRIANS, in *Geography*, a denomination given to a class of inhabitants of the southern parts of Russia. In their origin they are Sarmates, who settled in their present habitations, and now exist under the name of Tschuvatches. See **BOLGARIANS**.

BILITZ, a town of Silesia, in the principality of Teschen, separated from Biala by the river of the same name, and at a small distance from it. N. lat. 49° 51'. E. long. 19 6'.

BILIZIN, a town of Poland, in the palatinate of Novogrodek, about 18 miles N.E. of Novogrodek. N. lat. 53° 55'. E. long. 25° 45'.

BILL, in *Agriculture*, denotes an edge-tool, of the ax kind, with a hooked point, fitted to a handle, and used to lop boughs of trees, &c. When short, it is called a "hand-bill;" when long, a "hedge-bill."

BILL, in *Common Language*, denotes a written or printed paper posted up in some public place, for the purpose of advertising the sale of any merchandize, ship, &c. or the sailing of any vessel, &c.

BILL is also used among tradesmen and workmen for an account of goods sold and delivered, or of work done, with the charge annexed.

BILL, in *Commerce*, denotes a security for money under the hand, and sometimes seal of the debtor, without any condition or forfeiture, in case of non-performance.—In which it is distinguished from a bond or obligation. See **BOND**.

It has been usually defined a writing, wherein one man is bound to another to pay a sum of money, on a day that is future, or presently on demand, according to the agreement of the parties at the time when it is drawn, and the dealings between them.

BILL, in *Law*, denotes a declaration in writing, expressing a wrong or grievance, which the complainant hath suffered by the party complained of; or else some offence committed by him against some law or statute of the realm. This bill is commonly addressed to the lord chancellor, especially for unconscionable wrongs done to the complainant; and sometimes to others having jurisdiction, according as the law directs. It contains the fact complained of, the damages sustained, and the petition of process against the defendant for redress. This is used as well in criminal as in civil matters. In criminal cases, when the grand jury upon a presentment or indictment find the same to be true, they indorse on it "billa vera;" upon which the offender is said to stand indicted of the crime, and is bound to make answer to it; and if the crime touch the life of the person indicted, it is then referred to the jury of life or death, viz. the petty jury, by whom, if he be found guilty, then he shall stand convicted of the crime, and is by the judge condemned to death.

Many of the proceedings in the king's bench are by bill; it is the ancient form of proceeding, and was, and yet should be, filed in parchment, in all suits, not by original. The declaration is a transcript of it, or supposed to be. See **AMENDMENT**.

In Scots law, every summary application in writing, by way of petition to the court of session, is called a "bill."

BILL of Appeal. See **APPEAL**.

BILL of Attainder. See **ATTAINDER**.

BILL, Cross. See **CROSS-BILL**, and **SUIT in Equity**.

BILL in Equity, is a kind of petition addressed to the lord chancellor, with which a suit in chancery commences. This, in the nature of a declaration at common law, or a bill and allegation in the spiritual courts, sets forth the circumstances of the case at length, "in consideration of which," (to this is the usual language of the bill) "and for that your orator

is wholly without remedy at the common law," relief is therefore prayed at the chancellor's hands, and also process of subpoena against the defendant, to compel him to answer upon oath to all the matter charged in the bill. See *SUIT in Equity*.

BILL of Exception to Evidence. See *EXCEPTION*.

BILL of Exchange, in Commerce and Law, a short note, or writing, ordering the payment of a sum of money in one place, to some person assigned by the drawer, or remitter, in consideration of the like value paid to him in another place. (See *REMITTANCE*.) Or, it is an open letter of request from one man to another, desiring him to pay a sum of money named in it to a third person on his account, or to any other to whom that third person shall order it to be paid; or it may be made payable to bearer. This kind of negotiable security for money, invented among merchants in different countries, serves to facilitate the remittance of money from the one to the other, and of course the conduct of commercial transactions; so that, since its first introduction, it has extended itself to almost all pecuniary negotiations.

Bills of exchange were unknown in the ancient Roman commerce, as well as jurisprudence. According to the common opinion, they are said to have been brought into general use by the Jews and Lombards, when banished for their usury and other vices; who found means to withdraw their effects, which they had lodged in the hands of friends, both in France and England, by secret letters and bills conceived in short precise terms, like the modern bills of exchange, which they negotiated by the assistance of merchants and travellers. The Jews were banished out of France by Philip Augustus, in 1143, and out of England, in 1290; but the use of paper credit was introduced in the Mogul empire in China, in 1236. It further appears, that bills of exchange were negotiated at Hamburgh, in 1188; and it has been said, that the faction of the Gibellins, being expelled Italy by the Guelphs, towards the close of the 13th century, retired to Amsterdam, and used the same means for the recovery of their effects in Italy as the Jews had done; and hence, as some have thought, the Dutch merchants took the hint of negotiating bills of exchange, and soon spread the practice throughout Europe. The same Gibellins are said to be the inventors of the re-change, or re-exchange, on account of damages, charges, and interest, when bills of exchange, which they called "polizzo di cambio," are not paid, but returned on protest. In 1307, bills of exchange seem to have been in use in England, though their nature was not well understood at a much later period; and the first reference to them in an act of parliament, occurs in 1381, when they were forbidden to be used without the king's licence. In 1394, an ordinance was issued by the city of Barcelona, that bills of exchange should be accepted within twenty-four hours after they were presented, and that the acceptance should be written on the back of the bill. Moreover, in 1404, the magistrates of Bruges requested those of Barcelona to inform them what was the common practice, in regard to bills of exchange, when the person who presented a bill raised money on it in an unusual manner, in the case of its not being paid, and by these means increased the expences so much, that the drawer would not consent to sustain the loss. The term of the bill, such as is now used, is seen in the memorial, which also speaks of usance; and it also appears, that first and second bills were at that time drawn, and that when bills were not accepted, it was customary to protest them. Anderson's Hist. Com. vol. i. Beckman's Hist. of Invent. vol. iii. p. 462.

In common speech, a bill of exchange is frequently called a "draught;" but the former is the more legal, as well as

mercantile expression. The person who makes or draws the bill is called the "drawer," and he to whom it is addressed is denominated the "drawee;" and when he undertakes to pay the amount, he is called the "acceptor." The person to whom it is ordered to be paid is called the "payee;" and if he appoint another to receive the money, this other is called the "indorsee," as the payee is, with respect to him, the "indorser;" and any one who happens for the time to be in possession of the bill is called the "holder" of it. The time at which the payment is limited to be made is various, according to the circumstances of the parties, and the distance of their respective places of residence. Sometimes the amount is made payable at sight; sometimes at so many days after sight; at other times at a certain interval from the date. See *USANCE*.

Where the time of payment is limited by months, it must be computed by calendar, not lunar months; and where one month is longer than the succeeding, it is a rule not to go in the computation into a third. Thus on a bill dated the 28th, 29th, 30th, or 31st of January, and payable one month after date, the time expires on the 28th of February, in common years, and in the three latter cases, in leap year, on the 29th; to which are to be added the "days of grace." Where a bill is payable at so many days after sight, or from the date, the day of presentment, or of the date, is excluded. Thus, where a bill payable 10 days after sight is presented on the first day of a month, the 10 days expire on the 11th; where it is dated the first, and payable 20 days after date, these expire on the 21st. (Ld. Raym. 281. Stra. 829.) It is a custom among merchants, that a person to whom a bill is addressed, shall be allowed a few days for payment, beyond the time mentioned in the bill, called "days of grace." In Great Britain and Ireland, three days are allowed; in other places more. If the last of these three days happens to be Sunday, the bill is to be paid on Saturday; but these days of grace are not allowed on bills payable at sight. If bills become due on Sunday, or on such holidays, when the law forbids business to be done, payment must be demanded or protest made for non-payment on the preceding day.

Bills of exchange are either "foreign" or "inland;" the first being those which pass from one country to another, and the latter such as pass between parties residing in the same country: and by the consent of merchants, certain customs are established with regard to foreign bills, which have been adopted as part of the law in every commercial state. Inland bills of exchange do not seem to have been very frequent in England before the reign of Charles II. (6 Mod. 29); and foreign bills were much more regarded by the law than inland ones, as being thought of more public concern in the advancement of commerce. But at length the legislature, by two statutes, viz. 9 & 10 W. 3. c. 17. and 3 & 4 Ann. c. 9. has set both sorts of bills nearly on the same footing; so that what was the law and custom of merchants, with regard to the one, is now, in most respects, the established law of the country, with regard to the other.

Promissory notes, or notes of hand, are a plain and direct engagement in writing to pay a sum specified at the time limited in it, to a person therein named, or to his order, or to the bearer at large. These notes were at first considered merely as evidence of a debt; and it was held that a promissory note was not assignable or indorsible, within the custom of merchants; and that if such a note had been indorsed or assigned over, the person to whom it was so indorsed or assigned, could not maintain an action within the custom against the drawer of the note; nor could even the person, to whom it was in the first instance made payable, bring such an action.

action. (1 Salk. 120. 2 L.J. Raym. 757, 9.) But at length the legislature took notice of them and put them upon the same footing with bills of exchange; by statute 3 & 4 Ann. c. 9. made perpetual by stat. 7 Ann. c. 25. § 3; which enacts that promissory notes, payable to order or bearer, may be assigned and indorsed, and action maintained on them, as on bills of exchange. By stats. 15 Geo. III. c. 51. and 17 Geo. III. c. 30. made perpetual by stat. 27 Geo. III. c. 16. all negotiable notes and bills for less than 20s. are declared to be null and void; and notes or bills between that sum and 5l. must be made payable within 21 days after date, must particularize the name and description of the payees, must bear date at the time and place in which they are made, must be attested by a subscribing witness, and the indorsement of them must be attended with the same strictness in all respects, and made before the notes or bills become due. The omission of any one of these regulations and formalities vacates the security, and is penal to him that utters it. Bills of exchange and promissory notes must now be drawn on stamped paper; and the stamp is proportioned under stat. 31 Geo. III. c. 25. 37 G. III. and 41 G. III. c. 10. to the amount of the bill from sixpence to three shillings for such as are payable on demand; and for those payable after date from one shilling to four shillings. If foreign bills are drawn here, the whole set must be stamped; but bills drawn abroad are not liable to any stamp duty.

As bills of exchange were first introduced for the convenience of commerce, it was formerly thought that they could neither be drawn nor negotiated by any person who was not actually a merchant; but it has been since decided, that any person capable of binding himself by a contract, may draw or accept, or negotiate a bill of exchange, and by stat. 3 & 4 Ann. c. 9. be a party to a promissory note. However, an infant cannot be sued on a bill of exchange, nor a feme-covert, except in such cases as she is allowed to act in as a feme-sole. If a bill is drawn on two joint traders, the acceptance of one binds the other, if it concern the joint trade; but it is otherwise, if the bill concern the acceptor only, in a distinct interest and respect. On the subject of procurator with regard to bills; see PROCURATOR.

A promissory note, when indorsed, begins to resemble a bill of exchange, for the indorser of the note corresponds to the drawer of the bill; the maker to the drawee or acceptor, and the indorsee to the payee; and this resemblance being fixed, the law is precisely the same in bills of exchange and promissory notes. It is now a decided point of law, that bills and notes made payable to bearer are equally transferable with those payable to order; and the transfer in both cases equally confers the right of action on the *bona fide* holder. But the mode of transfer is different; as bills and notes payable to bearer are transferred by mere delivery, the others by indorsement.

There are other bills and notes which differ from those already described, and which are securities for money, because they are considered as money itself. These are "Banker's notes," "Banker's cash-notes," and "drafts on Bankers," payable on demand. Bank-notes are regarded in ordinary transactions by common consent as cash, and they have the credit and currency of money to every effectual purpose, and seem to be as lawful a tender. (Stat. 5 W. & M. c. 20. § 28. 3 Term. Rep. 554.) Banker's cash-notes, and drafts on bankers, are considered among merchants as money, and received in payment as ready cash; and if the party receiving them do not, within a reasonable time, demand the money, he must bear the loss in case of the banker's failure. The precise time is not absolutely determined; but it is held most advisable to carry such drafts on

bankers, as are payable on demand, for payment on the day in which they are received, if the situation of the parties admit of it.

Bills of exchange and promissory notes, which, according to the general principles of law, are to be considered only as evidences of a simple contract, are however in one respect regarded as specialties, and on the same footing with bonds; for they are presumed, unless the contrary be shewn by the defendant, to have been made on a good consideration; nor is it incumbent on the plaintiff either to shew a consideration in his declaration, or to prove it at the trial.

Bills of exchange, and also notes, are assignable or negotiable without any fiction; and every person to whom they are transferred may maintain an action in his own name against any one, who has before him in the course of their negotiations rendered himself responsible for the payment of them. But the instrument, or writing, which constitutes a good bill or note, must have certain essential qualities. One of these is, that the bill or note should be for the payment of money *only*, and not for the payment of money *and* the doing of some other act. Another requisite quality is, that the instrument must carry with it a *personal* and certain credit, given to the drawer or maker, not confined to credit on any particular fund. But in the application of this principle, there is a material distinction between bills and notes. With regard to the former, where the fund is supposed to be in the hands of the drawee, the objection holds in its full force, not only because the productiveness of the fund is contingent and precarious, but because the credit is not given to the *person* of the drawer; but where the fund, on account of which the money is payable, either is in the hands of the drawer, or he is accountable for it, the objection will not hold, because the credit is personal to him, and the fund is only the consideration of his giving the bill. With respect to a note, if the drawer promise to pay out of a particular fund, then within his power, the note will be good under the statute; the payment does not depend on the circumstance of the fund's proving unproductive, or not, but there is an obligation upon his *personal* credit; the bare making of the note being an acknowledgment that he has money in his hands. Another essential quality of a good bill or note is, that it must be absolutely payable at all events, and not depend on any particular circumstances which may or may not happen in the common course of things. No precise form of words is necessary to make a bill of exchange or a note under the statute; any order, which cannot be complied with, or promise, which cannot be performed, without the payment of money, will make a good bill or note. As the words "value received," have been usually inserted in bills or notes, some doubt has occurred, whether they are essential. It is now understood, as a decided point, that these words are not necessary; for instruments of this kind are presumed to have been made on a valuable consideration; and therefore words, which import no more, cannot be essential. It has been queried, whether it be essential to the constitution of a bill of exchange, that it should contain words which render it negotiable, as "to order," or "to bearer;" and the point has not yet received a judicial decision. With regard to notes that have not these words, the person to whom they are made payable, may maintain an action on them, within the statute, against the maker. With regard to the acceptance of bills of exchange. See ACCEPTANCE. Forging the acceptance of any such bill, or the number or principal sum of any accountable receipt, is made felony by stat. 7 Geo. 2. c. 22.

The mode of transferring bills and notes is different according to the expressions which render them negotiable. Such as are payable to bearer, are transferred by de-

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bearer; if payable to A. B. or bearer, they are payable to bearer, as if A. B. were not mentioned. But to the transfer of those payable to order, it is necessary, in addition to delivery, there should be something, by which the payee may appear to express his order. This additional circumstance is called an "indorsement." See **INDORSEMENT.**

By the very act of drawing a bill, the drawer comes under an implied engagement to the payee, and to every subsequent holder, fairly entitled to the possession, that the person on whom he draws is capable of binding himself by his acceptance; that he is to be found at the place where he is described to be, if that description be mentioned in the bill; that if the bill be duly presented to him, he will accept in writing on the bill itself, according to its tenor; and that he will pay it when it becomes due, if presented in proper time for that purpose. In default of any of these particulars, the drawer is liable to an action at the suit of any of the parties before-mentioned, on due diligence being exercised on their parts, not only for the payment of the original sum mentioned in the bill, but also in some cases for damages, interest, and costs; and he is equally answerable, whether the bill was drawn on his own account, or on that of a third person; for the holder of the bill is not to be affected by the circumstances that may exist between the drawer and another; the personal credit of the drawer being pledged for the due honour of the bill. If a man write his name on a blank piece of paper, and deliver it to another, with authority to draw on it a bill of exchange to any amount, at any distance of time, he renders himself liable to be called on as the drawer of any bill so formed by the person to whom he has given the authority. If acceptance be refused, and the bill returned, this is notice to the drawer of the refusal of the drawee; and then the period, when the debt of the former is to be considered as contracted, is the moment when he draws the bill; and an action may be immediately commenced against him, though the regular time of payment, according to the tenor of the bill, be not arrived; for the drawee, not having given credit, which was the ground of the contract, what the drawer had undertaken has not been performed. When a bill of exchange is indorsed by the person to whom it was made payable, as between the indorser and indorsee, it is a new bill of exchange; as it is also between every subsequent indorser and indorsee; the indorser, therefore, with respect to all the parties subsequent to him, stands in the place of the drawer, being a collateral security for the acceptance and payment of the bill by the drawee; his indorsement imposes on him the same engagement that the drawing of the bill does on the drawer; and the period when that engagement attaches, is the time of the indorsement. Nor will any thing discharge the indorser from his engagement, but the absolute payment of the money; not even a judgment recovered against the drawer or any previous indorser, neither is his engagement discharged by an ineffectual execution against the drawer, or any prior or subsequent indorser. The engagement of the drawer and indorsers depends on certain conditions to be performed by the holder of the bill, and without the performance of which he has no remedy against them.

When the payment of the bill is limited to a certain time after sight, the holder must present it for acceptance, otherwise the time of payment will never come. Although it has never been directly determined, whether the holder of a bill, payable at a certain time after date, be bound to present it for acceptance immediately on receiving it, or whether he may wait till it become due, and then present it for payment; yet in practice it often happens that a bill is negotiated and transferred through many hands, with-

out acceptance, and not presented to the drawee till the time of payment; and no objection is ever made on that account. If, however, on the holder presenting the bill for acceptance, this be refused, he is bound to give regular notice to all the preceding parties to whom he intends to resort for non-payment; and if, on account of the holder's delay, any loss be incurred by the failure of any of these parties, he must bear this loss. It is also the duty of the holder of a bill, whether accepted or not, to present it for payment within a limited time; otherwise the law will imply that payment has been made, and it would be prejudicial to commerce, if a bill might be produced to charge the drawer at any distance of time, when all accounts might be adjusted between him and the drawee. A presentment either for payment or acceptance must be made at reasonable hours, which are the common hours of business in the place where the party, to whom the bill is presented, resides. If acceptance or payment be refused, or the drawee of the bill, or the maker of the note, has become insolvent, or has absconded, notice from the holder himself must be given to the preceding parties, and in this notice it must be added, that the holder does not intend to give him credit. What may be considered as a reasonable time, within which notice should be given, either of non-acceptance or non-payment, has been subject to much doubt and uncertainty. It was once held, that a fortnight was a reasonable time; but that period is now much contracted. With respect to acceptance, it is usual to leave a bill for that purpose with the drawee till the next day; but if he, when called upon the next day, delay or refuse to accept according to the tenor of the bill, it is now an established rule, where the parties, to whom notice is to be given, reside at a different place from the holder and drawee, that notice should be sent by the next post; and the same rule obtains in case of non-payment. Also in case of the drawee of the bill, or maker of the note, having absconded, or not being found, notice of these circumstances, in case either of non-acceptance or non-payment, must be sent by the first post. Considerable difficulty has occurred in establishing a general rule in this respect, where the party entitled to notice resides in or near the place in which the holder lives. The court, however, has on several occasions laid it down as a principle, that what shall be considered as a reasonable time in case of notice, and also of demand of payment, is a question of law; and this seems to have been fully established, and it is understood generally, that a demand must be made, and notice given, as soon as under all the circumstances it is possible to do so. As to the manner in which notice is given, either of non-acceptance or non-payment, there is a remarkable difference between inland and foreign bills. In the former no particular form of words is necessary to entitle the holder to recover against the drawer or indorsers, the amount of the bill, on failure of the drawee or acceptor; it is sufficient if it appear that the holder means to give no credit to the latter, but to hold the former to their responsibility. But in foreign bills, other formalities are required. If the person to whom the bill is addressed, on presentment, will not accept it, the holder is to carry it to a person vested with a public character, who is to go to the drawee and demand acceptance; and if he then refuse, the officer is there to make a minute on the bill itself, consisting of his initials, the month, the day, and the year, with his charges for minuting. He must afterwards draw up a solemn declaration, that the bill has been presented for acceptance, which was refused, and that the holder intends to recover all damages which he, or the deliverer of the money to the drawer, or any other, may sustain on account of the non-accept-

acceptance. This minute, in common language, is termed the "notice" of the bill; the solemn declaration, the "protest;" and the person whose office it is to do these acts called a "public notary;" and to his protestation all foreign courts give credit. If no such notary be resident in the place where the bill is negotiated, protest may be made by any substantial inhabitant in the presence of two credible witnesses. For the circumstances attending this protest, and the difference in this respect between inland and foreign bills, see *PROTEST*.

When a bill is once accepted absolutely, it cannot in any case be revoked, and the acceptor is at all events bound, though he hear of the drawer's having failed the next moment, even if the failure was before the acceptance. The acceptor may however be discharged by an express declaration of the holder, or by something equivalent to such declaration. But no circumstances of indulgence shewn to the acceptor by the holder, nor an attempt on his part to recover of the drawer, will amount to an express declaration of discharge. Neither will any length of time short of the statute of limitations, nor the receipt of part of the money from the drawer or indorser, nor a promise by indorsement on the bill by the drawer to pay the residue, discharge the holder's remedy against the acceptor. Although the receipt of part from the drawer or indorser be no discharge to the acceptor, yet the receipt of part from the acceptor of a bill, or the maker of a note, is a discharge to the drawer and indorsers in the one case, and to the indorsers in the other, unless due notice be given of the non-payment of the residue; but where due notice is given, that the bill is not duly paid, the receipt of part of the money from an acceptor, or maker, will not discharge the drawer or indorsers; because it is for their advantage, that as much should be received from others as may be. So the receipt of part from an indorser is no discharge of the drawer or preceding indorser. If the drawer of a note, or the acceptor of a bill, be sued by the indorsee, and the bail pay the debt and costs, this absolutely discharges the indorser as much as if the principal had paid the note or bill; and the bail cannot afterwards recover against the indorser in the name of the indorsee. On the principles of several cases it has been finally settled, that to entitle the indorsee to recover against the indorser of an inland bill of exchange, it is not necessary to demand the money of the first drawer.

By the stat. 3 & 4 Ann. c. 9. § 7. it is enacted, that if any person accept a bill of exchange for and in satisfaction of any former debt or sum of money formerly due to him, this shall be accounted and esteemed a full and complete payment of such debt; if such person, accepting any such bill for his debt, do not take his due course to obtain payment of it, by endeavouring to get the same accepted and paid, and make his protest according to the directions of the act, either for non-acceptance or non-payment.

Where a privity exists between the parties in a bill of exchange, an action of debt, or of "indebitatus assumpsit," may be maintained; but where it does not exist, neither of these actions will lie. A privity exists between the payee and the drawer of a bill of exchange; the payee and drawer of a promissory note; the indorsee and his immediate indorser of either the one or the other; and perhaps between the drawer and acceptor of a bill; provided that, in all these cases, a consideration passed respectively between the parties. But no privity is supposed to exist between the indorsee and acceptor of a bill, or the maker of a note, or between an indorsee and a remote indorser of either.

The action which is now brought on a bill of exchange, is a special action on the case, founded on the custom of merchants. This custom was not at first recognized by the court, unless

it was specially set forth; but when this custom was recognized by the judges as part of the law of the land, and they declared they would take notice of it "ex officio," it became unnecessary to recite the custom at full length; a simple allegation that "the drawer, mentioning him by his name, according to the custom of merchants, drew his bill of exchange, &c." was sufficient. If the plaintiff, adhering to former precedents, thought proper to recite the custom in general terms, and did not bring his case within the custom so set forth; yet if by the law of merchants, as recognized by the court, the case as stated, entitled him to his action, he might recover; and the setting forth of the custom was reckoned surplusage, and rejected. Whether the drawer of a bill, or the indorser of a bill or of a note, receiving the bill or note in the regular course of negotiation before it has become due, can maintain an action on it against the acceptor or maker, in the character of indorsee, seems undecided; but there is a case which clearly shews that a drawer or indorser cannot maintain an action in the character of indorsee, "where the indorsement is after the refusal of payment;" because when a bill is returned unpaid, either on the drawer or indorser, its negotiability is at an end. The action, therefore, in which the drawer or indorser, after payment of the money in default of the acceptor, may recover, the first against the acceptor, and the latter against any of the preceding parties, must be brought in their original capacity as drawer or indorser, and not as indorsee. If the drawee, without having effects of the drawer, accept and duly pay the bill without having it protested, he may recover back the money in action for money paid, laid out, and expended to the use of the drawer. Instead of bringing an action on the custom, or on the statute, the plaintiff may in many cases use a bill or note only as evidence in another action; and if the instrument want some of the requisites for making it a good bill or note, the only use he can make of it is to give it in evidence.

The holder of the bill or note may sue all the parties who are liable to pay the money; either at the same time, or in succession; and he may recover judgment against all, if satisfaction be not made by the payment of the money before judgment obtained against all; and proceedings will not be staid in any one action, but on payment of the debt and costs in that action, and the costs in all the others in which he has not obtained judgment. But though he may have judgment against all, yet he can recover but one satisfaction; and though he be paid by one, he may sue out execution for the costs in the several actions against the others. To this action the defendant may plead the statute of limitations; and by the express provision of the statute of queen Anne, all actions on promissory notes must be brought within the same time as is limited by the statute of James, with respect to actions on the case. And to this plea it is no good replication, that it was on account between merchants, where it appears to be for value received.

As the action on a bill of exchange is founded on the custom of merchants, so that on a promissory note is founded on the statute 3 & 4 Ann. c. 9. In both cases, however, it is necessary, that all those circumstances should be expressly stated, or clearly and inevitably implied, which, according to the characters of the parties to the action, must necessarily concur, in order to entitle the plaintiff to recover. In stating the bill or note, regard must be had to the legal operation of each respectively. It has been decided, that the legal operation of a bill or of a note, payable to a fictitious payee, is, that it is payable to the *bearer*; and therefore it is proper in the statement of such a bill, to allege that the drawer thereby requested the drawee to pay so much money to the bearer;

bearer; and in the statement of such a *note*, that the maker thereby promised to pay such a sum to the bearer.

As to the *proof* that is necessary in actions on bills or notes, we may observe, that the plaintiff must, in all cases, prove so much of what is necessary to entitle him to his action, and of what must be stated in his declaration, as is not, from the nature of the thing, and the situation of the parties, necessarily admitted. In an action against the acceptor, it is a general rule that the drawer's hand-writing is admitted; that of the acceptor must of course be proved; and that of every person, through whom the plaintiff, from the nature of the transaction, must necessarily derive his title. On a bill payable to *bearer*, in an action against the acceptor, he has only to prove the hand-writing of the acceptor himself; but in case of a bill payable to *order*, the plaintiff must prove the hand-writing of the very payee who must be the first indorser. In case of a transfer by delivery, the plaintiff may be called upon to prove that he gave a good consideration for the bill or note, without the knowledge of its having been stolen, or of any of the names of the blank indorsers having been forged. In an action by the indorsee against the drawer, the same rules obtain with respect to proof of the hand-writing of the indorsers, as in an action against the acceptors. That of the drawer himself must of course be proved; and it must also be proved that the plaintiff has used due diligence. From the rule, that in an action against the drawer or acceptor of a bill payable to order, there must be proof of the signature of the payee, first indorser, and all those to whom an indorsement has been specially made, arose the question, which long and greatly agitated the commercial world, on the subject of indorsements in the name of "fictitious payees." A bill, payable to the order of a fictitious person, and indorsed in a fictitious name, is not a novelty among merchants and traders. But in the years 1786, 7, and 8, two or three houses, having connection in trade, and entering into engagements far beyond their capital, under an apprehension that the credit of their own names would not be sufficient to procure currency to their bills, adopted, to a very extensive degree, a practice which had before been found convenient on a smaller scale. For a considerable time, whilst money could be procured for the payment of these bills by the acceptors or drawers, and they had sufficient credit with the holder to have them renewed, the subject of these fictitious indorsements was not questioned. But when credit failed, and a commission of bankruptcy became necessary, the other creditors felt it their interest to resist the claims of the holders of these bills, and insisted that they should not be allowed to prove their debts, because they could not conform to the general rule of law, requiring proof of the hand-writing of the first indorser. The chancellor, when the question came before him by petition, directed trials at law. From the decisions in consequence of these trials, the principal of which was affirmed in the House of Lords, and which have settled that such bills are to be considered as payable to *bearer*, it follows, that proof of the acceptor's hand only is sufficient to entitle the holder to recover on the bill; and in a particular case, where the bill was drawn by the defendant and others on the defendant, it was determined that a *bonâ fide* holder for a valuable consideration might recover the amount against the acceptor in an action for *money paid, or money had and received*. The effect of the determination of the judges in the House of Lords, with respect to the principal case above alluded to, is as follows. If a bill of exchange be drawn in favour of a fictitious payee, with the knowledge as well of the acceptor as the drawer; and the name of such payee be indorsed on it by the drawer, with the knowledge of the acceptor, which fictitious indorsement

purports to be to the drawer himself or his order; and then the drawer indorses the bill to an innocent indorser for a valuable consideration, and afterwards the bill is accepted; but it does not appear that there was an intent to defraud any particular person; such innocent indorsee for a valuable consideration may recover against the acceptor, as on a bill payable to bearer. Perhaps also, in such case, the innocent indorsee might recover against the acceptor, as on a bill payable to the order of the drawee, or on a count stating the special circumstances. On other cases, afterwards brought before the House of Lords on demurrers to evidence, the judges gave their opinion, that it was not competent to the defendants to demur; and that on the record, as stated, no judgment could be given. The whole disclosed a system of bill-negotiation to the amount of a *million a year*, on fictitious credit, which ended in the bankruptcy of many; but which had at least the good effect of shewing that the obligations of law are not so easily eluded as those of honour and conscience.

In an action by an indorsee against an indorser, it is not necessary to prove either the hand of the drawer or of the acceptor, or of any indorser before him against whom the action is brought, every indorser being, with respect to subsequent indorsees or holders, a new drawer. Where an action is by one indorser, who has paid the money, proof must be given of the payment. In an action by the drawer against the acceptor, where the bill has been paid away and returned, it is necessary to prove the hand-writing of the latter, demand of payment by him, and refusal, the return of the bill, and payment by the plaintiff. In an action on the case by the acceptor against the drawer, the plaintiff must prove the hand-writing of the defendant, and payment of the money by himself; or something equivalent, as his being in prison on execution. Where a bill is accepted, or a bill or note is drawn or indorsed, by one of two or more partners, on the partnership's account, proof of the signature of the party accepting, drawing or indorsing, is sufficient to bind all the rest. When a servant has a general authority to draw, accept, or indorse bills or notes, proof of his signature is sufficient against the master; but his authority must be proved, as that it was a general custom for him to do so, &c. An action on a bill of exchange being by an executor, and upon a debt laid to be due to testator, it was held necessary to prove that the acceptance was in the life-time of the testator. Where the defendant suffers judgment by default, and the plaintiff executes a writ of inquiry, it is sufficient for the latter to produce the note or bill, without any proof of the defendant's hand; and on such judgment, a writ of inquiry seems now to be unnecessary.

As to the different subjects of *defence*, with regard to bills of exchange and notes, the most usual are those which arise either from the total want of consideration, or from the illegality of the consideration for which the bill or note was given. See *CONSIDERATION*.

If a bank-bill, payable to A. B. or bearer, be lost, and it is found by a stranger, payment to him would indemnify the bank; yet A. B. may have trover against the finder, though not against his assignee for valuable consideration, which creates a property. If the possessor of a bill accidentally loses it, he must cause intimation to be made by a notary public before witnesses, that the bill is lost or mislaid, and requiring that payment be not made of the same to any person without his privity. And by stat. 9 & 10 W. III. c. 17. if any inland bill of exchange for 5l. or upwards shall be lost, the drawer of the bill shall give another of the same tenor, security being given to indemnify him, in case the bill so lost be found again. If a bill lost by the possessor should

should afterwards come into the possession of any person, who pays a full and valuable consideration for it, without knowledge of its having been lost, the drawer and acceptor, if the bill was accepted, must pay it when due to such fair possessor, so that the provisions of the statute may, in many cases, be useless to the loser of the bill. But against the person who finds the bill, the real owner may maintain an action of trover. Stealing bills of exchange, notes, &c. is felony in the same degree as if the offender had robbed the owner of so much money, &c. And the forging of bills of exchange, or notes of money, indorsements, &c. is felony, by stat. 2 Geo. II. c. 25. 9 Geo. II. c. 18. See also stat. 31 Geo. II. c. 22. § 78. Blackst. Com. vol. ii. p. 466. Jacob's Law Dictionary, by Tomlins, vol. i. art. *BILL*.

BILL of Indictment. See *BILL* above, and *INDICTMENT*.

BILL of Interpleader. See *INTERPLEADER*, and *SUIT in Equity*.

BILL of Middlesex, which was formerly always founded on a "plaint" of trespass *quare clausum fregit*, entered on the records of the court, is a kind of "capias," directed to the sheriff of that county, and commanding him to take the defendant, and have him before our lord the king, at Westminster, on a day prefixed, to answer to the plaintiff of a plea of trespass. This bill of Middlesex must be served on the defendant by the sheriff, if he finds him in that county; but if he returns "non est inventus," then there issues out a writ of "latitat" to the sheriff of another county, as Berks; which, in the court of king's bench, is similar to the "testatum capias" in the common pleas, and recites the writ of Middlesex, and the proceedings thereon; and that it is testified, that the defendant "latitat et discerit," lurks and wanders about in Berks; and therefore commands the sheriff to take him, and have his body in court on the day of the return. But, as in the common pleas, the "testatum capias" may be sued out upon only a supposed, and not an actual, preceding "capias;" so, in the king's bench, a "latitat" is usually sued out upon only a supposed, and not an actual, "bill of Middlesex:" so that, in fact, a "latitat" may be called the first process in the court of king's bench, as the "testatum capias" is in the common pleas. Yet, as in the common pleas, if the defendant lives in the county wherein the action is laid, a common "capias" suffices; so, in the king's bench likewise, if he lives in Middlesex, the process must still be by "bill of Middlesex" only.

BILL, Navy. See *NAVY*.

BILL, in *Parliament*, denotes a paper containing propositions offered to the houses, to be passed by them, and then to be presented to the king to pass into an act or law: for the mode of presenting and conducting of which, see *PARLIAMENT*.

BILLS, Lombard, are instruments of an uncommon kind and figure, used in Italy and Flanders, and also in France; consisting of a piece of parchment, cut to an acute angle about an inch broad at top, and terminating in a point at bottom; chiefly given where private persons are concerned in the fitting out a ship for any long voyage.

The manner is this: the party who is desirous to be concerned in the cargo or venture, carries his money to the merchant, who fits out the ship, where it is entered down in a register. At the same time, the merchant writes down on a piece of parchment, upwards of an inch broad, and seven or eight inches long, the name of the lender, and the sum lent, which being cut diagonal-wise, or from corner to corner, each party retains his half. On the return of the vessel, the lender brings his moiety to the merchant, which

being compared with the other, he receives his dividend accordingly. Much the same is practised in Holland by those who lend money on pledges: the name of the borrower, and the sum, are written on a like slip of parchment, which is cut in two, and half given to the borrower, and the other half stitched to the pledge; that, upon comparing them together again, the borrower may receive his goods, on paying the money stipulated.

BILL, to note a. See *NOTE*, and *BILL of Exchange*.

BILL, to protest a. See *PROTEST*, and *BILL of Exchange*.

BILLS, bank, are notes or obligations signed in behalf of the company of the bank, by one of their cashiers, for value received. See *NOTE*, and *BILL of Exchange*.

BILL of credit. See *CREDIT*.

BILL of entry, an account of goods entered at the custom-house, both inward and outward; in which are expressed, the name of the merchant importing or exporting, the quantity, number, and mark of the goods, and place from or to which they are imported, or to be exported.

BILL of lading, an instrument signed by the master of a ship, acknowledging the receipt of a merchant's goods, and obliging himself to deliver them at the place to which they are consigned, in good condition. Of such bills there are usually three: the *first*, kept by the merchant; the *second*, sent to the factor to whom the goods are consigned; and the *third*, kept by the master of the ship. See *CHARTER-PARTY*.

BILLS of mortality, are weekly lists compiled by the parish-clerks in and about London, containing the numbers of such as die of each disease, as well as of those that are born every week. See *MORTALITY*.

BILL of parcels, an account of the particular sorts and prices of goods bought, given by the seller to the buyer.

BILL of rights. See *RIGHTS*.

BILL of sale, is an instrument or writing which a person, wanting a sum of money, and delivering goods as a security to the lender, gives to him, empowering him to sell the said goods, in case the sum borrowed is not repaid, with interest, at the time appointed. See *SALE*.

BILL of store, a licence granted at the custom-house to merchants, to carry such stores and provisions as are necessary for their voyage, custom-free.

BILL of sufferance, a licence granted at the custom-house to a merchant, to suffer him to trade from one English port to another, without paying custom.

BILL, or *BEAK, rostrum*, in *Ornithology*, the elongated horny processes or mandibles of birds. The form of the bill varies so greatly in different kinds of birds, that they afford the most permanent character by which these creatures may be arranged. In the distribution of families, Linnaeus first notices the structure of the bill, the tongue, and nostrils; and these parts constitute almost exclusively (with the legs) the distinction of the genera likewise. See *ORNITHOLOGY*, and *Anatomy of BIRDS*.

The *PHOENICOPTER's* bill is a true *hyperbola*, pointed at the end like a sword; and what is remarkable, the upper bill of this bird moves in eating, the lower being fixed, which is the contrary of what is found in all other kinds. The wood-pecker's bill is strong, and sharp enough to dig holes, and build in the heart of the hardest timber. See *PHOENICOPTERUS* and *PICUS*. Phil. Trans. N^o 211, p. 155. N^o 350, p. 509.

In the island of Ferro, a fixed reward is given for the bills of ravenous birds. All watermen are obliged to bring a certain number yearly to the country courts, at the feast of St. Olaus; when they are thrown into a heap, and burnt in triumph. Plott gives divers instances of monstrous irregularities

gularities in the bills of birds; particularly of a raven, whose mandibles crossed each other, the lower chap turning upwards, and the upper downwards. Plott's Nat. Hist. Stafford. ch. vii. § 4.

BILLA VERA, *the bill is true*. The grand jury indorsing a bill whereby any crime punishable in that court, is presented to them, with the words *billā vera*, signify thereby, that the presenter has furnished his presentment with probable evidence, and worthy of farther consideration; whereupon the party presented is said to stand indicted of the crime, and bound to make answer thereto, either by confessing or traversing the indictment. See **BILL** in *Law*, *supra*.

BILLANCOURT, in *Geography*, a town of France, 4 miles S.W. from Paris.

BILLARD, or **BILLET**, in *Ichthyology*, an English name, in some places, for the young coal-fish, *gadus carbonarius*, when a year old; measuring at that time from 8 to 10 or 15 inches in length.

BILLAU, in *Geography*, a river of Silesia, which runs into the Neys, near the town of Neys.

BILLE, a town of France, in the department of the Ille and Vilaine, and the chief place of a canton; in the district of Fougères, 1½ league south of Fougères.

BILLEKA, a town of Poland, in the palatinate of Lemberg, 10 miles east of Lemberg.

BILLERBEECK, a town of Germany, in the circle of Westphalia, and bishopric of Münster, 5 miles N.N.E. from Coesfeld.

BILLERICA, a township in Middlesex county, Massachusetts, in America, incorporated in 1655, containing 1200 inhabitants, lying 20 miles north of Boston, and watered by Concord and Shawheen rivers, which run north-easterly into Merrimack river.

BILLERICAY, in *Geography*, a market-town of Essex, England; is built on a fine eminence, commanding a view of a rich vale between the town and the river Thames. Though enjoying the advantage of a weekly market on Tuesdays, it is only a hamlet in the parish of Great Burstead, the church of which is situate about one mile and a half south of this place. For the accommodation of the inhabitants, a chapel is endowed and supported in the town. Here are two annual fairs: and the whole parish contains 250 houses, and 1472 inhabitants. Billericay is 23 miles N.E. from London. Morant's history of Essex.

BILLESDON. See **BILSTON**.

BILLET. See **HEADBOROUGH**.

BILLET, or **BILLETTE**, in *Heraldry*, signifies a figure whose length exceeds its breadth: when the arms are charged with several of them, they are then called *Billettee*. The royal arms of Nassau, prince of Orange, is *Jupiter Billettee sol, a lion rampant of the last*. Authors differ much in regard to the antiquity of the billet, which was evidently a piece of wood cut in the form of a parallelogram, and retains that name and shape to this day.

BILLET, *Billette*, in the *French Customs*, a little sign in form of a cast, hung up at places where toll is to be paid, to advertise passengers and carriages, that before they advance farther, the dues are to be paid to the king, or the lord who is charged with the care of repairing the high-ways.

BILLETS for fuel, are small pieces of wood, which must be 3 feet 4 inches long, and 7½ in compass, &c. Justices of peace shall enquire, by the oaths of six men, of the affize of billets; and those which are under size are forfeited to the poor. Stat 43 Eliz. c. 14. 9 Ann. c. 15. 10 Ann. c. 6. See **FUEL**.

BILLETS of gold, denote wedges or ingots of gold, mentioned in the ita. 27 Ed. 3. c. 27.

BILLETING of soldiers, in *Military Language*, is the lodging or quartering of them in the houses of the inhabitants of a place. This is done by a ticket, called a *billet*, which entitles each soldier, by act of parliament, to candles, vinegar, salt, and either small beer or cyder, not exceeding five pints per day, gratis; with the use of fire, and the necessary utensils for dressing and eating their meat.

BILLETING, among *Sportsmen*, denotes the ordure and dung of a fox.

BILLETINS. See **BROTHERS of Charity**.

BILLI, JAMES DE, in *Biography*, a French Jesuit, was born in Compiègne in 1602, and entered the society of Jesuits in 1619. He taught philosophy for three years, and was a preacher for more than twenty years. He was rector of Chalons, Langres, and Sens; but he is best known by his mathematical writings, which are as follow: "Nova Geometriæ Clavis Algebra," Paris, 1643, 4to.; "Tabulæ Lodoicæ de doctrina eclipsion," Dijon, 1658, 4to.; "Tumulus Astrologiæ Judiciariæ," Paris, 1659, 4to.; "Diophantus Geometra," Paris, 1660, 4to.; "Opus Astronomicum, &c." Dijon, 1661, 4to.; "Décours de la Comete qui a paru l'an 1665, au mois d'Avril," Paris, 1665, 4to.; "Crisis Astronomica de motu Cometarum," Dijon, 1666, 8vo.; "Doctrinæ analyticæ inventum novum," Toulouse, fol. Moreri.

BILLIARDS, an ingenious kind of game played with two small ivory balls, on an oblong table, covered with green cloth, and placed exactly level; which balls are driven, by sticks made on purpose, alternately against each other, with a view to push the passive ball into hazards, or holes, on the edges and corners, according to certain laws or conditions of the game.

The word comes from the French *billiard*, of *bile*, the ball made use of; and that from the Latin *pila*, a ball.

This game was invented by the French, and practised by the Germans, Dutch, and Italians; and is now a favourite diversion among persons of the first rank in many parts of England. The table on which it is played is about 12 feet long, and 6 wide; and not only covered with green cloth, but surrounded with cushions to prevent the balls from rolling off, and to make them rebound. It has six holes, nets, or pockets, which are fixed on the four corners, and in the middle, opposite to each other, for receiving the balls, which, when put into these holes, are called hazards. The making of a hazard, or putting the adversary's ball into the hole at the usual game, is reckoned for two in favour of the player.

The game is played with sticks, called maces, or with cues. The mace is a long straight stick, with a head at the end, and is the most powerful instrument of the two: the cue is a thick stick decreasing gradually to a point of about half an inch in diameter: this instrument is played over the left hand, and supported by the forefinger and thumb. This is the only instrument in vogue abroad, and is used with astonishing address by the Italians, and some of the Dutch; but in England the mace is the prevailing instrument, though regarded with some degree of contempt by foreigners, as the use of it does not require so much address as the cue; however, the mace is used for the peculiar advantage of "trailing," as it is called; or of following the ball with it to such a convenient distance from the other ball as to make it an easy hazard. The several degrees of trailing are variously denominated by the connoisseurs; e. g. the shove, the sweep, the long stroke, the trail, and the dead

trail

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trail or turn up, all which secure certain advantages to a good player; and even the butt-end of the cue becomes very powerful, when it is made use of by a good trailer. The varieties of this game are denominated the "white winning game," the "white losing game," the "red or carambole winning game," and the "red losing game." The game usually played is the first of these, and 12 is the number. The rules for this game are as follow: 1. String for the lead and choice of balls; the person who does this must stand within the limits of the corner of the table, and not place his ball beyond the stringing nails or spots: the lead is won by him who brings his ball nearest the cushion. 2. If after the first person has strung for the lead, the adversary should make his ball touch the other, he loses the lead; and if the player holes his own ball in stringing or leading, he loses the lead. 3. If the leader follows his ball with either mace or cue beyond the middle hole, it is no lead; and it is at the option of his adversary to make him lead again. 4. The striker who plays at the lead must stand with both his feet within the limits of the corner of the table, and not place his ball beyond the stringing nails; and his adversary (only) is bound to see that he stands and plays fair; otherwise the striker wins all the points he made by the stroke. 5. When a hazard has been lost in either of the corner holes, the leader is obliged, if his adversary require it, to lead from the end of the table, where the hazard was lost; but if the hazard was lost in either of the middle holes, it is at the leader's option to lead from either end of the table. 6. If the striker does not hit his adversary's ball, he loses one point; and if by the said stroke his ball should go into a hole, over the table, or on a cushion, he loses three points; and he also loses the lead. 7. If the striker holes his adversary's ball, or forces it over the table, or on a cushion; or if he holes both balls, or forces them over the table, or on a cushion; in either case he loses two points. 8. No person has a right to take up his ball without permission from his adversary. 9. If the striker should touch or move his own ball, without intending to make a stroke, it is deemed an accident; and his adversary, if he require it, may put the ball back in the place where it stood. 10. If the striker force his adversary's ball over the table, and his adversary should chance to stop it, so as to make it come on the table again, the striker wins two points, if the striker should force his own ball over the table, and his adversary should chance to stop it so as to make it come on the table again, the striker loses nothing by the stroke, and has the lead; but if the striker misses the ball and forces it over the table, and it should be stopped by his adversary, he loses one point, and has the lead, if he chuses. 11. If the striker, in playing from a cushion or otherwise, by touching the ball, makes his mace or cue go over or beyond it, he loses one point; and, if his adversary require it, he may put the ball back, and make him pass the ball. 12. If the striker, in attempting to make a stroke, doth not touch his ball, it is no stroke; and he must make another trial; but if when the balls are near each other, the striker should accidentally make his ball touch the other, it is a stroke, though not intended. 13. If the striker who plays the stroke should make his adversary's ball go so near the brink of a hole, as to be judged to stand still, and afterwards fall into it, the striker wins nothing; and the ball must be put upon the same brink where it stood, for his adversary to play from the next stroke. 14. If the striker's ball should stand on the brink or edge of a hole, and if in playing it off he should make the ball go in, he loses three points. 15. If a ball should stand on the brink or on the edge of a hole, and should fall into the hole, before or when the striker has delivered his ball from the mace or cue,

so as to have no chance for his stroke, in that case the striker and his adversary's ball must be placed in the same position, as nearly as possible, and the striker must play again. 16. The striker is obliged to pass his adversary's ball, more especially if he misses the ball on purpose; and it is at the option of his adversary to oblige him to place the ball where it stood, and play until he has passed. 17. If the striker plays both balls from his mace or cue, so that they touch at the same time, it is deemed a foul stroke; or if the adversary discover it, and a dispute should arise, an appeal may be made to the company present; and the marker, if required, must go round the table to each person separately, and ask if he has any bet depending, and if he understands the game and the disputed subject; and if the company and marker determine it to be a foul stroke, it is at the adversary's option (if not holed) either to play at the ball, or to take the lead; but if the adversary doth not discover it to be a foul stroke, the striker may reckon all the points he made by the said stroke, and the marker is obliged to mark them: and no person has a right to discover to the player whether a stroke be fair or foul, unless he is asked. 18. If by a foul stroke the striker should hole his adversary's ball, he loses the lead; but if by such a stroke he holes his own or both balls, or forces his own or both over the table, or on a cushion, he loses two points. 19. If the striker plays on a ball when it is running or moving, it is deemed a foul stroke; and if he plays with both feet off the ground, without leave of his adversary, it is a foul stroke: if he plays with a wrong ball, he loses the lead, if his adversary require it. 20. If the ball should be changed in a hazard, or on a game, and it is not known by which party, the hazard must be played by each party with their different balls and then changed. 21. If the striker plays with his adversary's ball, and hole, or forces the ball at which he played over the table, &c. it is deemed a foul stroke. 22. If the striker plays with his adversary's ball and holes, or forces the ball with which he played over the table, &c. he loses two points; and if he missed the ball, three points. 23. If the striker plays with his adversary's ball and misses it, he loses one point; and if his adversary discovers that he hath played with the wrong ball, he may part the balls, and take the lead if he pleases. 24. In all these cases of the striker's playing with the wrong ball (if discovered), his adversary must play with the ball, at which the striker played throughout the hazard, or part the balls and take the lead. 25. Whoever stops a ball when running with hand, stick, or otherwise, loses the lead, if his adversary does not like the ball he has to play at the next stroke. 26. Whoever retains his adversary's stick when playing, it is deemed foul. 27. If the striker stops or puts his ball out of its course, when running towards either of the holes, and, if adjudged by the marker and company to be going into a pocket, if he misses the ball he loses one point, and if going into a hole by the same stroke, three points. 28. If the striker stops or puts his adversary's ball out of the course, when running towards or into a hole, or puts it into a hole, it is deemed a foul stroke. If the adversary does the same, as in the foregoing cases, he is subject to the same penalties as the striker. 29. He who shakes the table when the ball is running, or throws his stick across the table, so as to occasion any detriment to his adversary, or blows on the ball when running, makes in either case a foul stroke; and if his own ball was running towards or near the hole, when he blows on it, he loses two points. 30. He who leaves the game before it is finished, and will not play it out, loses the game. 31. Any person, whilst playing, may change his mace or cue; and neither party has a right to object to either mace or cue being played within the said game; but when the parties agree to play mace against

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cue, the mace-player hath no right to use a cue, and vice versa, without leave of the adversary. 32. When a person agrees to play with the cue, he must play every ball within his reach with its point, and if he agrees to play with the butt of the cue, he must not use the point, without permission; when the parties agree to play point and point of the cue, neither has a right to use a butt during the match, without permission; but they have a right to play with a long cue over a mace, &c. and when they agree to play all points with the same cue, they have no right to use any other during the game. 33. If it be proposed to part the balls, the proposer, if the adversary agree to it, loses the lead. 34. Two missings do not make a hazard, unless the contrary is previously settled. 35. The betters are to abide by the players on the determination of the hazard, or on the game; and they have a right to demand their money, when their game is over, to prevent disputes. 36. The striker has a right to command his adversary not to stand facing him, or near him, so as to annoy or molest him in the stroke. 37. Each person is to attend to his own game, without asking questions. 38. No person in the room has a right to lay more than the odds on a hazard or game; and in questionable cases appeal should be made to the marker, or to the table of odds hung up in the room. 39. When four persons play, the game is fifteen in number; and each party has a right to consult with and direct his partner in any matter respecting the game, &c.

The "white losing-game" is the common winning-game, and twelve is the number. This depends entirely upon the defence, and the knowledge of the degree of strength with which each stroke should be played, either to defend or make a hazard; for if a person who has a competent knowledge of the game should not have a hazard to play at, he must endeavour to lay his own ball in such a position, that his adversary may not have one to play at the next stroke. In this game, if the striker misses the ball, he loses one, and if by the same stroke his ball goes into a hole, he loses three points; if he strikes his adversary's ball he loses two points; if either or both balls be forced over the table, or on a cushion, nothing is reckoned, and the striker loses the lead, but if he misses his adversary's ball, and forces his own over the table, &c. he loses one point and the lead; if either of the parties forces either or both balls over the tables, he reckons nothing, and the striker loses the lead; if the striker holes his own ball, he wins two points; if he holes both balls, he wins four points; if he holes either ball, and forces the other over the table, &c. he only loses the lead. The "winning and losing game" is a combination of both games; in which all balls that are put in by striking first the adversary's ball, reckon towards game; and holing both balls reckons four. At this game and the losing, knocking over, or forcing the balls over the cushion, goes for nothing; the striker only losing the lead. The "choice of balls" is choosing each time which ball the player pleases, which is without doubt a great advantage, and is generally played against losing and winning.

"Bricole," is being obliged to hit a cushion, and make the ball rebound or return to hit the adversary's ball, otherwise the player loses a point. This is a great disadvantage, and is reckoned between even players to be equal to receiving about eight or nine points.

"Caranbole," is a game newly introduced from France. It is played with three balls, one being red, which is neutral, and is placed upon a spot on a line with the stringing nail, (*i. e.* that part of the table from whence the player strikes his ball at first setting off, and which is generally marked with two brass nails). Each antagonist, at the first stroke of a hazard, plays from a mark which is upon a line with it at

the other end of the table. The chief object at this game is, for the player to hit with his own ball the two other balls: which is called a *caranbole*, and by which the player wins two. If he puts in the red ball he gets three, and when he holes his adversary's ball he gets two; so that seven may be made at one stroke, by caranboling and putting in both balls. This game resembles the losing, depending chiefly upon particular strengths, and is generally played with the cue. The game is fifteen up; nevertheless it is reckoned to be sorer over than the common game. The next object of this game, after making what we have distinguished by the *caranbole*, is the *lank*; that is, making the white ball, and bringing the player's own ball and the red one below the stringing nail, from whence the adversaries begin. By this means the opponent is obliged to play bricole from the opposite cushion; and it often happens that the game is determined by this situation.

"The Russian caranbole," is a game that has still more lately been introduced from abroad, and is played in the following manner: The red ball is placed as usual on the spot made for that purpose; but the player, when he begins, or after having been holed, never places his ball on any particular place or spot; being at liberty to put it where he pleases. When he begins to play, instead of striking at the red ball, he leads his own gently behind it, and his antagonist is to play at which he thinks proper; if he plays at the red ball and holes it, he scores three as usual towards the game, which is twenty-four instead of sixteen points; and the red ball is put upon the spot again: at which he may strike again, or take his choice which of the two balls to push at, always following his stroke till both balls are off the table. He is entitled to two points each time that he caranboles, the same as at the other game; but if he caranboles and puts his own ball into any hole, he loses as many as he might have got had he not holed himself; for example, if he strikes at the red ball, which he holes, and at the same time caranboles and holes himself, he loses five points; and if he holes both balls when he caranboles, and likewise his own, he loses seven, which he would have got if he had not holed his own ball. In other respects it is played like the common caranbole game.

"The Bar-hole," is so called from the hole being barred which the ball should be played for, and the player striking for another hole; when this game is played against the common game, the advantage for the latter, between equal players, is reckoned to be about six.

The player at the *one-hole*, though it seems to those who are not judges of the game to be a great disadvantage, has in fact the best of it; for as all balls that go into the one-hole reckon, the player endeavours to lay his ball constantly before that hole, and his antagonist frequently finds it very difficult to keep one or other ball out, particularly on the leads, when the one player lays his ball (which he does as often as he can) on the brink of the hole; leading for that purpose from the opposite end, which in reality he has no right to do; for the lead should be given from the end of the table at which the hazard is made; but when a person happens to be a novice, this advantage is often taken.

"The four game," consists of two partners on each side, as the common winning game; who play by succession after each hazard, or two points lost. The game is fifteen up; so that the point or hazard is an odd number, which makes a miss at this game of more consequence than it is at another; being as much at four, six, or eight, as it is at five, seven, or nine, at the single game.

"Hazards," are so called because they depend entirely upon the making of hazards, there being no account kept

of any game. Any number of persons may play by having balls that are numbered; but the number seldom exceeds six, to avoid confusion. The person whose ball is put in, pays so much to the player according to what is agreed to be played for each hazard; and the person who misses, pays half the price of a hazard to him whose ball he played at. The only general rule is, not to lay any ball a hazard for the next player, which may be in a great measure avoided, by always playing upon the next player, and either bringing him close to the cushion, or putting him at a distance from the rest of the balls. The table, when hazards are played, is always paid for by the hour.

BILLIAT, in *Geography*, a town of France, in the department of the Ain, and chief place of a canton, in the district of Nantua, $2\frac{1}{2}$ leagues S. E. of Nantua.

BILLICHA, in *Ancient Geography*, a river of Asia in Mesopotamia, which rises in the mountains of Ofroene, south of Edessa, and pursuing a south-easterly course, discharges itself into the Euphrates, at the town of Nicephorum.

BILLIGHEIM, in *Geography*, a town of Germany, in the palatinate of the Rhine, $\frac{1}{2}$ miles S. of Landau, and 16 S. W. of Spire.

BILLIGRATZ, a town of Germany, in the duchy of Carniola, $\frac{1}{2}$ leagues N. of Laubach.

BILLINGEN, a town of the Netherlands, in the duchy of Luxemburg, 20 miles E. of Spa.

BILLINGSGATE, a fish-market of London, kept every day, and the toll of which is appointed by statute. All persons buying fish in this market may sell the same in any other market by retail, but none but fishmongers are allowed to sell it in shops: and if any person shall buy any quantity of fish at Billingsgate for others, or any fishmonger shall engross in the market, they incur a penalty of 20*l*. Fish imported by foreigners shall be forfeited, and the vessel &c. 10 & 11 Wil. III. c. 24. 1 Geo. I. stat. 2. c. 18. § 1. &c.

BILLINGSPOURT, a place on the river Delaware, in America, situate 12 miles below Philadelphia, which was fortified in the late war, for the defence of the channel, and opposite to which were sunk frames of timber, headed with iron spikes, called chevaux-de-frize, in order to prevent the British ships from passing. After the war they were raised by a curious machine, invented at Philadelphia for this purpose.

BILLIS, in *Ancient Geography*, a small river of Asia Minor, on the frontiers of Paphlagonia, on the borders of which was seated the town of Teium, mentioned by Sallust.

BILLITON, in *Geography*, one of the Sunda islands in the Indian ocean, N. E. of the lower part of Sumatra, and E. of Banca. (See *Straits of BANCA*.) S. lat. between $2^{\circ} 30'$. and $3^{\circ} 30'$. E. long. between $107^{\circ} 45'$. and $108^{\circ} 26'$.

BILLOM, a town of France, and principal place of a canton, in the district of Clermont, and department of Puy-de-Dome, $\frac{1}{2}$ leagues E.S.E. from Clermont. The town contains 5,110 inhabitants, and the canton 13,711. The territorial extent comprehends 115 kilometres, and 10 communes. N. lat. $45^{\circ} 43'$. E. long. $3^{\circ} 14'$.

BILLON. **BILLIO**, in *Coinage*, a kind of base metal, either of gold or silver, in whose mixture copper predominates.

The word is French, formed, according to Menage, from the Latin *bullia*, or *bullo*, *bullion*. According to M. Bouteroue, billon of gold is any gold beneath standard, or twenty-one carats; and billon of silver, all below ten penny-weights. But, according to others, and among the rest, M. Bonard,

gold and silver beneath the standard, as far as twelve carats, and six penny-weights, are properly base gold and silver, and all under those billon of gold, and billon of silver, because copper is the prevailing metal. The writers on numismatic science appropriate the term billon to signify metals of copper alloyed with a very small quantity of silver.

BILLS, in *Geography*, a rock in the Atlantic, near the west coast of Ireland, 6 miles N.W. from the island of Clare, and 6 S. S. E. from Achill-head.

BILLY, **JAMES DE**, in *Biography*, was born in 1535, at Guise in Picardy, and devoting himself to study, he entered the church, in which he possessed some benefices. After suffering considerably in the civil wars, he retired to Paris, and died in the house of his friend Gilbert Genebrard, in 1581. His works, both in prose and verse, were numerous; but the most valuable are his Latin translations of the Greek fathers: such are, "S. Gregorii Nazianzeni opera omnia," fol. 1569 and 1583; "Interpretatio Latina 18 priorum libri S. Irenæi adv. Hæres. capitum," fol. 1577; "S. Joh. Damasceni opera," fol. 1577; "Isidori Pelusiote: Epistolæ, Gr. & Lat. (3 first books,) fol. 1587;" and translations of some pieces of St. Chrysostom, inserted in the Paris editions of his works, in 1581, &c. Moreri.

BILLY, in *Geography*, a town of France, in the department of the Allier; $\frac{1}{2}$ leagues N. E. from Gannat.

BILMA, a desert country in the north of Africa, being a part of the Great Desert, or Sahara, and a prolongation of the Libyan desert to the S. W. bounded on the N. by the Tibesti mountains, and the desert of Berdoa, on the E. by Kaware or Kuar, on the S. by Bornou, and on the W. by Zegzeg, Agades, Afouda, Ganat, &c. N. lat. about 23° to 25° . W. long. about 20° . The salt lake of Dumboo, the Chelonides Palus of Ptolemy, is said to be situated in the desert of Bilma.

BILOBUS, in *Entomology*, a species of *SCARABÆUS*, with two prominent lobes on the thorax; a simple horn on the head, and wing-cases striated. Inhabits the south of Europe. Fabricius.

BILOBUS, a species of *DYTISCUS*, of an oblong-ovate form and black; mouth, vertical two-lobed spot, thorax, sutural line, base, and margin of the wing-cases yellow. Linn. Mus. Lestk.

BILOBUS, a species of *CINEX* (*Spinifus*), with an obtusely-dentated thorax; wing-cases greyish or reddish; vent with two lobes. Linn. Mus. Lestk. A native of Europe.

BILOBUS, in *Ornithology*, a species of *CHARADRIUS*, called the *Wattled Plover*, by Latham. It is an inhabitant of the coast of the Malabar. The bill and legs are yellow; frontal skin naked, and pendulous in two pointed lobes; body above yellowish grey: beneath white. Gmelin, &c. The crown, band on the tail, and quill-feathers are black; band across the eyes, greater wing-coverts, and some of the tail-feathers at the end white. This is *Pluvier à l'ombreau* of Buff. Hist. Ois. and *Pluvier de la côte de Malabar* of Pl. enl. of the same author. Length nine inches and a half.

BILOCULAR, in *Botany*, a term applied to a *capsule*, having two cells.

BILOIYAR, in *Geography*, a town of Russia, in the government of Simbirsk, on the east side of the Volga, 10 miles S. E. of Simbirsk.

BILLS, or **BILSIUS**, **LOUIS DE**, of Rotterdam, in Holland, in *Biography*, acquired much fame for a time, about the middle of the 17th century, for a supposed new method of preserving bodies from putrefaction, and of dissecting them without occasioning an effusion of blood. By his method of preparing the bodies, they were said to preserve their flexibility as well as freedom from putridity for ages; so that they

they might be dissected during the summer, and remain under the demonstrator's hands for weeks, months, or years, if necessary, without emitting any offensive smell. De Bils had the art of gaining so much credit to his professions, that he is said, by Haller, to have sold his secret to the university of Louvain for 22,000 florins. He had demanded a much larger sum, and certainly had his preparations answered the high elogia bestowed on them by his favourers, the secret would have deserved it. Prior to the sale he had sent one of his bodies to the theatre at Leyden, at which Deusingius, one of his warmest admirers says, "sed fidem superat omnem, exsiccatum hominis cadaver, recenter mortuum diceret, tanto theatro dignissimum opus." De admiranda anatome, nobilissimi viri L. D. Bils, p. 362. But not contented with the fame and money acquired by his secret, for he sold his prepared bodies at high prices, he pretended to have made discoveries in the structure of the liver, and in the lymphatics, by which he exposed himself to deserved contempt, it appearing that he was totally ignorant of the art of anatomy, in which he affected to be a master. He is said to have died phthisical from the effects of the putrid air inhaled while preparing his bodies, and in a few years his preparations, which were to have lasted for ages, were totally destroyed. His productions, which were numerous, and excited much interest at the time, were collected and published in 1692, in 4to. under the title of, "De Bils inventa anatomica antiquo-nova cum clarissimorum virorum epistolis, et testimoniis, ubi annotationes Joannis ab Hoorne, et Pauli Barbette, refutantur, interprete Gedeone Buenio. Amst.

BILSAH, in *Geography*, a city of Hindoostan, and capital of a circar in the Malwa country; 416 miles S. W. of Benares, 867 N. W. of Calcutta, by Gurry Mundlah, 560 N. W. of Hyderabad, 367 S. W. of Lucknow, 249 N. W. of Nagpour, 140 nearly E. of Ougein, and 496 N. E. of Poonah. Bilshah, which is almost in the heart of India, affords tobacco of the most fragrant and delicious kind throughout that whole region, and which is distributed accordingly. N. lat. 23° 30'. E. long. 77° 53'.

BILSEN, a town of Germany, in the circle of Westphalia, and bishopric of Liege, chief place of a canton in the district of Maestricht, and department of the Lower Meuse, seated on the Demer, possessing the privileges of a city, but of no great consideration, 14 miles N. of Liege. The town contains 1925 persons, and the population of the canton includes 9388. The territory comprehends 170 kilometres, and 16 communes.

BILSKOI, a town of Siberia, on the Bilaia, 90 miles N. W. of Irkutsk.

BILSON, THOMAS, in *Biography*, a learned prelate of the English church, was born at Winchester, and educated at Wykeham's school near his native city. In 1565, he was admitted fellow of New College, Oxford, after having served two years of probation. He took in due course his several degrees of bachelor and master of arts, and also of bachelor and doctor of divinity; the last of which was conferred on him in 1580. In his earlier years he was fond of poetry, philosophy, and physic; but after having entered into orders he confined himself wholly to divinity, and became an excellent preacher. His first preferment was the mastership of Winchester school; and he afterwards became prebendary of Winchester, and at length warden of the college, in which office he was instrumental in preserving the revenues of it, when they were likely to have been lost by forgery. In 1585, he published a treatise entitled "The true Difference between Christian Subjection and unchristian Rebellion," dedicated to queen Elizabeth, and composed for the purpose

of confuting those catholic writers who attacked her right to the throne, and to the allegiance of her subjects. In this treatise passages occur that are favourable to resistance in certain cases, and which have not escaped the censures of later advocates of passive obedience. This was succeeded, in 1593, by his "Perpetual Government of Christ's church, &c." designed to shew, that from the Mosaic institution to the modern ages of Christianity, the church has been governed by pastors and teachers of different ranks, superior and subordinate, and esteemed one of the best books in favour of episcopacy. In consequence of this publication he was promoted to the see of Worcester in 1596, from which he was translated in 1597 to that of Winchester, when he was also appointed a privy counsellor. About this time he delivered a course of sermons at Paul's cross, against some of the tenets of the Puritans, on the subject of redemption, and the descent of Christ into hell, which occasioned a controversy with the leaders of that sect. In the course of this controversy the bishop maintained the actual descent of Christ into hell, or the place of the damned, an opinion which was then deemed orthodox, but which has since been rejected by the best expositors of the 39 articles, and by every rational divine. This prelate took a lead in the Hampton-court conference, where he was distinguished by his learning; and in general he was one of the most able advocates in favour of the church of England. To him, in conjunction with Dr. Smith, afterwards bishop of Gloucester, was committed the care of revising and finishing the new version of the Scriptures, called king James's Bible. He was also one of the delegates who pronounced the sentence of divorce between the earl of Essex and his countess. This learned bishop, whose life was a course of incessant labour for the public good, and whose private character uniformly corresponded with his high station, died in 1616, and was buried in Westminster Abbey. Biog. Brit.

BILSTEIN, in *Geography*, a town of Germany, in the circle of the Lower Rhine, and capital of a bailiwick, in the duchy of Westphalia, seated on a mountain; 42 miles E. of Cologne.

BILSTON, a large village, or chapelry, of Staffordshire, England, is remarkable for the number of its houses and inhabitants, without having the advantage of a chartered market or fair. From its proximity to Birmingham and Wolverhampton, and having the advantage of a navigable canal near it, Bilston abounds with manufactures, among which those for japanned and enamelled goods are the principal. Furnaces for smelting iron ore, forges and slitting mills, mostly worked by steam engines, also abound here. In the vicinity of the town are several coal mines, which produce great quantities of that fossil. An orange coloured sand is also abundant, and is in much request by the artizans, as a sand to cast metals in. Here is a quarry of remarkable stones, lying horizontally in twelve strata, each progressively increasing in thickness from the top downwards. The stone is mostly appropriated to the making of cisterns, troughs, &c. Bilston is in the parish of Wolverhampton, but is a distinct township for all parochial proceedings. There is a chapel of modern erection; also two meeting-houses, and a free-school. This chapelry is within the exempt jurisdiction of the dean of Wolverhampton, and is a perpetual curacy. Bilston is 127 miles N. W. from London: it contains 1305 houses, and 6914 inhabitants. Shaw's History of Staffordshire.

BILSTON, or BILDSTON, is a small manufacturing town of Suffolk, England. The making of blue cloths, blankets, and yarn, give employ to most of the inhabitants. Here was formerly a considerable market on Wednesdays, but it

is nearly deserted, and the whole town is much reduced. Here are two annual fairs. The parish contains 121 houses, and 744 inhabitants.

BILUR, in *Natural History*, a name given by many of the Arabian writers to a gem, which though they often mention, yet they have no where given us a description of. Some have imagined it the *onyx*, and others the *beryl*; but it appears more probable to have been a species of crystal; probably the pebble-crystal of the East Indies, which is considerably finer than the common frigid-crystal, and is often fold under the name of the white sapphire; though considerably inferior, both in lustre and hardness, to the true white sapphire.

BIMA, in *Geography*, a river of Hindoostan, so called by Mr. Pennant. See **BEEMAH**.

BIMACULARIS, in *Entomology*, a species of **PHALÆNA** (*Pyralis*, Gmel.), found in Europe. The anterior wings are griseous brown, with two brown spots. Linn.

BIMACULATA, in *Conchology*, a species of **TELLINA**, found in the European and American seas. This shell is of a somewhat rotundated triangular shape, rather broad, smooth, whitish, with two sanguineous spots within. It is a small shell, being usually half an inch in length, and sometimes, though rarely, of a yellowish colour. Linnæus, Donovan Brit. Shells, &c. On the English coasts this is a scarce species.

BIMACULATA, in *Entomology*, a species of **STILPHA**, found in Barbary. It is ovate and black; head of the antennæ, globose; legs ferruginous. Gmelin. The margin of the thorax is rather ferruginous, and the middle of each wing-case is marked with a red spot.

BIMACULATA, a species of **CHRYSOMELA**, of an oblong shape, and black; wing-cases testaceous, with a black spot on each. Inhabits America. Fabricius.

BIMACULATA, a species of **LEPTURA**, of a rufous colour, with cylindrical thorax; wing-cases dotted, with a spot and undulated streak of white on each. Schæffer, &c.

BIMACULATA, a North American species of **CANTHARIS**, with a ferruginous thorax; having a black spot, wing-cases testaceous, with a black spot at the tip. Fabricius.

BIMACULATA, a species of **MORDELLA**, of a large size, that is found in Hungary. It is ferruginous, with the breast black; wing-cases testaceous, with a black spot on each. Fabricius. Mant. Inf.

BIMACULATA, a species of **BUPRÆSTIS**, that inhabits India. The wings are very entire, striated, with a red spot; body brownish, green. Linn. Fabr. &c.

BIMACULATA, a species of **SPHINX** (*Zygana*), of the middle size, that inhabits America. The wings are above and beneath black, with two yellow spots on the anterior wings. Gmel. Fabr. &c.

BIMACULATA, a species of **PHRYGÆNEA**, described by Degeer. The wings are brown, with a double yellow lateral spot. Linn. &c.

BIMACULATA, a species of **TIPULA**, found in Europe. The wings are hyaline, with two brown spots; abdomen spotted, with ferruginous in the middle; antennæ feathered. Linn. Fr. Suec. Obs. This specific character is liable to some exception, for it is only the female which has the abdomen spotted with ferruginous; that of the male is immaculate.

BIMACULATA, a species of **MUSCA**, found in New Holland, and described by Swederus, Nov. Act. Stockh. The colour is light blue, with a whitish spot on each side of the breast; abdomen green, and blue at the base.

BIMACULATA, a species of **SCOLIA**, described by Fabricius. It is black, hairy, with two pale yellow spots, au-

tenes yellow. A variety of this insect with fulvous, instead of yellow spots, is mentioned by Pelagn. Inf. Calabr. The former inhabits North America.

BIMACULATA, a species of **ARANEÆ**, of a small size, that is found in Europe. The abdomen is subrotund, chestnut with two white spots. Gmelin. Abdomen rather depressed.

BIMACULATA, a species of **TENTHREDO**, of a pale colour, with the eyes, base of the abdomen above, and two spots on the breast, black. Linnæus Mus. Lesk.

BIMACULATA, in *Zoology*, a species of **LACERTA**, described by Sparmann. Nov. Act. Stockh. The tail is carinated, toothed, and twice the length of the body; all the toes lobated. Inhabits the woods of St. Eastace and Pennsylvania, living under ground, or in the hollows of trees, and depositing its eggs in the earth. The body is blue, tinged with green, and thickly spotted with black, but having two larger than the rest on the shoulders, from whence it is specifically named *bimaculata*; on each foot are five toes.

BIMACULATUM, in *Entomology*, a species of **PHALANGIUM**, with the abdomen black, and two white spots. A native of England and Norway. Gmelin.

BIMACULATUS, a species of **SCARABÆUS**, with three slight tubercles on the head; wing-cases striated, with two red spots at the base. Inhabits Germany. Fabricius.

BIMACULATUS, a species of **HISTER**, of a black colour, with the posterior end of the wing-cases red. Linn. Fr. Suec. Found in the dung of oxen. This is *Hister fimetarius* of Scopoli; and *Attelabus totus niger*; *elytris lævis nonnihil striatis*; *l'escarbot noir* of Geoffroy.

BIMACULATUS, a species of **CURCULIO**, of a brown colour; wing-cases dotted with cinereous; snout and legs black. Inhabits Saxony; and resembles *Curculio colon*, but is rather smaller.

BIMACULATUS, a species of **CRYPTOCEPHALUS**, of a dusky black, with fulvous thorax, and testaceous wing-cases, with two spots of black. Fabricius. Obs. This is *Chrysmela melanocephala* of Schaller, &c. A native of Italy and Saxony.

BIMACULATUS, a species of **CARABUS**, of a black colour, with a common interrupted band; antennæ and feet testaceous. Mant. p. 532. Gmel. Inhabits India. The thorax of this insect is yellow, or black, and sometimes spotted in different specimens.

BIMACULATUS, a species of **DYTISCUS**, of a testaceous colour, with a blackish spot on the wing-cases. Inhabits France. Size of a grain of rice. Gouan. Gmelin, &c.

BIMACULATUS, a species of **GRYLLUS** (*Bulla acridium*) found in Europe, and described by Herbit. The thorax is brown, with an ochraceous lunule on each side.

BIMACULATUS, a species of **ICHNEUMON**. Colour black; front, legs, antennæ beneath, anterior part of the thorax, two spots on the wings, and posterior margin of the abdominal segments, except the second, yellow. Linn. Mus. Lesk. Breeds in the larva of *phalæna fimbria*. Scutel raised behind. Inhabits Europe.

BIMACULATUS, is also a species of **ICHNEUMON**, that inhabits Austria, and is described by Schranck. It is black, with a yellowish scutel; two last segments of the abdomen with a single gypticous spot on each above.

BIMACULATUS, in *Ichthyology*, a species of **SALMO**, the body of which is compressed, and marked with two spots; anal fin with thirty-two rays. Gmelin. This is a native of South America. Seba calls it *Titragonopterus*; and Artedi *Coregonoides Amboinensis*.

BIMACULATUS, a species of **IABRUS**, found in the Mediterranean

diterranean sea. The dorsal fin is filamentous, body marked with a brown spot in the middle, and another near the tail. Gmel. &c.

BIMACULOSA, in *Entomology*, a species of *Coccinella*, with fulvous wing-cases, having two obsolete white feminar patches. Herbit. apud Fuesli, &c.

BIMACULOSA, a species of *PHALÆNA*, that inhabits Germany. Colour whitish grey; anterior wings rather clouded; posterior ones with two black spots. Fabricius, &c.

BIMATRA, in *Ancient Geography*, a town of Asia in Mesopotamia. Ptolemy.

BIMBELE ou *fausse Linotte*, in *Ornithology*, a name given by Buffon to a species of motacilla, since called by Latham the *palm warbler*, and *motacilla palmarum* by Gmel n.

BIMEDIAL, in *Mathematics*. When two medial lines, as AB and BC, commensurable only in power, and containing a rational B C rectangle, are compounded; the A | ——— | ——— | whole AC shall be irrational, with respect to either of the two, and is called a *first bimedral* line.

But if two medial lines, commensurable only in power, and containing a medial rectangle, be compounded, the whole will be irrational, and is called a *second bimedral* line. Eucl. lib. x. prop. 38 and 39.

BIMINI, in *Geography*, one of the Bahama islands on the west side of the great Bahama bank, near the gulf of Florida. Its compass is about twenty miles, and it has a good harbour. N. lat. 25°. W. long. 79° 34'.

BIMPLEPATAM, or *BIMLIPATAN*, a sea-port town of Hindoostan, on the western side of the bay of Bengal, in the circar of Cicacole, 35 miles S.S.W. of Cicacole. N. lat. 18° 10'. E. long. 83° 15'.

BIMUCRONATUS, in *Entomology*, a species of *SCARABÆUS*, that inhabits Amboyna. It is testaceous; shanks of the anterior legs large, and bearded; shield of the head mucronated on both sides, and bordered with fine hairs.

BINA, in *Geography*, a town of Italy, in the Cremonese, 10 miles N.E. from Cremona.

BINACLE, in *Sea-Language*. See *BITTACLE*.
BINAGARA, in *Ancient Geography*, a town of India, on this side the Ganges. Ptolemy.

BINARD ISLAND, in *Geography*, a long and narrow island on the north coast of France, to the east of Roteneuf point, having entrances at both the east and west end, and within it a sound or bay. It lies to the east of St. Maloes, towards Cancale.

BINAROS, or *VINAROS*, a town of Spain in Valencia, on the confines of Catalonia, near the coast of the Mediterranean, at the mouth of a river, which forms a small harbour, with anchorage at about a cannon-shot from the town, in 6 to 9 fathoms. It is surrounded with walls, and defended by some cannon; 5 miles north of Penniscola, and 20 south of Tortosa.

BINARY NUMBER, that which is composed of two units.

BINARY Arithmetic, a method of computation first proposed by M. Leibnitz; wherein, in lieu of the ten figures in the common arithmetic, and the progression from 10 to 10, he has only two figures, and uses the simple progression from two to two.

Jof. Pelican, of Prague, has more largely explained the principles and practice of the binary arithmetic, in a book entitled, "Arithmeticus perfectus, qui tria numerare nescit," 1712.

All his characters used in this arithmetic are 0 and 1; and the cipher, here, multiplies every thing by 2, as it does in the common arithmetic by 10. Thus, 1 is one; 10,

two; 11, three; 100, four; 101, five; 110, six; 111, seven; 1000, eight; 1001, nine; 1010, ten, &c. being founded on the same principles with the common arithmetic. Hence immediately appears the reason of the celebrated property of the duplicate geometrical proportion in whole numbers; viz. that one number of each degree being had, we may thence compose all the other whole numbers above the double of the highest degree. It being here, v. gr. as if one should say 111 is the sum of 4, 2, and 1, which property may serve assayers to weigh all kinds of masses with a little weight; and may be used in coins, to give several values with small pieces. This method of expressing numbers once established, all the operations will be easy: in multiplication particularly, there will be no need for a table, or getting any thing by heart. The author, however, does not recommend this method for common use, because of the great number of figures required to express a number; adding, that if the common progression were from 12 to 12, or from 16 to 16, it would be still more expeditious: but its use is in discovering the properties of numbers, in constructing tables, &c. What makes the binary arithmetic the more remarkable is, that it appears to have been the same with that used 4000 years ago among the Chinese, and left an *enigma* by Fohi, the founder of their empire, as well as of their sciences. M. Laguy has proposed a new system of logarithms, on the plan of the binary arithmetic; which he finds shorter, more easy, and natural than the common ones.

100	4
10	2
1	1
111	7

BINARY, a time in *Music*, consisting of two crotchets, or two minims in a bar.

BINASCO, in *Geography*, a town of Italy, in the Milanese, 10 miles south of Milan.

BINATED LEAF, in *Botany*. See *LEAF*.

BINCHE, in *Geography*, a town of the Netherlands, in the county of Hainaut, situated in a fertile country on the river Hainne; and, according to the French distribution, a place and canton in the district of Charleroy and department of Jemappe. The town contains 3798 persons, and the population of the canton is estimated at 13,908. The extent of the territory comprehends 125 kilometres and 16 communes. Binche was burned by Henry II. of France in 1554, and soon after rebuilt. In 1578, it was taken by John duke of Austria, and retaken in the same year by the duke of Alençon. The Spaniards regained possession of it, and ceded it to France at the peace of Aix-la-Chapelle, but the peace of Nimwegen restored it, together with its jurisdiction, including 51 towns and villages, to Spain. It is distant 8 miles E. S. E. from Mons.

BIND, in *Commerce*, contains 10 strikes of eels, each strike including 25.

BIND-Weed, in *Botany*. See *CONVOLVULUS*.

BIND-Weed, black. See *TAMUS*.

BIND-Weed, rough. See *SMILAX*.

BIND-With. See *CLEMATIS*.

BINDEN, in *Geography*, a town of Switzerland in the Valais, near the river Binna. N. lat. 46° 13'. E. long. 7° 58'.

BINDER-OOZE, the weakest kind of tan-ooze. See *TANNING*.

BINDING JOISTS, in *Architecture*. See *JOISTS*.

BINDING, in the *Art of Defence*, a method of securing or crossing the adversary's sword with a pressure, accompanied with a spring from the wrist. See *BEATING*.

Unless a man, by some kind of cross, secure, as it were, or render his adversary's sword incapable to find him during the time of his performing a lesson upon him, it is impossible for him to be certain, but that he may receive from his adversary, either a fortuitous *contretemps*, or an exchanged thrust,

thrust, before the recovery of his body, or going off after a thrust.

The great objection made by some people, particularly those time-catchers, against the frequent use of *Binding*, is, that when a man, in performing it, cleaves too much to his adversary's sword, he is liable to his adversary's slipping of him, and consequently of receiving either a plain thrust, or one from a feint.

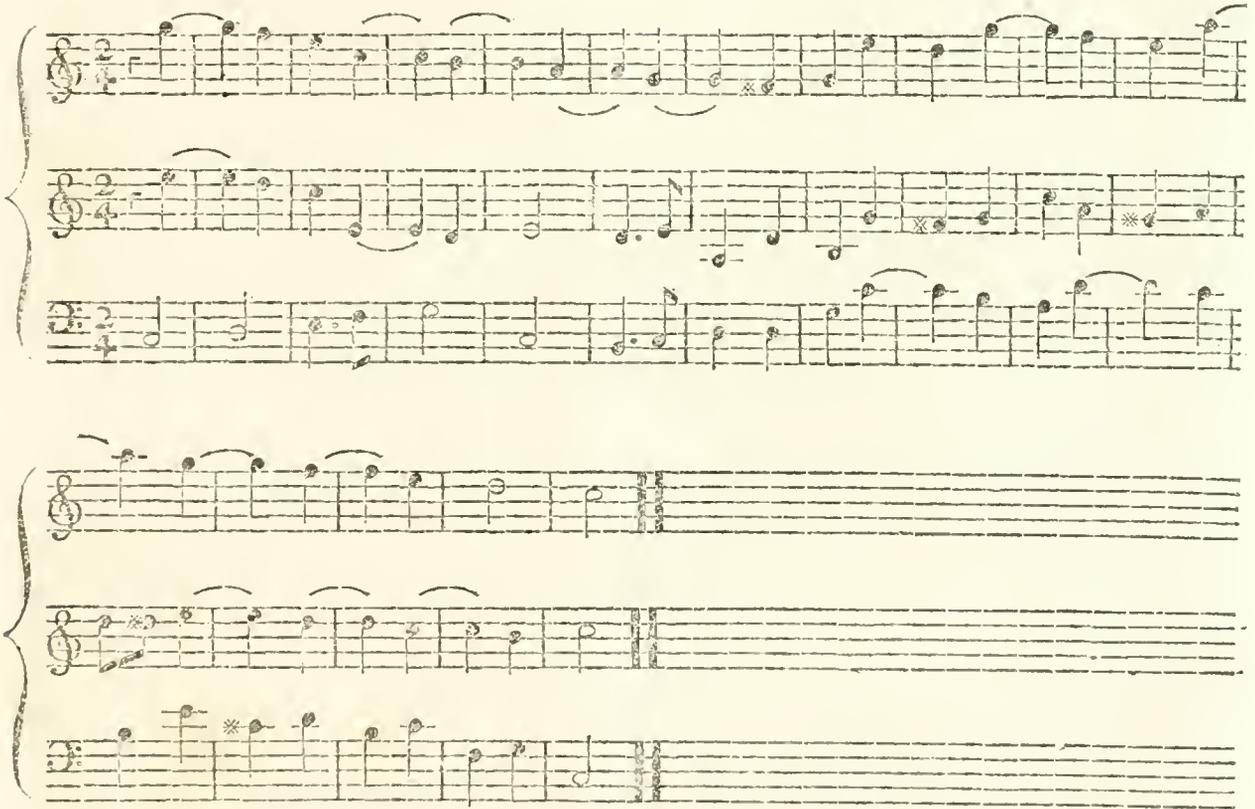
BINDING is a term in *Falconry*, which implies tiring, or when a hawk seizes.

BINDING Books. See *BOOK-Binding*.

BINDING-Notes, in *Music*, imply two or more sounds on the same line or space, that are linked together by a semi-circle; and which, though written or printed twice, are not to be separated, but sustained like a single sound.

The first of these tied or binding-notes, as in preparing discords, is usually struck on the unaccented part of a bar, and continued on the accented part. See *LIGATURE*, and *SYNCOPE*.

Example.



BINETTA, in *Geography*, a town of Italy, in the kingdom of Naples, and country of Bari, 4 miles W.S.W. of Biddetto.

BINGAZI. See BENGASI.

BINGE, a town of France, in the department of the Cote d'Or, and chief place of a canton in the district of Dijon, 10 miles east of Dijon.

BINGEN, a town of Germany, in the circle of the Lower Rhine, and electorate of Mentz or Mayence, and by the French arrangement, the principal place of a canton, in the district of Mayence, and department of Mont-Tonnerre. The town is said to contain 2663 inhabitants, and the canton 5638. It includes 10 communes. The town is seated at the conflux of the Nahe and Rhine. The stone bridge over the former is a noble structure, and the adjoining country is delightful. Bingen is a very ancient town, and was once imperial. The fortifications were destroyed by Lewis XIV. in 1689. A great part of the corn, which is carried into the Rhinegau, the neighbouring palatinate, comes through this place, which, on the other hand, supplies the palatinate with drugs, and various foreign commodities. Besides this

traffic, it has in its vicinity very fruitful vineyards, which produce excellent wine. Near this town the Rhine is compressed into a narrow channel, between two rocks; about a mile and a half below it is a kind of whirl-pool, called the "Bingen-loch," the passage of which is dangerous. At a small distance is also an island on the Rhine, denominated "Maus-turm," or tower of rats; from a tradition, that an archbishop of Mentz was there devoured by these animals, in the tenth century, as a judgment executed on him for his cruelty to the poor, whom he compared to rats eating up the substance of the rich. Bingen is 19 miles W. of Mentz, 30 S. of Coblenz, and 54 E. of Treves. N. lat 49° 54'. E. long. 7° 33'.

BINGENHEIM, a town of Germany, in the circle of the Upper Rhine, and principality of Hesse, 16 miles N.N.E. from Frankfort on the Mayne.

BINGHAM, JOSEPH, in *Biography*, a learned English divine, was born at Wakefield, in Yorkshire, in 1668. Having acquired the rudiments of classical learning at a school in his native town, he was admitted, in 1683, into University-college at Oxford, and in 1687 became fellow. Having taken

taken his master's degree in 1690, he was soon after presented by Dr. Radcliffe, the celebrated physician, to the rectory of Headbourn-Worthy, near Winchester; a preferment which, though not exceeding in value 100*l.* a year, afforded him access to the valuable library at Winchester, and enabled him to prosecute the arduous undertaking, to which, in this retirement, he devoted much of his time and labour. Accordingly, the first volume of his learned work, entitled "Origines Ecclesiasticæ, or the Antiquities of the Christian Church," appeared in 1708. It was completed in ten volumes, 8vo. and contains a judicious and candid, as well as ample account of the Christian clergy and churches from the earliest times. Besides this work, which was the result of much reading and indefatigable application, he published, in 1706, "The French Church's Apology for the Church of England; or the objections of the Dissenters against the Articles, Homilies, Liturgy, and Canons of the English Church, considered and answered upon the principles of the Reformed Church of France, &c." 8vo. His avowed design in this work was to reason Dissenters "into union upon such principles as are common to all the churches of the reformation." However laudable the design, uniformity of sentiment is not likely to be produced by any reasoning, as long as men are allowed to exercise the right of private judgment, and the only practicable union seems to be that which results from mutual forbearance and benevolence. Mr. Bingham likewise published "A Scholastic History of Lay-Baptism," in two parts, 1712, 8vo.; and "A Discourse concerning the Mercy of God to Penitent Sinners." All his works were collected and published in 2 vols. fol. Lond, 1725. Notwithstanding the acknowledged learning and meritorious services of Mr. Bingham, he had no other preferment besides that above-mentioned, till the year 1712, when he was collated to the rectory of Havant near Portsmouth. He died in 1723, and was buried in the church-yard of Headbourn-Worthy, without any monument, of which he declared his dislike in his last will. Biog. Brit.

BINGHAM, in *Geography*, a town of Nottinghamshire, in England, stands nearly in the centre of the vale of Belvoir. It consists principally of two streets, running nearly parallel to each other, with some smaller streets branching from them. Near the centre of the town is a spacious market-place, where a weekly market is held every Thursday; it has also three annual fairs, and a large statute fair yearly for hiring of servants. Bingham is stated by Thoroton to be much reduced since the reformation, as, previously to that event, it contained three chapels, exclusive of the parish church. The latter was collegiate, and is still a large handsome structure, with a tower and spire, side aisles and chancel. It contains numerous monuments, among which is a plain one inscribed to the memory of Robert White, a native of this place, where he died, in 1773, at the advanced age of eighty. He was author of an annual publication, entitled "The celestial Atlas, or New Ephemeris." The rectory of Bingham is esteemed one of the most valuable in the county of Nottingham, and is in the gift of lord Chesterfield, who is lord of the manor. This town is 124 miles north from London. It contains 220 houses, and 1082 inhabitants.

At Aslaston, about two miles east from Bingham, archbishop Craumer was born. About two miles north from Bingham is East-Bridgeford, where are the remains of an entrenchment, and where some coins, urns, &c. have been found. Horsley places the Roman station, Margidunum, "near East-Bridgeford," from its situation near the fens, and from the agreement of distances, between this and

the other stations named in the Itinerary. Thoroton's History of Nottinghamshire.

BINGIUM, in *Ancient Geography*, a town of Gaul, in Germania Prima, west of Mogontiacum; now *Bingen*, which see.

BINGLESTEIN, in *Geography*, a town of Germany, in the circle of Westphalia, and bishopric of Paderborn, 3 miles south of Buren.

BINGO, a small country of Japan, in the island of Nipon, situate in N. lat. about 34° 30'. E. long. 134°.

BINGUM, a town of Germany, in the circle of Westphalia, and county of East Friesland, one mile north-west of Ort.

BINGUT CAPE and BAY, lie about E. by N. from Algiers, on the coast of Africa, in the Mediterranean. The town of Bingut is at the bottom of the bay of its name, about 12 or 13 leagues from Algiers.

BINIESZKY, a town of Lithuania, in the palatinate of Wilna, 44 miles S. E. of Wilna.

BINN, *binna*, a sort of chest or cupboard, wherein to lock up bread, meat, or other provisions.

The word is also used for a place boarded up to put corn in. The pease and oatmeal, used at sea, are apt to spoil in casks. Dr. Hales proposes to prevent this by putting them into large bins, with false bottoms of hair-cloth laid on bars, whereby fresh air may be blown upwards through them, at proper times, with small ventilators.

BINNA, in *Ancient Geography*, a town of Assyria, according to Ptolemy.

BINNINGER, JOHN NICHOLAS, in *Biography*, born at Montbelliard, in 1628, studied medicine at Padua, and then went to Basle, where he was admitted to the degree of doctor in that art in 1652. Returning to his own country, he soon acquired so much fame for his skill in his profession, that he was appointed professor of medicine, and physician to the family of the duke, his sovereign. He left "Observationum et Curationum medicinalium, centuriæ quinque," 8vo. 1673, Montb. containing some curious and valuable observations. Haller. Bib. Med. Eloy. Dict. Hist.

BINNIGUET, in *Geography*, a small island near the west coast of France, about a league south-west of Le Conquet, and $\frac{2}{3}$ west of St. Matthew's point. N. lat. 48° 19'. E. long. 1° 5'.

BINN-NA-BAIRD, and BINN-NA-MUICK-DUIDH; are the names of two lofty mountains, in the parish of Crathy, Aberdeenshire, in Scotland. These eminences are constantly covered with snow, and extending in the same ridge with the Cairngoram mountain, contain the same species of topaz, which bears the name of Cairngoram stones. Emeralds have been sometimes discovered here; also a species of brown silicious stone, which bears a very fine polish.

BINOCLE, or BINOCULAR *Telescope*, from *binus*, double, and *oculus*, eye, in *Optics*, that to which both the eyes may be applied, and consequently the same object be observed at the same time by both. It consists of two tubes, with two sets of glasses of the same power, and adjusted to the same axis; and some have pretended that it represents objects much larger and clearer than a single or monocular glass. But this is perhaps only an illusion, occasioned by the stronger impression, which two equal images alike illuminated make upon the eyes. This method of construction was invented by father Rheita, and brought into use by father Cherubin of Orleans. There are also microscopes of the same kind, but very seldom used.

BINODIS, in *Entomology*, a species of FORMICA, described by Fabricius as a native of Egypt. It is black; head

Head large and rufous; with two tubercles on the pe-
tiole.

BINOMINAL, or **BINOMIAL**, from *bis*, twice, and *nomen*, name, in *Algebra*, a quantity confisting of two terms or members, connected by the sign *plus*, or *minus*.

Thus $a + b$ and $5 - 3$ are binomials, confisting of the sum or difference of those quantities; though the latter is often called *residual*, and by Euclid, *apotome*.

The terms binomial and residual are said to have been first introduced by Robert Recorde. See *ALGEBRA*.

The powers of a binomial are found by a continual multiplication of it by itself, as often as an unit is contained in the index of the power required. Those of a residual, $a - b$, are obtained in the same manner, only with this difference in the result, that the terms in which the exponent of b is an odd number, will be negative.

If a root have three parts, as $a + b + c$, it is called a trinomial; if more, a multinomial.

BINOMIAL, *impossible*, or *imaginary*, in *Algebra*, is used for a binomial, one of the terms of which is an impossible or imaginary quantity: as $a \pm \sqrt{-bb}$ is an impossible binomial.

Dr. Maskelyne, the astronomer royal, has given (in his Introduction to "Taylor's Tables of Logarithms," p. 56.) the following method of finding any power of an impossible binomial, by another similar binomial. The logarithms of a and b being given, it is required to find the power of the

impossible binomial $a \pm \sqrt{-b^2}$ whose index is $\frac{m}{n}$, that is

to find $(a \pm \sqrt{-b^2})^{\frac{m}{n}}$ by another impossible binomial; and

thence the value of $(a + \sqrt{-b^2})^{\frac{m}{n}} + (a - \sqrt{-b^2})^{\frac{m}{n}}$, which is always possible, whether a or b be the greater of the two.

Solution. Put $\frac{b}{a} = \text{tang. } z$. Then

$$(a \pm \sqrt{-b^2})^{\frac{m}{n}} = (a^2 + b^2)^{\frac{m}{2n}} \times (\text{cof. } \frac{m}{n} z \pm \sqrt{-\text{fin. } \frac{2m}{n} z}).$$

Hence $(a + \sqrt{-b^2})^{\frac{m}{n}} + (a - \sqrt{-b^2})^{\frac{m}{n}} = (a^2 + b^2)^{\frac{m}{n}} \times 2$

$$\text{cof. } \frac{m}{n} z = a \times \text{fec. } z)^{\frac{m}{n}} \times 2 \text{ cofin. } \frac{m}{n} z = (b \times \text{cofec. } z)^{\frac{m}{n}}$$

$$\times 2 \text{ cofin. } \frac{m}{n} z, \text{ where the first or second of these two last}$$

expressions is to be used, according as z is an extreme or mean arc; or rather, because $\frac{b}{a}$ is not only the tangent of z but also of $z + 360^\circ$, $z + 720^\circ$, &c.; therefore the factor in the answer will have several values, viz.

$$2 \text{ cof. } \frac{m}{n} z; 2 \text{ cof. } \frac{m}{n} (z + 360^\circ); 2 \text{ cof. } \frac{m}{n} (z + 720^\circ);$$

&c.; the number of which, if m and n be whole numbers, and the fraction $\frac{m}{n}$ be in its least terms, will be equal to the

denominator n ; otherwise infinite.

By *Logarithms*. Put $\log. b + 10 - \log. a = \log. \text{tan. } z$.

$$\text{Then } \log. \left((a + \sqrt{-b^2})^{\frac{m}{n}} + (a - \sqrt{-b^2})^{\frac{m}{n}} \right) = \frac{m}{n}$$

$$\times (10 + 10 - \text{l. cof. } z) + \text{l. } 2 + \text{l. cof. } \frac{m}{n} z - 10 = \frac{m}{n}$$

$$\times (\text{l. } b + 10 - \text{l. fin. } z) + \text{l. } 2 + \text{l. cof. } \frac{m}{n} z - 10; \text{ where}$$

the first or second expression is to be used, according as z is

an extreme or mean arc. Moreover, by taking successively,

$$\text{l. cof. } \frac{m}{n} z; \text{l. cof. } \frac{m}{n} (z + 360^\circ); \text{l. cof. } \frac{m}{n} (z + 720^\circ), \&c.$$

there will arise several distinct answers to the question, agreeable to the remark above

BINOMIAL furd, is used for a binomial, the terms of which are furds; as $\sqrt{a} + \sqrt{b}$, or $a^m + b^n$, if m and n be fractions. The term binomial furd is also applied to any quantity having a rational part and a furd part, as $25 + \sqrt{968}$. Euclid enumerates six kinds of binomial lines or furds in the 10th book of his "Elements," which are exactly similar to the six residuals or apotomes, of which he has also treated in the same place. See *APOTOME*. These apotomes become binomials by merely changing the sign of the latter term from *minus* to *plus*, and they are as follow: 1st. $3 + \sqrt{5}$; 2d. $\sqrt{18} + 4$; 3d. $\sqrt{24} + \sqrt{18}$; 4th. $4 + \sqrt{3}$; 5th. $\sqrt{6} + 2$; 6th. $\sqrt{6} + \sqrt{2}$.

For the extraction of roots of binomial furds, see Newton's *Arithmetica Universalis*; St. Gravesande's *Commentary*; and Mac Laurin's *Algebra*, p. 114—130. See *SURD*.

BINOMIAL Curve, is used for a curve, the ordinate of which is expressed by a binomial. Thus, if the ordinate of a

curve be of this form $x + e + \sqrt{ax}$, the curve is called a binomial curve. Stirling's *Method. Diff.* p. 58.

BINOMIAL Theorem, is a general algebraical expression, or formula, by which any power or root of a quantity, consisting of two terms, is expanded into a series.

It is also frequently called the Newtonian theorem, or Newton's binomial theorem, on account of his being commonly considered as the inventor of it, as he undoubtedly was, at least in the case of fractional indices, which includes all the other particular cases of powers, divisions, &c.

This celebrated theorem, as proposed in its most general form, may be exhibited in a manner nearly similar to that of Newton, as follows:

$$\begin{aligned} a + x^{\frac{m}{n}} &= a^{\frac{m}{n}} \times \left(1 + \frac{m}{n} \left(\frac{x}{a} \right) + \frac{m}{n} \cdot \frac{m-n}{2n} \left(\frac{x}{a} \right)^2 + \right. \\ &\frac{m}{n} \cdot \frac{m-n}{2n} \cdot \frac{m-2}{3n} \left(\frac{x}{a} \right)^3 + \&c. \text{ Or, } a + x^{\frac{m}{n}} = a^{\frac{m}{n}} \times \\ &: 1 + \frac{m}{n} A \left(\frac{x}{a} \right) + \frac{m-n}{2n} B \left(\frac{x}{a} \right) + \frac{m-2n}{3n} C \left(\frac{x}{a} \right) + \\ &\left. \frac{m-3n}{4n} D \left(\frac{x}{a} \right) + \&c. \right. \end{aligned}$$

Where a, x , are the two terms of the binomial, $\frac{m}{n}$ the index, and A, B, C, D, &c. each preceding term, including their signs $+$ or $-$, the terms of the series being all positive when x is positive, and alternately positive and negative when x is negative, independently however of the effect of the coefficients made up of m and n , which may be any numbers whatever, positive or negative.

A few easy examples, in the extraction of roots, will be sufficient to shew the application of the theorem in all similar cases. For this purpose, let it be required to find the

square root of $a + b$, or $a + b^{\frac{1}{2}}$, and the cube root of $a - b$,

or $a - b^{\frac{1}{3}}$; in the first of which $\frac{m}{n} = \frac{1}{2}$ and in the se-

cond $\frac{m}{n} = \frac{1}{3}$.

$$\begin{aligned} \text{Then } a + b^{\frac{1}{2}} &= a^{\frac{1}{2}} \left[1 + \frac{1}{2} \left(\frac{b}{a} \right) - \frac{1}{2 \cdot 4} \left(\frac{b}{a} \right)^2 + \frac{3}{2 \cdot 4 \cdot 6} \right. \\ &\left. \left(\frac{b}{a} \right)^3 - \frac{3 \cdot 5}{2 \cdot 4 \cdot 6 \cdot 8} \left(\frac{b}{a} \right)^4, \&c. \right. \end{aligned}$$

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And $\overline{a-b}^{\frac{1}{3}} = a^{\frac{1}{3}} \left[1 - \frac{1}{3} \left(\frac{b}{a}\right) - \frac{1}{3^2} \left(\frac{b}{a}\right)^2 - \frac{5}{3^3} \left(\frac{b}{a}\right)^3 - \frac{5 \cdot 8}{4 \cdot 3^4} \left(\frac{b}{a}\right)^4, \&c. \right]$

And, in the same manner, if 1, divided by the cube root of the square of $a \pm b$, be converted into a series, we shall

have $\frac{1}{a \pm b^{\frac{2}{3}}} = \frac{1}{a^{\frac{2}{3}}} \left[1 \mp \frac{2}{3} \left(\frac{b}{a}\right) + \frac{2 \cdot 5}{2 \cdot 3^2} \left(\frac{b}{a}\right)^2 \mp \frac{2 \cdot 5 \cdot 7}{2 \cdot 3^3} \left(\frac{b}{a}\right)^3, \&c. \right]$

But these series are only comedious in calculation, in proportion to their degree of convergency. For if N be made to represent the rank which any term holds in the series arising from the binomial $a - b$ being raised to the m th power, then that term will be to the following one as 1 to $\frac{b}{a} \times \frac{m - N + 1}{N}$; from which it is evident, that for the terms of the series to go on decreasing, $b \times m - N + 1$, taken positively, must be always less than aN .

With respect to the history of this theorem, the prevailing opinion, till within these few years, has been, that it was not only invented by Newton, but first given by him in that state of perfection, in which the terms of the series, for any assigned power whatever, can be found, independently of the terms of the preceding powers: viz. the second term from the first, the third from the second, the fourth from the third, and so on, by a general rule. But it has since been found, that in the case of integral powers, the theorem had been described by Briggs, in his "Trigonometrica Britannica," long before Newton was born; and that, by the general law of the terms, independently of those of the preceding powers. For, as far as regards the generation of the coefficients of the terms of one power from those of the former ones, successively one after another, it was remarked by Vieta, Oughtred, and many others; and was not unknown to much more early writers on arithmetic and algebra, as will be manifest by a slight inspection of their works, as well as the gradual advance the property made, both in extent and perspicuity, under the hands of the latter authors, most of whom added something more towards its perfection.

The knowledge, indeed, of this property of the coefficients of the terms of the integral powers of a binomial, is, at least, as old as the practice of the extraction of roots, of which it is both the foundation and principle. And as the writers on arithmetic became acquainted with the nature of the coefficients in the higher powers, they extended the extraction of roots accordingly, still making use of this property. At first, they appear to have been only acquainted with the nature of the square, the coefficients of which are the three terms, 1, 2, 1; and, by their means, extracted the square roots of numbers, but went no farther. The nature of the cube next presented itself, which consists of the coefficients, 1, 3, 3, 1; and, by means of these, they extracted the cube roots of numbers, in the same way as is practised at present. And this was the extent of their extractions, in the time of Lucas de Burgo, who, from 1470 to 1500, wrote several tracts on arithmetic, containing the substance of what was then known of this science.

It was not long, however, before the nature of the coefficients of all the higher powers became known, and tables formed for constructing them indefinitely. For, in the year 1543, Michael Stifelius, a German, published an excellent work on arithmetic and algebra, under the title of *Arithmetica Integra*, in which he gives the following table, for

constructing both figurate numbers and the coefficients of the terms of the various powers of a binomial, which, since his time, has been often used for these and other purposes; and, more than a century after, was, by Pascal, otherwise called the arithmetical triangle, and of which he has commonly been called the inventor, though he only mentioned some of its additional properties.

1									
2									
3	3								
4	6								
5	10	10							
6	15	20							
7	21	35	35						
8	28	56	70						
9	36	84	126	126					
10	45	120	210	252					
11	55	165	330	462	462				
12	66	220	495	792	924				
13	78	286	715	1287	1716	1716			
14	91	364	1001	2002	3003	3432			
15	105	455	1365	3003	5005	6435	6435		
16	120	560	1820	4368	8008	11440	12870		
17	136	680	2380	6188	12376	19448	24310	24310	

In this table Stifelius observes, that the horizontal lines furnish the coefficients of the terms of the correspondent powers of a binomial; and teaches how to use them in extracting the roots of all powers whatever. The same table was also used, for a similar purpose, by Cardan, Stevin, and other writers on arithmetic; and it is highly probable that it was known much earlier than the time of Stifelius, at least as far as regards the progressions of figurate numbers, which had been amply treated of by Nicomachus, who lived, according to some, before Euclid, but not till long after him, according to others; and whose work on arithmetic was published at Paris in 1538, and is supposed to have been chiefly copied in the treatise on the same subject by Boethius.

The contemplation of this table has also, probably, been attended with the invention and extension of some of our most curious discoveries in mathematics, both with respect to the powers of a binomial, the consequent extraction of roots, the doctrine of angular sections by Vieta, and the differential method of Briggs, and others. For a few of the powers or sections being once known, the table would be of the greatest use in discovering and constructing the rest; and accordingly it appears to have been used, on many occasions of this kind, by Stifelius, Cardan, Stevin, Vieta, Briggs, Oughtred, Mercator, Pascal, &c.

But although the nature and construction of this table were thus early known, and employed in raising powers and extracting roots, it was yet only by raising the numbers from one another, by continual additions, and taking them from the table for use when wanted; till Briggs first pointed out the way of raising any horizontal line in the table, by itself, without any of the preceding lines; and thus teaching to raise the terms of any integral powers of a binomial independently of any other powers; which was, in fact, giving the substance of the binomial theorem in words, but wanting the notation in symbols.

It may, however, be fairly questioned, whether Briggs knew how, even in the case of an integral exponent, to exhibit the law of the formation of the coefficients, under the form $\frac{m(m-1) \cdot (m-2) \dots (m-n+1)}{1 \cdot 2 \cdot 3 \dots n}$; for, though his method of forming the successive coefficients amounts to nearly

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nearly the same thing, yet the advancement in analysis depended on the circumstance of the law which they observe, being expressed by means of a general symbol (m); without which, its extension would never have been made to those cases in which the index is negative or fractional: so that Briggs, even in the case of integral powers, does not appear to be fully entitled to the invention of the binomial theorem, properly so called.

But however this may be, it is universally agreed that no one before Newton had ever thought of extracting roots by means of infinite series. He was the first who happily discovered, that, by considering roots as powers having fractional exponents, the same binomial series would equally serve for them all, whether the index should be fractional or integral, or the series finite or infinite; and from this extension of the theorem, some of the most important improvements, in the higher departments of mathematics, have arisen; particularly in the construction of logarithms, and the doctrine of series in general, which have since been carried to a great degree of perfection, and now form some of the most curious and interesting branches of analytics.

It may also be farther observed, with respect to the claim of Newton as an original inventor of this highly useful theorem, that he had probably never seen the *Arithmetica Logarithmica* of Briggs; for it is well known that he was not an extensive reader of mathematical works, depending more on the powers of his own genius than upon any helps of this kind: so that there can be but little doubt of his having made the discovery himself, without receiving any light from what had been done by Briggs; and that he conceived the theorem to be new for all powers in general, as it was for roots and quantities with fractional indices.

But though this appears to be the case with respect to Newton, it is yet surprising that Dr. Wallis, who was a general reader of most mathematical works, and who had actually seen Briggs's *Arithmetica Logarithmica*, as he mentions it in page 60, chap. xii. of his *Algebra*, should not have attended enough to this curious treatise, to know that it contained such a new and excellent theorem, as it fully appears he did not; since, in the 85th chapter of the above-mentioned work, he ascribes the invention entirely to Newton; and adds, that he himself had fought after such a rule, but without success. It is also no less singular, that John Bernoulli, not half a century since, should first dispute the invention of this theorem with Newton, and afterwards give the discovery of it to Pascal, who was not born till long after it had been taught by Briggs. (See Bernoulli's works, vol. iv. p. 173).

Dr. Wallis's *Algebra* was published in the year 1685; and it was here, for the first time after Newton's discovery of it, that the binomial theorem, according to his general manner of expressing it, appeared in print, and was made known to the learned world; though Leibnitz, and probably Dr. Barrow (who was Newton's great friend and patron in his youth), as well as some other mathematicians of that time, had seen it, in a letter addressed to Mr. Oldenburgh, of October 24th 1676, (which was given in the *Commercium Epistolicum*), soon after the said letter was written. But he no where tells us his manner of investigating it; nor is any demonstration of it to be found, even in the case where the index is a whole number, in any part of his works. He says, indeed, in his next letter to Oldenburgh, to be found in the same work, that the occasion of its discovery was as follows:

"Not long (he observes) after I had ventured upon the study of the mathematics, whilst I was perusing the works of the celebrated Dr. Wallis, and considering the series of

universal roots, by the interpolation of which we exhibit the area of the circle and hyperbola: for instance, in this series of curves, whose common base or axis is x , and the respective ordinates $\sqrt{1-x^2}$, $\sqrt{1-x^2}$, $\sqrt{1-x^2}$, $\sqrt{1-x^2}$, $\sqrt{1-x^2}$, $\sqrt{1-x^2}$, &c. I observed that if the areas of the alternate curves, which are x , $x - \frac{1}{3}x^3$, $x - \frac{2}{3}x^3 + \frac{1}{5}x^5$, $x - \frac{3}{3}x^3$

$+ \frac{3}{5}x^5 - \frac{1}{7}x^7$, &c. could be interpolated, we should, by this means, obtain the areas of the intermediate ones, the first of which $\sqrt{1-x^2}$ is the area of the circle. In order to this it was evident, that in each of these series the first term was x , and that the second terms $\frac{0}{3}x^3$, $\frac{1}{3}x^3$, $\frac{2}{3}x^3$, $\frac{3}{3}x^3$, &c. were in arithmetical progression; and consequently the first three terms of the series to be interpolated must be $x - \frac{1}{3}\left(\frac{1}{2}x^3\right)$, $x - \frac{1}{3}\left(\frac{3}{2}x^3\right)$, $x - \frac{1}{3}\left(\frac{5}{2}x^3\right)$, &c.

"Now, for the interpolation of the rest, I considered that the denominators 1, 3, 5, 7, &c. were, in all of them, in arithmetical progression; and consequently the whole difficulty consisted in discovering the numeral coefficients: but these, in the alternate areas which are given, I observed were the same with the figures of which the several ascending powers of the number 11 consist, viz. 11², 11¹, 11⁰, 11¹, 11², &c. that is, the first, 1; the second, 1, 1; the third, 1, 2, 1; the fourth, 1, 3, 3, 1; the fifth, 1, 4, 6, 4, 1, &c.

"I applied myself, therefore, to discover a method by which the first two figures of this series might be derived from the rest; and I found, that if for the second figure, or numeral term, I put m , the rest of the terms would be produced by the continual multiplication of the terms of this series, $\frac{m-0}{1} \times \frac{m-1}{2} \times \frac{m-2}{3} \times \frac{m-3}{4} \times \frac{m-4}{5}$, &c.

"For instance, if the second term be put for 4, there will arise $4 \times \frac{m-1}{2}$, that is 6, which is the third term; the fourth term will be $6 \times \frac{m-2}{3}$, that is 4; the fifth term will be $4 \times \frac{m-3}{4}$, that is 1; and the sixth term will be $4 \times \frac{m-4}{5}$, that is 0, which shews the series is here terminated, in this case.

"This being found, I applied it, as a rule, to interpolate the above-mentioned series. And since, in the series which expresses the circle, the second term was found to be $\frac{1}{3}\left(\frac{1}{2}x^3\right)$, I therefore put $m = \frac{1}{2}$; and there was produced the terms $\frac{1}{2} \times \frac{1}{2}\left(\frac{1}{2} - 1\right)$ or $-\frac{1}{8}$; $-\frac{1}{8} \times \frac{1}{3}\left(\frac{1}{2} - 2\right)$ or $+\frac{1}{16}$; $\frac{1}{16} \times \frac{1}{4}\left(\frac{1}{2} - 3\right)$ or $-\frac{5}{128}$, and so on *ad infinitum*. Hence I found that the area of the segment of the circle sought is $x - \frac{1}{2}\left(\frac{1}{3}x^3\right) - \frac{1}{8}\left(\frac{1}{5}x^5\right) - \frac{1}{16}\left(\frac{1}{7}x^7\right) - \frac{5}{128}\left(\frac{1}{9}x^9\right)$ &c.

"In the same manner, the areas to be interpolated of the other curves might be produced; as also the area of the hyperbola,

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hyperbola, and the rest of the alternate curves in the series $1+x^2$, $1+x^2$, $1+x^2$, $1+x^2$, &c.; and in a similar way might other series be likewise interpolated, and that even if they should be taken at two more intervals.

"This was the way by which I first opened an entrance into these speculations, which I should not have remembered, but that, in turning over my papers, a few weeks ago, I, by chance, cast my eyes upon those relating to this matter.

"After I had proceeded so far, it immediately occurred to me that the terms $1-x^2$, $1-x^2$, $1-x^2$, $1-x^2$, &c. that is, 1 , $1-x^2$, $1-2x^2+x^4$, $1-3x^2+3x^4-x^6$, &c. might be interpolated in the same manner as I had done in the case of the areas generated by them: and for this, there required nothing more than to leave out the denominators, 1 , 3 , 5 , 7 , &c. in the terms that express the areas; then the coefficients of the terms to be interpolated ($1-x^2$, $1-x^2$, or univ ersally $1-x^2$) will be had by the continual multiplication of the terms of the series $m \times \frac{m-1}{2} \times \frac{m-2}{3} \times \frac{m-3}{4}$ &c.

"Thus, for example, $1-x^2 = 1 - \frac{1}{2}x^2 - \frac{1}{8}x^4 - \frac{1}{16}x^6$ &c.; and $1-x^2 = 1 - \frac{3}{2}x^2 - \frac{3}{8}x^4 - \frac{3}{16}x^6$ &c.; and $1-x^2 = 1 - \frac{1}{3}x^2 - \frac{1}{9}x^4 - \frac{5}{31}x^6$ &c.

"Thus, I discovered a general method of reducing radical quantities into infinite series, by the binomial theorem, which I sent in my last letter, before I observed that the same thing might be obtained by the extraction of roots.

"But after I had discovered this method, the other way could not long remain unknown; for, in order to prove the truth of these operations, I multiplied $1 - \frac{1}{2}x^2 - \frac{1}{8}x^4 - \frac{1}{16}x^6$ &c. by itself, and found the product to be $1-x^2$, all the terms after these *ad infinitum* vanishing: in like manner $1 - \frac{2}{3}x^2 - \frac{1}{9}x^4 - \frac{5}{81}x^6$ &c. being twice multiplied into itself, produced $1-x^2$. And as this was a certain proof of the truth of these conclusions, I was thereby naturally led to try the converse of it, viz. whether these series, that were now known to be the roots of the quantity $1-x^2$, might not be produced by the rule for extraction of roots in arithmetic; and, upon trial, I found it succeed to my wishes.

"This being found, I laid aside the method of interpolation, and assumed these operations, as a more genuine foundation to proceed upon. In the mean time, I was not ignorant of the way of reduction by division, which was so much easier."

From this account, as given by Newton himself, it appears that his discovery of the law for the areas, with irrational ordinates, preceded that of the law for the expansion of those ordinates; although the latter, as Montucla observes, might have been expected to precede the former, if inventive genius always pursued the most easy method. But, in tracing the progress of the human mind, it may generally be observed, that a collection of discoveries in any branch of science, is seldom found to be a series of regular deductions; but, on the contrary, we often discern therein many

anticipations, and sometimes even a reversion of the natural and logical order of ideas.

It is worth while here to remark, that Newton had made these discoveries, as well as many others, several years before Mercator had published his "Logarithmotechnia," which contains a particular case of this theory; but, from an excess of modesty and indifference for these fruits of his genius, he delayed making them known to the world: and, even after the above-mentioned work had appeared, which would have operated as a powerful motive with most other men, in exciting them to share in the glory of these brilliant inventions, he was still more confirmed in the resolution he had taken, of not making himself known as an author till he was of a more mature age. He conceived, that Mercator having discovered, as it was said, the series for the hyperbola, would not be long before he extended his method to the circle, and other curves; or, if this should not be done by him, the invention would be readily perceived by others. In short, it appears rather singular, that as Mercator had

converted the expression $\frac{1}{1+x}$ into an infinite series, by the ordinary method of division, he should not have tried to discover the series for $\sqrt{1 \pm x^2}$ by the known method of extracting the square root; but this, though extremely obvious, escaped his notice: and many circumstances, of a similar kind, are to be found in the history of the sciences.

Newton, as has been already observed, left no demonstration of this theorem; but appears to have formed it merely from an induction of particular cases; and though no doubt can be entertained of its truth, having been found to succeed in all the instances in which it has been applied; yet, agreeably to the rigour that ought to be observed in the establishment of every mathematical theory, and especially in a fundamental theorem of such general use and application, it is necessary that as regular and strict a proof should be given of it as the nature of the subject, and the state of analysis, can afford.

One of the first demonstrations of this kind that appears to have been given, is that of James Bernoulli, which is to be found, among several other curious things, in a small treatise of his, entitled "Ars Conjectandi," which has been very improperly omitted in the collection of his works, published by his nephew, Nicholas Bernoulli. But this is only applied to the case of integral and affirmative powers, and is nearly the same with that which was afterwards given by Mr. John Stewart, in his commentary on sir Isaac Newton's quadrature of curves. It is founded on the doctrine of combinations, and the properties of figurate numbers, which are there shewn to involve in them the generation of these coefficients; and in the instance before mentioned, where the index of the binomial is a whole positive number, it is clearly and satisfactorily explained.

Since that time, many attempts have been made to demonstrate the general case, or that where the index of the binomial is either a whole number or a fraction, positive or negative; but most of these demonstrations having been conducted, either by the method of increments, the multinomial theorem of De Moivre, or by fluxions, are commonly thought to be unsatisfactory and imperfect; and it should seem not without reason; as, independently of other objections, it appears contrary to the principles of science, as well as to just reasoning, to employ, in a matter purely algebraical, notions and doctrines derived from other branches, or from an analysis which is in some sort transcendental.

For these reasons, several eminent mathematicians have endeavoured to investigate this formula on pure analytical principles,

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iples, in a more natural and obvious way; one of the first of these attempts being that of Landen, in his "Discourse concerning the residual analysis," and the next that of Epinus, in the eighth volume of the "New Petersburg Memoirs." But the legitimacy of the former may be objected to, as depending upon vanishing fractions, and other considerations of too difficult and abstract a nature to be regarded as sufficiently convincing; and the latter, though very ingenious, is not less difficult and embarrassing: at least, such is the opinion of Euler, who having himself first given a demonstration of this theorem, in which, like Maclaurin, he employed the differential calculus, or method of fluxions, was afterwards led to deduce it from the principles of algebra alone: though he does not appear to have been much more successful than either of the former.

S. Lhuillier of Geneva, perceiving the defects and obscurity of these methods, has made a new demonstration of this formula in one of the preliminary articles of his excellent work, entitled, "Principiorum calculi differentialis et integralis, &c." which is purely elementary; and abating from its length, and a fatiguing detail of particulars, which the nature of the subject does not seem to require, he appears to have accomplished his object; at least as far as the method he adopted would allow; for it must be confessed, that neither this, nor any other investigation that had hitherto appeared, have been attended with the simplicity and strictness which could be desired.

The reason of this, as Dr. Woodhouse properly observes, in his "Principles of Analytical Calculation," seems to be, that most mathematicians appear to have sought for some high origin of this theorem, distinct from the simple operations of multiplication, division, extracting of roots, &c.: and instead of considering the nature of the operations it was known to comprehend, hoped to supersede them by deductions drawn from abstruse and fine theories: whereas it is clear that whatever imperfections these fundamental operations are attended with, are also attached to the binomial theorem, which, in a certain sense, may be said to be a method of trial and conjecture. For, as this formula is only meant to express, in general terms, the algebraical rules above mentioned, it cannot possess a greater degree of certainty than is possessed by the simple operations themselves.

To avoid entering into a too prolix investigation of the well known and simple elements upon which the general formula depends, it is sufficient to observe that it is clearly manifest from some of the first and most common rules of algebra, that whatever is the operation which the index (m) in $(a+x)^m$ directs to be performed upon the binomial $a+x$, whether of continued multiplication, or elevation, or of division, or of extraction of roots, the terms of the resulting series will necessarily arise by regular and whole positive powers of x ; and that the two first terms of this series will always be $a^m + ma^{m-1}x$; so that the entire expansion of it may be represented under the form $a^m + ma^{m-1}x + px^2 + qx^3 + rx^4$, &c.

For, omitting the practical part of the process, which is taught by the above mentioned rules, it will constantly be found, by performing the operations at length in the usual way, that

$$\begin{aligned} \overline{a+x}^2 &= a^2 \pm 2ax + x^2 \\ \overline{a+x}^3 &= a^3 \pm 3a^2x + 3a^2x^2 \pm x^3 \\ \overline{a+x}^4 &= a^4 \pm 4a^3x + 6a^2x^2 \pm 4ax^3 + x^4 \\ &\quad \&c. \&c. \end{aligned}$$

$$\frac{1}{\overline{a+x}} = a^{-1} \mp a^{-2}x + a^{-3}x^2 \mp a^{-4}x^3, \&c.$$

$$\begin{aligned} \frac{1}{\overline{a+x}^2} &= a^{-2} \mp 2a^{-3}x + 3a^{-4}x^2 \mp 4a^{-5}x^3, \&c. \\ \frac{1}{\overline{a+x}^3} &= a^{-3} \pm 3a^{-4}x + 6a^{-5}x^2 \pm 10a^{-6}x^3, \&c. \\ &\quad \&c. \&c. \end{aligned}$$

$$\begin{aligned} \overline{a+x}^{\frac{1}{2}} &= a^{\frac{1}{2}} \pm \frac{1}{2}a^{-\frac{1}{2}}x - \frac{1}{8}a^{-\frac{3}{2}}x^2 \pm \frac{1}{16}a^{-\frac{5}{2}}x^3, \&c. \\ \overline{a+x}^{\frac{1}{3}} &= a^{\frac{1}{3}} \pm \frac{1}{3}a^{-\frac{2}{3}}x - \frac{1}{9}a^{-\frac{4}{3}}x^2 \pm \frac{5}{81}a^{-\frac{8}{3}}x^3, \&c. \\ \overline{a+x}^{\frac{2}{3}} &= a^{\frac{2}{3}} \pm \frac{2}{3}a^{\frac{1}{3}}x - \frac{1}{9}a^{-\frac{1}{3}}x^2 \pm \frac{2}{81}a^{-\frac{5}{3}}x^3, \&c. \\ &\quad \&c. \&c. \end{aligned}$$

$$\begin{aligned} \frac{1}{\overline{a+x}^{\frac{1}{2}}} &= a^{-\frac{1}{2}} \pm \frac{1}{3}a^{-\frac{3}{2}}x + \frac{2}{9}a^{-\frac{5}{2}}x^2 \pm \frac{7}{81}a^{-\frac{7}{2}}x^3 \&c. \\ \frac{1}{\overline{a+x}^{\frac{1}{3}}} &= a^{-\frac{1}{3}} \pm \frac{2}{3}a^{-\frac{4}{3}}x + \frac{5}{9}a^{-\frac{5}{3}}x^2 \mp \frac{20}{81}a^{-\frac{11}{3}}x^3, \&c. \\ &\quad \&c. \&c. \end{aligned}$$

In all the instances here given, it is apparent, that the first term of the series, in each of them, is the same as the power or root of the first term of the binomial quantity to which it belongs; and that the coefficient of x in the second term is always had by multiplying the index of the first term into that term, having its index diminished by 1; and as these cases are of the same kind with those that are designed to be expressed, in universal terms, by the general formula, it is in vain, as far as regards the two first terms of the expansion, to look for any other origin of them, than what may be derived from these and similar operations.

Assuming therefore, $\overline{a+x}^m = a^m + ma^{m-1}x + px^2 + qx^3 + rx^4$, &c. it only remains to determine the value of the coefficients p, q, r , &c. and to shew the law of their dependence on the index (m) of the operation by which they are produced.

For this purpose, let m denote any number whatever, integral or fractional, positive or negative; and let the coefficients of the 3d, 4th, 5th, &c. terms of the m th power of any binomial be denoted by p', q', r' , &c.

Then for x , in the above form, put $y+z$, and there will arise $\overline{a+y+z}^m = \overline{a+y+z}^m = \overline{a+y+z}^m$; which are all identical expressions; and when expanded according to the proper forms, must be equal to each other.

But $\overline{a+y+z}^m = a^m + ma^{m-1}(y+z) + p(y^2 + 2yz, \&c.) + q(y^3 + 3y^2z, \&c.)$ &c. (omitting to set down the higher powers of z , which are not wanted in the demonstration) $= a^m + ma^{m-1}y + py^2 + qy^3$ &c. $+ ma^{m-1}z + 2pyz + 3qyz$, &c.

And $\overline{a+y+z}^m = \overline{a+y}^m + m.a^{m-1}y^{m-1}z$, &c. $= \overline{a+y}^m + mz(a^{m-1} + m-1.a^{m-2}y + p'y^2 + q'y^3, \&c.) = a^m + ma^{m-1}y + py^2 + qy^3$, &c. $+ ma^{m-1}z + m.m-1.a^{m-2}yz + mp'y^2z + mq'y^3z$, &c. Hence the two series being identical, $a^m + ma^{m-1}y + py^2 + qy^3$ &c. $+ ma^{m-1}z + 2pyz + 3qyz$, &c. $= a^m + ma^{m-1}y + py^2 + qy^3$ &c. $+ ma^{m-1}z + m.m-1.a^{m-2}yz + mp'y^2z + mq'y^3z$, &c. or, leaving out the terms common to each, $2pyz + 3qyz$ &c. $= m.m-1.a^{m-2}yz + mp'y^2z$, &c.

And since the coefficients of the terms involving the same powers of the arbitrary quantities y and z must be the same, we shall have $2p = m.m-1.a^{m-2}$, or $p = \frac{m.m-1}{2} a^{m-2}$;

and hence $p' = \frac{m-1.m-2}{2} a^{m-3}$. Also $3q = mp' =$

$$\frac{m \cdot m - 1 \cdot m - 2}{2} a^{m-3}, \text{ or } q = \frac{m \cdot m - 1 \cdot m - 2}{2 \cdot 3} a^{m-3}; \text{ and fo}$$

on.
From which it follows, that $(a+x)^m = a^m + m \cdot a^{m-1} x + \frac{m \cdot m - 1}{2} a^{m-2} x^2 + \frac{m \cdot m - 1 \cdot m - 2}{2 \cdot 3} a^{m-3} x^3$ &c. univerfally, whatever may be the value of m , whether integral or fractional, positive or negative, as was to be fhewn.

The demonftration here given (which is fimilar to that in vol. ii. of Manning's Algebra) is founded upon the principles firft laid down by la Grange, in his "Theorie des Fonctions Analytiques;" to which admirable work the reader is referred for farther information on this fubject, as well as for whatever regards the doctrine of expanded functions in general, which is there treated of in a way worthy the genius of the author.

BINOMIUS, from *bis* and *nomen, name*, in *Middle Age Writers*, denotes a perfon with two names.

Moft Christians anciently were called binomii, as having had other names in their heathen ftate, which they changed at their converfion. Befides, it was an ancient cuftom for parents to give names to their children immediately after they were born, and fometimes other different ones afterwards at their baptifm; one of which frequently became a *cognomen*, or furname. In reality, it was a conftant practice to affume a new name at baptifm, as the religious ftill do in the Romifh church, on their reception into the monaftic ftate; or the Jewifh profelytes at their circumcifion.

BINOTATA, in *Entomology*, a fpecies of **CHRYSOMELA**, found in Denmark. This is teftaceous, with the wing-cafes ferruginous at the bafe. Gmelin.

BINOTATA, a fpecies of **CICADA** (*Membracis Foliacea*). This infect inhabits New Holland; the thorax is flightly armed, and produced behind; abdomen fhort and teftaceous; with a black fpot at the bafe of the wing-cafes. Fabricius, &c.

BINOTATUS, an European fpecies of **CARABUS**, of a black colour, with two red fspots in front of the head, and the antennæ yellow at the bafe. Fabricius.

BINOTATUS, a fpecies of **CIMEX** (*Reduvius*), found in Surinam. It is black above, with a rufous dot at the apex of each of the wing-cafes. Fabricius.

BINTAM, in *Geography*, one of the chief towns of the kingdom of Yhor or Jor. See **MALACCA**.

BINTAN, one of the fmall iflands at the fouth end of the ftraits of Malacca, and nearly north from Lingan ifland.

BINTHA, in *Ancient Geography*, a town of Libya interior, near the Niger, according to Ptolemy.—Alfo, a place in Afta, in Ofrhoenè, according to the Notitia Imperii.

BINTSCHAY, in *Geography*, a town of Bohemia, in the circle of Boheflaw. 7 miles north-eaft of Turnau.

BINWY HEAD, a cape of Ireland, on the north-weft coaft of the county of Mayo. N. lat. 54° 20'. W. long. 9° 36'.

BIOBIO, or **VIOVIO**, a river of Chili, in South America. Its fource is among the filver mines, in the mountains called *Sierra belluda*; it receives the fstreams of the Huequen and Tolpan, before it reaches Santa Fee, where it firft becomes navigable, and from whence, to its mouth, for the diftance of 33 leagues, its courfe is nearly from eaft to weft.

The new city of Mocha, peopled by inhabitants who removed from Conception twelve years ago, is fituated on its north bank, about twelve miles from the fea, and is a depot for the filver from the mines of Nimino, and for the gold with which its fands abound.

The mouth of this river is in S. lat. 36° 45'. W. long. 73° 28'; and its entrance known by two remarkable hills, called the Teats of Biobio, which are fituated at the north, betwixt it and the bay of Conception, and ferve to both as land-marks for navigators.

The river is about one mile acrofs at the mouth, has good depth of water in the middle, and the tide riles about feven feet and a half at the full and change of the moon.

BIOCOLYTÆ, in the *Byzantine Empire*, an order of officers appointed to prevent the violences frequently committed by the foldiers. The word is compounded of βία, *vis, violence*, and κολύω, *I hinder*; and fhould rather be written *biacolyte*.

The biocolytæ appear to have been much the fame with the French archers of the Marfhalsea. They were fuppreffed by the emperor Juftinian.

BIOCULATA, in *Entomology*, a fpecies of **EPHEMERA**, defcribed by Geoffroy, Linnæus, &c. The wings are white, reticulated; on the head two yellow tubercles. Fabr. Inhabits wet places in Europe. The tail of this kind is furnifhed with two briftles as long as the body.

BIOCULATA, in *Natural Hiftory*, a fpecies of **HIRUDO**, of an elongated form and cinereous colour, with two eyes. Gmel. Müll: This is *hirudo flagnalis* of Linnæus. Fn. Suec. &c. Found in wet hollows and rivulets very common. Length of this creature is nine lines. The female bears about forty eggs at a time, which are furrounded by a pellucid circle; at firft thefe are cinereous, afterwards brown; and the young, after excludion, adhere by their tails to the belly of the female. Gmel.

BIOCULATUS, in *Entomology*, a fpecies of **CRYPTOCEPHALUS** (*Crioceris*), found at the Cape of Good Hope. It is teftaceous; thorax immaculate; on the wing-cafes two ocellar white fspots. Fabricius.

BIO CZ, in *Geography*, a town of Poland, in the palatinate of Cracow, north of the Carpathian mountains. N. lat. 49° 48'. E. long. 21° 40'.

BIOEA, in *Ancient Geography*, a fea-port in the fouthern part of the ifland of Sardinia, according to Ptolemy.

BIOGLIO, in *Geography*, a town of Italy, in the lordfhip of Vercelli, 23 miles N.W. of Vercelli.

BIOGRAPHER, formed from the Greek βίος, *life*, and γράφω, *I defcribe*, an author who writes a hiftory, or life, of one or more perfons. Such were Plutarch, Corn. Nepos, &c.

BIOGRAPHY, the art of defcribing or writing lives, is a branch or fpecies of hiftory more entertaining, as well as more ufeful in many refpects, than general hiftory, as it reprefents great men more diftinctly, unincumbered with a crowd of other aactors, and defcending into the detail of their aactions and character, their virtues and failings, gives more light into human nature, and leads to a more intimate acquaintance with particular perfons than general hiftory allows. A writer of lives may defcend, with propriety, to minute circumftances and familiar incidents. From him it is expected to give the private as well as the public life of thofe whofe aactions he records; and it is from private life, from familiar, domeftic, and feemingly trivial occurrences, that we often derive the moft accurate knowledge of the real character. The fubjects of biography are not only the lives of public or private perfons, who have been eminent and beneficial to the world in their refpective ftations, but thofe alfo of perfons notorious for their vice and profligacy; which may ferve, when juftly characterized, as warnings to others, by exhibiting the fatal confequences which, fooner or later, generally follow licentious practices. As for thofe, who expofed their lives, or otherwife employed their time and labours for the
service

service of their fellow-creatures, it seems but a just debt, that their memories should be perpetuated after them, and that posterity should be made acquainted with their benefactors. This was no small incentive to virtue in the pagan world; and no one can be ignorant, on due reflection, how natural this passion is to mankind in general. For this reason, as Dr. Ward presumes (*Orat.* vol. ii. p. 252.), Virgil has placed not only his heroes, but also the inventors of useful arts and sciences, and other persons of distinguished merit, in the Elysian fields, where he describes them (*Æn.* l. vi. v. 661.):

“Here patriots live, who, for their country’s good,
In fighting fields were prodigal of blood;
Priests of unblemished lives here make abode,
And poets worthy their inspiring god;
And searching wits of more mechanic parts,
Who grac’d their age with new-invented arts;
Those who to worth their bounty did extend,
And those who knew that bounty to command:
The heads of these with holy fillets bound,
And all their temples were with garlands crown’d.”

In the lives of public persons, their public characters are principally, but not solely, to be regarded. The world is inquisitive to know the conduct of princes and other great men, as well in private as in public: and both may be of service, considering the influence of their examples. But to be over-inquisitive in searching into the weaknesses and failings of the greatest or best men, is, to say no more of it, a needless curiosity.

In this species of writing Plutarch has no inconsiderable merit; and to him we are indebted for much of the knowledge which we possess concerning several of the most eminent personages of antiquity. His matter, however, is better than his manner; as he cannot lay claim to any peculiar beauty or elegance. His judgment too, and his accuracy, have sometimes been taxed; but whatever may be his defects of this kind, his lives of eminent men will always be considered as a valuable treasure of instruction. He is remarkable for being one of the most humane writers of all antiquity; less dazzled than many of them are, with the exploits of valour and ambition; and fond of displaying his great men to us, in the more gentle lights of retirement and private life.

It has been a matter of dispute among the learned, whether any one ought to write his own history. No one, it may be said, can be so much master of the subject as the person himself; and besides, there are many instances, both ancient and modern, to justify this practice. But, on the other hand, it must be owned, that it is attended with many inconveniences, some of which are mentioned by Cicero: “If,” says he, (*Ad. Famil. l. v. epist. 12.*) “there is any thing commendable, persons are obliged to speak of themselves with greater modesty, and to omit what is blameable in others. Besides, what is said is not so soon credited, and has less authority; and after all, many will not hesitate in censuring it.” To the same purpose it is well observed by Pliny (*l. viii. ep. 1.*): “Those who proclaim their own virtues, are thought not so much to proclaim them, because they did them, as to have done them, that they might proclaim them. Hence, what would appear great, if told by another, is lost, when related by the party himself. For when men cannot deny the fact, they reflect upon the vanity of its author. Wherefore, if you do things not worth mentioning, the actions themselves are blamed; and if the things you do are commendable, you are blamed for mentioning them.” The justice of these reflections will be allowed; and yet, considering how natural it is for men to love them-

selves, and to be inclined in their own favour, it seems to be a very difficult task for any one to write an impartial history of his own actions. There is scarcely any treatise of this kind that is more celebrated than Cæsar’s “Commentaries;” and yet Suetonius tells us (*In Vit. c. 56.*), that “Afinius Pollio, who lived at that time, thought that they were written neither with due care nor integrity; that Cæsar was too often credulous in his accounts of what was done by other persons, and misrepresented his own actions, either designedly, or through forgetfulness; and therefore he supposes he would have revised and corrected them.” At some times, however, it may without doubt be justifiable for a person to be his own historian. Plutarch mentions two cases, in which it is allowable for a man to commend himself, and to be the publisher of his own merits. These are, “when the doing of it may be of considerable advantage, either to himself, or to others.” “Anciently,” says Tacitus (*Vit. Agric. c. 1.*), “many wrote their own lives, rather as a testimony of their conduct, than from pride;” remarking, “that the more virtue abounds, the sooner are reports of it are credited.” But the ancient writers had a method of diverting the reader’s attention from themselves, when they had occasion to record their own actions, and of thus rendering what they said less invidious, which was by speaking of themselves in the third person: thus Cæsar never says, “I did,” or “I said this or that,” but always “Cæsar did,” or “said, so and so.” Dr. Johnson has given an excellent paper on the subject of biography in the collection of papers called the “*Idler.*” Volney, in his “*Lectures on History,*” remarks, that biography is the only kind of history that is proper for young people. See *HISTORY*.

Dr. Priestley has constructed and published a “*Biographical Chart,*” which is very useful to students in chronology, history, and biography. This chart, which is about three feet in length, and two feet in breadth, represents the interval of time between the year 1200 before the Christian era and 1800 after Christ, divided by an equal scale into centuries. It contains about 2000 names of persons the most distinguished in the annals of fame, the length of whose lives is here represented by lines drawn in proportion to their real duration, and terminated in such a manner as to correspond to the dates of their births and deaths in universal time. These names are distinguished into several classes by lines running the whole length of the chart, the contents of each division being expressed at the end of it. The chronology is noted in the margin on the upper side, by the year before and after Christ, and on the lower by the same era, and also by the succession of such kings as were the most distinguished in the whole period.

BIOLLE, LA, in *Geography*, the chief place of a canton, in the district of Chambery, and department of Mont Blanc. The population of the place is estimated at 1038, and of the canton at 5625 persons; the territorial extent contains 92½ kilometres, and 10 communes.

BIOLYCHNIUM, formed of *βίος*, *life*, and *λυχνία*, *light*, a name given by some physicians to a supposed principle of vitality inherent in the heart, or blood, and remaining there as long as life continues. Of this principle, or innate heat, different accounts have been given by different writers; as Gasp. Hoffman, Courgius, &c.

Beguinus has described a process for preparing from human blood a vital balsam under this denomination; and J. Ern. Burgravius has written a treatise upon it.

BION, in *Biography*, a native of Proconnesus, was contemporary with Pherecydes, and flourished about the 59th olympiad, or 544 years B. C. Clemens Alexandrinus informs us, that he copied the titles, and abridged the works of

of Cadmus the Milesian, who is said to have been the first writer of history in prose, and to have lived before the Trojan war.

BION, the *Philosopher*, was a native of Borysthenes, and flourished in the reign of Antigonus Gonatas, king of Macedonia, and died about the last year of the 134th olympiad, or the 231st year B.C. He was a person of mean extraction, being the son of a Lacedæmonian harlot; and when young, was sold as a slave to an orator, who afterwards gave him his freedom, and left him large possessions. Thus endowed, he went to Athens, and devoted himself to the study of philosophy. He was first the disciple of Crates, then of the Cynics, afterwards of Theodorus, and last of all of Theophrastus; but he adopted and maintained the opinions of Theodorus, called the atheist. He was skilled in geometry and music, and also in poetry and rhetoric; and went about from one city to another, displaying his talents. Several of his repartees, for which he was famous, are preserved; and Horace is supposed to allude to him in his

“Ille Bioneis sermonibus, et sale nigro.” Epist. 2. lib. ii. To a great talker, who asked him a favour, he said, “If you would have me grant it, let some other person ask it for you.” Being on board a ship belonging to pirates, which was chased by another, the pirates exclaimed, “We are undone, if they discover who we are;” “and I,” says Bion, “if they discover who I am.” He ridiculed the contradiction of burning the dead as if they were insensible, and lamenting them as if they were still sensible. Some of his jests were offensive to morals and decency; for to neither of these did he pay much regard. Notwithstanding his avowed irreligion, he recurred, when sick, to the practice of puerile superstitions, and submitted to death with great reluctance. Brucker’s Hist. Phil. by Enfield, vol. i. p. 189. Gen. Dict. Laertius, lib. iv. tom. i. Ed. Meib. p. 253, &c.

BION, a celebrated Bucolic poet, was a native of Smyrna, and a contemporary of Ptolemy Philadelphus, about 280 years B.C. In Sicily or Magna Græcia, where he is supposed to have spent the last part of his life, Moschus was his pupil; and from the beautiful elegy of this poet, we are led to infer, that he lost his life in prison, and that the perpetrators of this deed did not escape just punishment. As a poet he was highly esteemed; and his performances that are extant, though inconsiderable, serve as examples of the excellence to which the Greeks had attained in similar compositions. Nothing can be more sweet and tender than his “Elegy on the death of Adonis,” nor any thing more elegantly ingenious than his “Cupid instructed.” The works of Bion are usually printed with those of Moschus; and the best editions are those of Paris, in 1686; of Venice, in 1746; Heskin’s, at Oxford, in 1748; Scheir’s, at Leiptic, in 1752; and Wakefield’s, Lond. 1795. Gen. Dict. Gen. Biog.

BION, M. mathematical instrument maker to the French king, died at Paris, in 1733, at the age of 78 years, and is known to mathematicians as the author of two works; one, “On the construction and principal uses of mathematical instruments,” translated into English with additions, by Mr. Edmund Stone; and another, “On the Use of the Globes;” the fifth edition of which was published at Paris, in 1728.

BIONCOURT, in *Geography*, a town of France, in the department of the Meurthe, and the chief place of a canton, in the district of Chateau-Salins, 2 leagues W. S. W. of Chateau-Salins.

BJÖRKNA, in *Ichthyology*, a species of *CYPRINUS*, having thirty-five rays in the anal fin. Found in the lakes of Sweden. Linnæus. This is *Cyprinus quincuncialis*, pinna ani officulorum 25, of Ardeti.

BIONDO, FLAVIO, (Lat. *Blondus*), in *Biography*, an antiquary and historian, and one of the first who illustrated

the Roman antiquities, was born at Forli in 1388, and studied at Cremona. Being deputed in his youth on public business to Milan, he there made the first copy of Cicero’s treatise on famous orators. At Rome he became secretary to pope Eugenius IV., and served the three succeeding popes in the same office. He was employed in various delegations to Venice, where he had an opportunity of cultivating an acquaintance and friendship with many learned persons in that republic. Debarred by his marriage from enjoying any church preferments, and devoted to study more than to the pursuit of wealth and honour, he preferred retirement to any public station, and prosecuted his literary labours till his death in 1463. His long residence at Rome enabled him accurately to describe its chief relics of antiquity in 3 books entitled “Roma instaurata;” which were followed by 10 books on the laws, government, customs, religion, &c. of the Romans, under the title of “De Roma Triumphante.” Another work, on its history, antiquities, and geography, was intitled “Italia Illustrata.” All these works display great reading and diligent research, though they are not free from many errors to which his ignorance of Greek literature must have contributed. Having undertaken to write a general history from the decline of the Roman empire to his own time, he finished three decads of it, and the first book of the fourth. He also wrote a book “De Origine et Gestis Venetorum,” and had planned an entire history of the Venetian republic; but he afterwards chose to insert the substance of it in his general history. He left several other writings in MS., which it is needless to mention. His style wants purity and elegance, and his judgment in collecting materials was superior to his taste in using them. A collection of his works was published at Basil, in 1531, fol. Nouv. Dict. Hist. Gen. Biog.

BJORKO, in *Geography*, a town of Sweden, in the province of Upland.

BIORNEBORG, a town of Finland, on the east side of the gulf of Bothnia, seated on a lake, 80 miles north of Abo. N. lat. 62° 6’. E. long. 22° 35’.

BIORNSE, a small island of Denmark, near the south coast of the island of Funen.

BIÖRNSTAHL, JAMES JONAS, in *Biography*, a learned Swedish traveller, was born at Rotarbo in 1731, and having finished his education in the university of Upsal, he became, in 1766, tutor to the son of baron Rudbec, with whom he travelled for eight years through France, Italy, part of Germany, Holland, and England. At Paris, where he improved himself in the Oriental languages, he was elected, in 1770, a member of the academy of sciences, and upon the baron’s return to Sweden, in 1775, Biörnstaahl received orders from the king to travel at his expence through the Ottoman empire, Syria, Egypt, and the northern part of Africa, and in the same year he was appointed extraordinary professor of philosophy at Upsal. In the following year he commenced his travels; and having arrived at Constantinople, he continued there two years, improving himself in the eastern languages. In 1779, he was appointed professor of the Oriental languages at Lund; but he died this year of a putrid fever at Salonichi. The result of his observations in the course of his travels was communicated in a series of letters to C. C. Giörwell, librarian to the king at Stockholm; and a complete collection of them appeared at Stockholm, in 1778, in three volumes, 8vo. under the title of “J. J. Biörnstaahl’s Bref rörande des utländska Resa till utgifvaren C. C. Giörwell.” A German translation of this work was published at Stralsund and Rostock, in 1783, in six volumes, 8vo. The principal object of Biörnstaahl’s research was Oriental MSS. from which he made many important and useful extracts. Gen. Biog.

BIOT, in *Geography*, a town of France, in the department of the Var, and chief place of a canton, in the district of Grasse, 3 miles north of Antibes.

BIOTA, in *Zoology*, a name introduced by Dr. Hill for the *Polypterus* genus called *Hydra*, by Linnæus, as it is believed from the reproduction or regeneration of the parts when cut off; and this name *biota* is likewise given it on the same account, being derived from *bio*, *life*. See **HYDRA**.

BIO THANATI, from *bio*, *with life*, and *thanos*, *death*, in some *Medical Writers*, denote those who die a violent death. The word is also written, and with more propriety, *biothanati*; sometimes *biothanati*.

In a more particular sense, it denotes those who kill themselves, more properly called *autothanati*. See **SUICIDE**. In this sense it is that the word is used both by Greek and Latin writers. By the ancient discipline of the church, they were punished by denying them burial, and refusing all commemoration of them in the prayers and offices of the church.

BIO THANATI, supposed by some to be derived from *bio*, *life*, and *thanos*, *death*, and alluding to the belief of a future life after death, was also a name of reproach given by the heathens to the primitive Christians, for their constancy and forwardness to lay down their lives in martyrdom.

BIO THANATOS is also used in some writers of the barbarous age for wicked, damnable, or accursed. Du-Cange.

BIOUAC, *Βιουακ*, or *Βιουακ*, in the *Military Art*, a nightly guard performed by the whole army, when there is an apprehension of danger from the enemy. The word is formed by corruption from the German *weywach*, a *double watch*, or *guard*. See **GUARD**.

BIOLLE, in *Geography*, a town of France, in the department of the Lot, and chief place of a canton, in the district of Montauban, 3 leagues N.E. of Montauban.

BIPARTIENT, in *Arithmetic*, is a number that divides another into two equal parts without a remainder. Thus 2 is a bipartient to 4, &c.

BIPARTITA, in *Entomology*, a species of **LEPTURA**, that inhabits Upper Austria. It is of a black colour; thorax ferruginous, with a longitudinal black line; a common ferruginous spot on the wing-cases.

BIPARTITE LEAF, in *Botany*. See **LEAF**.

BIPARTITION, signifies a division into two equal parts.

BIPED, in *Zoology*, an animal furnished with only two legs. Men and birds are bipeds. Apes occasionally walk on their hind legs, and seem to be of this tribe, but that is not a natural position for them, and they rest upon all their leg-like other quadrupeds. The jerboas are also of the latter description, jumping and leaping on their hind legs, but resting on the fore legs likewise.

Plato, we are told, once described a man to be a biped without fathers; and Diogenes, in order to shew what he deemed the absurdity of this definition, plucked all the feathers off a cock, and placing it in the midst of the Academic school, exclaimed, "there is one of Plato's men!"

BIPED, **BIFEDE**, **BIPES**, a genus of reptiles that belongs to the lizard family, in the system of La Cépède. These have, according to the character established by that author, a very long body covered with scales; and the toes of the two little feet, which are placed anteriorly, are armed with nails. La Cépède describes only one species of this genus, which he calls *le cannelle*; it is a native of Mexico, and preserved in the museum at Paris. La Cépède, it appears, was the first writer who described this creature; but Dr. Shaw noticed it afterwards in the Naturalist's Mis-

cellany, under the name of *lacerta umbrioides*, *umbrioides* lizard, which see; and a specimen of it, about half the size of that in the museum at Paris, is preserved in the British museum. This must not be confounded with *lacerta bipes* of Linnæus. Pallas has described another kind of biped lizard, which is called *lacerta apus*, but in that the legs are very small, monodactylous, and placed far behind: some have almost doubted whether these may not rather be part of the organs of generation than legs; and in general appearance the creature approaches rather to the snake than lizard tribe. It is a native of the southern part of Siberia, and also of Greece, and is of a ferruginous colour.

BIPENNIS, in *Roman Antiquity*, a two-edged ax, used anciently by the Amazons in fight: as also by the heathen, to cut asunder the ropes and cordage of the enemy's vessels. The bipennis was a weapon chiefly of the oriental nations, made like a double ax, or two axes joined back to back, with a short handle. Some compare it to a figure of a pen, and suppose it hence to have acquired the name *bipennis*; the tube or barrel of the pen representing the handle, and the point or nib the head. Modern writers usually compare it to our halbard, or partizan; from which it differed in that it had no point, and that its shaft or handle was much shorter. See **HALBARD**.

BIPES, in *Zoology*, a species of **LACERTA**, with the body subequal, round, imbricated, and pale; on each scale a brown dot; no anterior feet; posterior feet with two toes unarmed. Gmelin. *Anguis bipes*, with 100 abdominal, and 60 subcaudal plates. Linn. Mus. Ad. Frid. A native of South America and India. Length about six inches; body cylindrical and slender; colour pale yellow. Biped Lizard.

BIPES, a species of **COLUBER**, described by Gmelin on the authority of Scopoli, as an inhabitant of the Tyrolese waters, where it is said to feed on frogs and fishes; it has two feet, fulvous eyes, whitish under-jaw, elliptic, marginate, dorsal scales; sides spotted with white; abdominal plates whitish, with a brown spot in the middle. Gmelin describes it specifically as having 116 plates on the belly, and 58 subcaudal scales.

BIPINNULA, in *Botany*. See **ARETHUSA**.

BIPLICATA, in *Conchology*, a species of **VOLUTA**, figured by Martini only. It is of a tapering shape, smooth, white spotted with yellow, and dotted with black; lip acute; pillar with two pluts.

BIPUNCTARIA, in *Entomology*, a species of **PHALÆNA** (*Geometra*), the anterior wings of which are cinereous, undulated with brown; a dusky band in the middle, and two black dots. Fabricius, &c.

BIPUNCTATA, a species of **APIS**, that inhabits Siberia. This insect is hairy and black, with two yellow belts; the first with two lateral black dots. Lepechin. it. Gmel.

BIPUNCTATA, a species of **ARANEA**, with a black, globose abdomen, marked with two excavated dots. Linn. Fa. Suec.

BIPUNCTATA, a species of **CANTHARIS**, with two black spots on the thorax; wing-cases black at the tip. Fabricius. Inhabits Leipzig.

BIPUNCTATA, a species of **CASSIDA**, of a yellowish colour, with two black dots on the wing-cases. This is a native of India. Fabricius, &c.

BIPUNCTATA, a species of **CHRYSOMELA**, described by Fabricius as a native of the Cape of Good Hope. It is testaceous, with a brown spot on each of the wing-cases.

BIPUNCTATA, a species of **CICADA**, described by Linnæus. It is yellow, with two brown spots in front; wing-cases white, veined with yellow. A native of Europe.

BIPUNCTATA is also a species of **CICADA** (*Deflexa*), found in South America. The colour is whitish; wing-cases deflected, and griseous, with two impressed dots on the anterior part of the margin of the thorax. Fabricius, &c.

BIPUNCTATA, a species of **COCCINELLA**, of a red colour, with two black dots. Linn. Fn. Succ. &c.

BIPUNCTATA, a species of **FORFICULA**, that inhabits Italy. This is black; hind part of the head and legs rufous; a white spot on the wing-cases. Fabricius. It has eleven joints in the antennæ.

BIPUNCTATA, a species of **LEPTURA**, of a black colour, and villous; wing-cases livid; scutellum, spot in the middle, and tip black. Inhabits Siberia.

BIPUNCTATA, a species of **NITIDULA**, of a testaceous colour, with five black spots. Gmelin.

BIPUNCTATA, a species of **TENTHredo**, with somewhat fetaceous antennæ, of nine joints; black; scutellum black, and marked with two white dots. Inhabits the woods of Lufice.

BIPUNCTATA, a species of **VESPA**, with a spotted thorax; abdomen with four yellow bands, and two dots of the same colour on the first segment. Fabricius. Inhabits Germany.

BIPUNCTATUM, a species of **OPATRUM**, of a brown colour, with somewhat cylindrical, immarginate thorax, with two hollows; two extreme joints of the antennæ distant and larger. Herbst. Gmel. &c.

BIPUNCTATUS, a species of **BRUCHUS**, that inhabits Helvetia. It is cinereous; wing-cases brown with an ocular, black dot at the base of each. Fabricius.

BIPUNCTATUS, a species of **CARABUS**, of a somewhat brassy colour, with two impressed dots on the wing-cases. Linn. Fn. Succ. This is described by Fabricius as being brassy, with black antennæ, and pale shanks. This inhabits Europe.

BIPUNCTATUS, a species of **CIMEX** (*Rotundatus*), of a pale griseous colour, with a white dot on each side of the scutellum near the base. Linnæus. Inhabits Syria.

BIPUNCTATUS, a species of **CRYPTOCEPHALUS**, of a glossy black; wing-cases red with two black dots; antennæ length of the body. Fabricius. Gmelin, &c. *Chrysomela punctata*. Linn. Inhabits the northern parts of Europe; on the Nut.

BIPUNCTATUS, a species of **CURCULIO**, found in Europe. This is cinereous, with a black spot on the wing-cases; shanks yellowish. Linnæus. Fn. Succ.

BIPUNCTATUS is likewise a species of **CURCULIO**, with the thorax scabrous; wing-cases clouded, with two glossy black spots near the apex. Lepech. it. A native of Siberia.

BIPUNCTATUS, a species of **GRYLLUS** (*Acrida. Truxalis*), of a brownish colour; scutellum as long as the abdomen. A native of Europe.

BIPUNCTATUS, a species of **HEMOROBIVS**, found in Europe. It is variegated with yellow and brown, and has two black spots on the wings. Fabricius.

BIPUNCTATUS, a species of **ICHNEUMON**, found in Europe. This insect is black; base of the antennæ brown; thighs at the base, and face yellow, with two black marks on the latter; abdomen, shanks, and tips of the posterior feet ferruginous. Linn. Mus. Lesh.

BIPUNCTATUS, a species of **PAPILIO** (*Plib. Urli*). The wings are entire, brown; on both sides of the first pair an oblique band, and two dots of silvery; at the base of the posterior ones beneath a band and stripe of yellowish.

BIPUNCTATUS, a species of **SCARABÆUS**, having a black thorax, bordered with red; and red wing-cases

with a black spot on each. Lepech. it. Fabricius. This is the insect which Pallas names *Scarabæus coccinilloides*; it is found in the southern parts of Russia under horse dung.

BIPUNCTATUS, in *Inhibiology*, a species of **CYRINUS**, described by Bloch. The lateral line is red, with a double series of black spots; and sixteen rays in the anal fin. This kind is found in the sandy rivers of Germany.

BIPUNCTELLA, in *Entomology*, a species of **PHALÆNA** (*Tinea*), wings cinereous brown, with a marginal white spot. Fabricius.

BIPUNCTELLA, a species of **PHALÆNA** (*Tinea*), with fuscous wings, with a common dentated white stripe; thorax snowy-white with two black spots. Fabricius. This is *Tinea cchiella* of Schmettler.

BIPUSTULATA, a species of **CANTHARIS** (*Malachius*), of a brassy green colour with the apex of the wing-cases red. Linn. Fn. Succ. Geoffroy. This is *Thelephorus viridellanus nitidus* of Degeer. A very common insect in most parts of Europe.

BIPUSTULATA, a species of **CASSIDA**, of a green colour; wing-cases with two lateral sanguineous spots. Inhabits Cayenne. Linn. Fabr. &c.

BIPUSTULATA, a species of **CHRYSOMELA**, described as a Swedish insect by Thunberg. The wing-cases are black, spot at the tip, head and sides of the thorax yellow.

BIPUSTULATA, a species of **COCCINELLA**, of a black colour, with red spots, and sanguineous abdomen. Linn. Fn. Succ.

BIPUSTULATA, a species of **HISPA**, with ferrated antennæ; black and hairy, with a rufous spot at the base of the wing-cases. This kind inhabits Italy. Fabricius.

BIPUSTULATA, a species of **LEPTURA**, that inhabits Upsal. The wing-cases are black, striated with dots, and two testaceous spots. Thunberg, &c.

BIPUSTULATA, a species of **NITIDULA**, of an ovate form, and black colour, with a red spot on each of the wing-cases. Fabricius and Gmelin. This is *Silpha oblonga nigra*, &c. of Linn. Fn. Succ. and Syst. Nat. *Silpha*, of Degeer; *Dermestes*, of Geoffroy; and *Ostoma bipustulata*, of Laichart. Inhabits Europe, and feeds on carcasses, meat, bacon, &c.

BIPUSTULATUM, a species of **OPATRUM**, that inhabits Pomerania, and is about the sixth part of an inch in length. Its form is narrow and elongated; colour ferruginous; wing-cases slightly grooved.

BIPUSTULATUS, a species of **ATTELABUS**, met with in North America. It is black, with a rufous spot at the base of each of the wing-cases. Fabricius.

BIPUSTULATUS, an insect of the genus **CARABUS**, in Gmelin's edition of the *Systema nature*. This is the true *Carabus crux major* of Linnæus, which Fabricius misconceiving, describes as a new species, in his work entitled "Species Insectorum," under the name of *Bipustulatus*. By retaining at the same time the Linnæan character of *Carabus crux major* under the proper name, he constitutes two species of the same insect. In the *Entomologia systematica* of Fabricius, this error is continued, and Gmelin, resting on the authority of this writer, describes them also as distinct species. See **CRUX MAJOR** (*Carabus*.)

BIPUSTULATUS, a species of **CIMEX**, the general colour of which is black; thorax spinous; wing-cases livid; and two scarlet dots on the head. Fabricius, Gmelin, &c. *Cimex balteatus* of Degeer. Inhabits South America.

BIPUSTULATUS, a species of **CRYPTOCEPHALUS**, described by Fabricius as being of a black colour, with a rufous spot at the tip of the wing-cases. Obs. The figure referred to in Schæffer *Vierzehender Fälskåfer*, is not black, but of a

light or azure blue, rufous at the apex of the wing-cases; a little anterior of the same colour. It is an European insect, and inhabits the flowers of the chr; fauthemum. Gmelin considers it as *Cryptophylus* of Lachart.

BIPUSULATUS, a species of **DERMESTES**, that is black and glossy, with the head, thorax, and spot at the base of the wing-cases red. Thu.berg. This is *Ips humeralis* of Fabricius. Country unknown.

BIPUSULATUS, a species of **DYTISCUS**, described by Fabricius. It is smooth and black, with two red spots on the posterior part of the head. This inhabits the north of Europe.

BIPUSULATUS, a species of **DYTISCUS**, that inhabits Germany. This kind is black; thorax yellow, with two black spots; wing-cases yellow, varied with brown. Fabricius.

BIPUSULATUS, a small species of **ELATER**, found in woods in England and other parts of Europe; the colour is black and shining, with a red spot at the base of each of the wing-cases. Linn. Marsh, &c. Gsf. By mistake, this insect is thus described by Gmelin, *N. or. n. l. m. elytra puncta ligata*, &c. with reference to the Fabrician Species, *El. scutum*, in which the dot at the base of the wing-cases is said to be black. This is *Elater punctatus* of Parzer; and *Le. Imp. nigr. & tr. l. m. g.* of Geoffroy.

BIPUSULATUS, a species of **CAYLUS**, in the section *loc. m.* of a pale brown colour; sword at the extremity of the abdomen, and two spots on the thorax black; wing-cases yellowish, suffused with black, and shorter than the wings. Gmelin, &c. This insect is rather less than an inch in length according to Schaeffer's figure, exclusive of the antennae, which are rather longer than the body. Inhabits Europe.

BIPUSULATUS, a species of **SCARABÆUS**, of a black colour, with a rufous spot on each of the wing-cases. A native of New Holland. Fabricius.

BIPUSULATUS, a species of **STAPHYLINUS**, that inhabits the northern parts of Europe. Colour black, with a ferruginous dot on each of the wing-cases. Linn.

BIQUADRATE, or **BIQUADRATIC power**, in *Algebra* and *Arithmet.* is the next power above the cube, or the square multiplied by itself. Thus, 16 is the biquadrate, or 4th power of 2, or it is the square of 4, which is the second power of 2: for $2 \times 2 = 4$, and $4 \times 4 = 16$.

BIQUADRATIC Equation, an equation raised to the fourth power, or where the unknown quantity of one of the terms has four dimensions: thus, $x^4 + ax^3 + bx^2 + cx + d = 0$ is a biquadratic equation. See **EQUATION**.

BIQUADRATIC parabola, in *Geometry, a curve line of the third order, having two infinite legs tending the same way. See **INFINITELY**.*

BIQUADRATIC root of any number, is the square root of the square root of that number: thus, the biquadratic root of 81 is 3: for the square root of 81 is 9, and the square root of 9 is 3: the biquadratic root of 16 is 2.

BIQUADRAT, in the *Customs of the Algerines*, a cook of the army. The *J. m. l.* is, where the *Algerines* collect, after the great battles at certain feasts, are preferred to be biquadrats, or cooks of the division, which is the first step towards arriving at higher preferment. Biquadrats lay the care of furnishing the officers and commandants of the Algerine army with meat and drink in the camp, in garrison, &c. From biquadrat they are called *absolut*; that is, commandants of companies, or companies of square-rows.

BIQUINTILE, an aspect of the planets, when they are 144 degrees distant from each other. It is thus called, because they are distant from each other by twice the fifth part of the 360 degrees. See **ASPECT**.

BIR, or **BIRAD CRIB**, in *Geography, a town of Asiatic Turkey in Mesopotamia, seated on a mountain near the east*

coast of the Tigris, in a very fertile country, the residence of a bey; 100 miles S. W. of Diarbeck.

BIRABETANE, in the *Botanical Writings of the Ancients, a name given to *verbena*, or vervain, and to other herbs used in sacrifices. It is only the word *hierobotane*, as altered by the Æolic manner of writing and speaking it. Hierobotane is the common Greek name of vervain, and other sacrificial herbs, and it is probable that the Latin name *verbena* came from the Æolic manner of speaking this word. All those herbs, which were laid upon the altars on solemn occasions, such as making of peace, and other solemn contracts, and were to be taken up by the contracting parties as part of the ceremony, were called by the Greeks *hierobotane*, that is, sacred plants, and *vervaine*; but as the plant was now particularly known by the name *vervaine*, was more frequent in use than any other on this occasion, it was afterwards distinguished by that name. See **VERBENA**.*

BIR-AL-CADHI, in *Geography, a town of Persia, in the province of Segistan, 80 miles west of Zareg.*

BIRBOOM, a town of Hindostan in Bengal, 56 miles W. S. W. of Moorshedabad, 100 N. N. W. of Calcutta. N. lat. 24. E. long. 87° 40'.

BIRBUSCA. See **BIRUSCA**.

BIRCH, THOMAS, in *Biography*, an English historical and biographical writer of exact, free and industrious research, was born in London, November 23, 1735. His parents were Quakers; and he was intended for his father's trade, which was that of a coffee-mill maker; but so strong was his inclination to literature, that he requested leave to indulge it on the condition of providing for himself. Accordingly he became assistant to the master of a school belonging to the Quakers at Hemel Hempsted; and after a similar employment in other situations, he at length deserted the profession of his parents, and though he had not enjoyed the advantage of an university education, took orders in the church of England. In 1732, having been ordained deacon in 1730, and priest in 1731, he was preferred under the patronage of lord chancellor Hardwicke, who was then attorney general, to the living of Ulting, in the county of Essex. Some time before he took orders, he married the daughter of a clergyman; but she died within 12 months after their marriage. In 1735, he was admitted into the royal society, and also into the society of antiquaries; and of the former society he became secretary in 1752, which office his declining health obliged him to resign in 1765. In 1753, the degree of doctor in divinity was conferred upon him by the Marischal college of Aberdeen, and in the same year he received the same honour from Dr. Herring, bishop of Exeter and Canterbury. He was also a director of the Society of Antiquaries, and a trustee of the British museum. His preferments were various, and rapid in their progress; the last of these was the rectory of Dunstable, which he held, together with the united rectories of Dunstable, Pateus, and St. Gabriel, Fechurch-st. This melancholy event happened in consequence of his horse betwixt London and Ham, being killed in 1766. Having, in the course of his rations, bequeathed his library to the British museum, and the amounting to little more than 1000*l.* including the salaries of the clerical officers.

Dr. Birch was distinguished by his talents, and the friendship and esteem of the great. He was eminently active and diligent in his various and laudable undertakings, of which he devoted much of his time and labour. In his private life, he gained leisure by ear-

in the pleasures of social intercourse with persons the most distinguished for their attachment to letters and science. With respect to theological subjects, his sentiments were rational and liberal, and he was a zealous friend to religious and civil liberty. In this respect his views and principles were conformable to those of the truly excellent bishop Hoadly.

In literary labour few persons have been more diligent and indefatigable than Dr. Birch. The first great work in which he engaged was, "The General Dictionary, Historical and Critical," comprehending a new translation of that of Mr. Bayle, and several thousand new lives, never before published. This valuable work was completed, principally by himself, with the co-operation of the reverend Mr. John Peter Bernard, Mr. John Lockman, and Mr. George Sale, in 10 volumes, folio. The first volume appeared in 1734, and the last in 1741. In 1737, he published "Professor Greaves's Miscellaneous Works," 2 vols. 8vo.; and in 1742, "Thurloe's State Papers," in 7 vols. folio, with a dedication to lord chancellor Hardwicke. In 1743, he edited "Cudworth's Intellectual System," his "Discourse on the Lord's Supper," and "Two Sermons," with a life of the writer, in 2 vols. 4to. His "Life of the Hon. Robert Boyle," 8vo. which has been since prefixed to the 4to. edition of that eminent philosopher's works, appeared in 1744; and in the same year he began a series of biographical sketches of distinguished persons, designed to accompany their engraved portraits by Howbraken and Vertue. The first volume of this work was completed in 1747, and the second in 1752. In 1747, he published in 8vo. "An Inquiry into the share which King Charles I. had in the Transactions of the Earl of Glamorgan, &c." a fact which, however overlooked, or disputed by some of our historians, was confirmed by the evidence adduced in this interesting publication, and has been since further corroborated by the Charendon state papers. In 1748, Dr. Birch was the editor, in 2 vols. 8vo. of the "Miscellaneous Works of Sir Walter Raleigh," to which is prefixed a life of the author. His next publication was "An Historical view of the Negotiations between the Courts of England, France, and Brussels, from the year 1592 to 1617; extracted chiefly from the MS. state papers of sir Thomas Edmondes, and of Anthony Bacon, esq.; to which is added, a relation of the state of France, with the character of Henry IV. and the principal persons of his court, by sir George Carew," 8vo. 1749. To this volume Dr. Birch has prefixed a discourse on the utility of deducing history from the original letters and papers of the persons who were the principal actors in public affairs, followed by a biographical account of the three negotiations above-mentioned. Mrs. Cockburn's "Theological, moral, dramatic, and poetical works," 2 vols. 8vo. with the life of that ingenious lady, were edited by Dr. Birch in 1751; and he also published an edition of "Spenser's Fairy Queen," in 3 vols. 4to. One of his most popular works, which was "The Life of Archbishop Tillotson, compiled chiefly from his original papers and letters," and dedicated to archbishop Herring, in one volume, 8vo. appeared in 1752; and in the following year he revised an edition of "Milton's Prose Works," in 2 vols. 4to. to which is prefixed a new life of the author. In 1754, he published in 2 vols. 4to. "Memoirs of the reign of Queen Elizabeth, from the year 1581 till her death, &c. from the papers of Anthony Bacon, esq. and other MSS. never before published;" in which, besides a full display of the temper and actions of the earl of Essex, much light is thrown on the characters of the Cecils, Bacons, and other eminent persons of that period. Dr. Birch's next publication was "The History of the Royal Society of London, from its

first rise; in which the most considerable of those Papers communicated to the Society, which have hitherto not been published, are inserted in their proper order, as a Supplement to the Philosophical Transactions." The two first volumes of this work appeared in 1756, and the other two volumes in 1757; and they bring down the history to the end of the year 1687. This is unquestionably an useful book of reference, and contains many particulars which may be of occasional service both to the philosopher and the biographer. In 1760, Dr. Birch published "Letters between Colonel Robert Hammond, Governor of the Isle of Wight, and the Committee of Lords and Commons at Derby-house, &c. concerning the King's department at Hampton Court, and in the Isle of Wight," 8vo.; and he closed his voluminous labours with "Letters, Speeches, Charges, Advices, &c. of Francis Bacon, lord viscount St. Alban's, &c. in one volume, 8vo." Soon after his death, Dr. Maty published, "The life of Dr. Ward," which he had just lived to finish; and he had also prepared for the press, "Historical Letters, written in the reign of James I. and Charles I." which Mr. Ayscough proposed to publish. In the list of his printed works we might also comprehend some papers communicated to the Royal Society, and some accounts of books in the works of the learned; but besides these, such was his unwearied assiduity in collecting every fragment pertaining to literature, and deemed by him of importance, that he left behind him 24 volumes 4to. of various papers copied by himself from the Lambeth library. Upon the whole, whatever may be thought of Dr. Birch's judgment in his selection of materials, of the minuteness of his researches, of the justice and sagacity of his inferences from the facts which he produces, and of the want of elegance and animation in his style, it must be allowed, that literature has already derived, and may yet further derive, great benefit from his labours. Biog. Brit.

BIRCH tree, in Botany. See BETULA.

BIRCH, bark, fungus, leaves, twigs, wine of. See BETULA.

BIRCH bay, in Geography, a bay on the coast of New Albion, situate in N. lat. 48° 53' 30". E. long. 257° 33'.

BIRCK, a town of Germany, in the circle of Westphalia, and duchy of Berg; 3 miles N. E. of Siegburg.

BIRD, BIRDS, *Aves*, in Ornithology. See AVIS, and ORNITHOLOGY.

BIRD, or fowl-mead grass, in Agriculture, a species of grass, which has been lately cultivated with particular attention. It is a fine, sweet, silky grass, with a durable verdure; throws out a great crop, and produces a large quantity of seed. One rood of ground yielded a hundred weight of seed, and a very large load of hay. It is most proper for upland meadow: the seed should be left uncovered on the ground.

BIRDS, *Anatomy of*. The regard which has been bestowed upon this tribe of animals, by different descriptions of mankind, renders their organization one of the most interesting branches of general anatomy. The immense catalogue of the species of birds, and the variety and beauty of their external characters, have made them favourite objects of investigation with the natural historian. The extraordinary degree of instinct displayed in all their habits and economy, more especially in the attachment of the sexes, the construction of their nests, the care of their young, and the conduct of their migrations, has called forth the admiration of the philosopher and the lover of nature. The splendid colouring of their plumage, the powers of melody, and the liveliness and docility of many species, have given them value as objects of beauty or entertainment; whilst others

are as highly prized from furnishing occupation to the sportsman, or a delicacy to the epicure.

The anatomical characters of this class of animals are not less deserving of attention than their other properties. In the scale of animated existence, birds can scarcely be considered inferior to mammalia; and yet many of their functions are exercised upon a very dissimilar plan, and almost constantly by organs differently constituted. It is in birds that we perceive the first general deviations from the scheme of organization pursued in the human subject: this will be found most remarkably exemplified in the apparatus for the preparation and digestion of food, the secretion of urine, the mode of generation, and the growth and economy of the young animal, the anatomy of the brain, the structure of the eye and ear, the mechanism of the organs of sound, and the construction of the instruments of loco-motion.

The anatomy of birds has been much prosecuted both by the older authors and in modern times, as the means of physiological knowledge, and in aid of the several purposes for which these animals are so much estimated. The information, however, communicated in this way, falls far short of a systematic account of the subject; to supply which, therefore, much original matter is necessarily introduced into the present article, more particularly in the descriptions of the blood-vessels, of the organs of motion, and of the minute structure and uses of parts. Many errors of the older writers are also corrected; and wherever the descriptions of others are followed, they have been, as far as it has been practicable, revised by a comparison with the recent subject or authentic preparations.

ORGANS CONCERNED IN THE EXERCISE OF THE VITAL FUNCTIONS.

The Mouth and its contained Parts.

In the other classes of animals, these parts are constructed to effect the division of the food previous to its passage into the stomach, but in birds the process of mastication is either imperfectly performed, or carried on by a peculiar mechanism to be afterwards described. Birds are unprovided with those soft and flexible parts called lips; the aperture of their mouth is made by the prolongation of the two jaws, which are covered with a hard and horny substance. These are named the upper and the lower *mandibles*, and together form the *beak* or *bill*. The bones which enter into the composition of the bill, will be considered along with the other parts of the skeleton. The external or horny part is produced, like other similar substances, from a vascular and spongy membrane, which is interposed between it and the bones; it corresponds exactly in shape with the jaws, which serve it as a mould.

The bill is designed for many different purposes, and consequently is subject to great variety in its conformation. In the birds of prey it is strong, hooked, sharp, and furnished with a tooth-like process on its edge, to enable them the better to seize and lacerate their prey; those birds which subsist on small grain, are provided with short, pointed, sharp-edged bills for picking up and breaking their food; the parrots also use their bills for dividing their meat; in those instances, therefore, the bill may be considered analogous to the teeth of other animals; but it is only the incisors with which it can be compared, as it is incapable both from its thin edges, and from the nature of the articulation of the lower jaw, of performing any thing like the grinding motion in which properly mastication consists.

The *piscivorous* birds have commonly large and extended bills, which become necessary to them, in order to secure their prey; these birds almost always swallow their food without dividing it.

Swallows and *goat-suckers* have short bills, but opening very wide, suitable to their mode of procuring their food, which consists in taking flies while the bird is on the wing.

The *wood-peckers*, *corn-necks*, *nuthatches*, &c. use the bill as an instrument for perforating the bark of trees, and breaking nuts; for which purpose it is constructed like a wedge.

It may, in fine, be given as a general observation, that the form and structure of the bill indicate the proper habits and economy of the birds; they have therefore been always employed by naturalists as classic distinctions, and to their works we refer the reader for a more detailed account of the peculiarities observed in the bills of birds.

In consequence of a particular mechanism, arising from two additional bones, the upper jaw of birds is capable of a certain degree of motion. In general this is very confined, but the *parrot* tribe are able to move the upper jaw with considerable freedom. The bones and muscles upon which this peculiarity depends, will be described with the organs of motion.

The *cavity of the mouth* is lined with a thick vascular membrane, behind which are placed a great number of follicular glands, which discharge a mucous liquor upon every part of the surface of the mouth. They are, however, most abundant in those parts which sustain most friction, as the commencement of the oesophagus, and surrounding the aperture of the nares, in the upper and back part of the mouth.

A cuticular tunic is spread over the glandular membrane, which is as usual so soft and delicate, that it cannot without difficulty be detected.

The *tongue of birds* can hardly be considered an instrument of mastication; its motions are very limited, in consequence of its containing a bone which runs through its whole length, and the lingual bone being articulated behind with the os hyoides, which determines the extent of its movements. The only birds, in which the tongue is immediately concerned in the division of the food, are those *passeres* living upon seeds that are enclosed by a shell. In such the tongue is employed to convey the seed between the edges of the bill, and secure it there until it is broken, which is not unlike the action of the tongue of mammalia during mastication.

The tongue of the *wood-peckers* and *corn-necks* is an organ of curious structure, and enables these birds to trash their prey at some distance from the mouth; the mechanism by which this is accomplished, and the bones and muscles which belong to the tongue in general, will be particularly described with the other organs of motion. The varieties in external form, and the structure and integuments of the substance of the tongue, will be considered under the head of the organ of taste.

Salivary glands have been ascribed by most authors to birds; but, as it would appear, without duly considering the uses of these parts. Birds, as already observed, do not comminute their food by mastication in the mouth, for which purpose the saliva is employed by other animals; and the glandular bodies, which have been described as salivary, appear to yield a fluid rather a mucous than an aqueous nature. The internal surface of the mouth of birds is besmeared with mucus, in order to facilitate the passage of the food, which would not be necessary, if the aliments were softened by saliva.

The reputed salivary glands of birds are situated within the angle formed by the anterior part of the lower jaw, and between the skin and the inner membrane of the mouth. They are two in number, and appear to be composed of granular masses, or follicles, closely connected to each other. They discharge their secretion into the lower part of the mouth, by means of some foramina arranged on each side of

the tongue. They would seem to be of the greatest size in proportion to the bird, where the food is hard and dry grain; they are larger in the *common fowl* than in the *goose*.

The Parisian academicians observed these glands in almost every bird they dissected. In the *ostrich* they describe them as being situated towards the pharynx; and in the *bustard*, they found several glandular bodies.

Oesophagus.

The tube, which conveys the food into the stomach of birds, is not situated exactly on the fore part of the neck, but a little on the right side. It is partially covered by the trachea, and it is connected to all the neighbouring parts by loose cellular substance; in consequence of which, and its inclination to one side, when the neck is much bent, it does not take the same degree of flexure, but falls a little off to the right side. This effect is best observ'd in some of the birds which have long and flexible necks, as the *gallie* and *water birds*.

The form of the oesophagus varies according to the habits of the bird, and the nature of its food. In the rapacious birds, and those which subsist on fish, it is of great capacity throughout its whole length, generally exceeding in width the stomach itself. The magnitude of the oesophagus not only enables those birds to swallow their prey whole, but answers the purpose of a repository for their food, and thus counterbalances the disadvantages arising from their precarious means of subsistence.

Hurons, the *cormorant*, the *spoon-bill*, &c. will devour as much fish at once as will be sufficient to support them for a considerable time; and an *osel* is often obliged to exist for days or weeks upon a rat or mouse, which being swallowed, is conveyed by degrees into the stomach, until the whole is digested.

All the *piscivorous* birds have the oesophagus most capacious at its commencement, or next the fauces, for the more convenient swallowing of their prey, which is always gulped down.

The *pelican* furnishes a most remarkable instance of a dilatation of the fauces, in the pouch which is placed beneath the lower jaw. This bag, if full, is very conspicuous externally; but when it is empty, the bird has the power of contracting it very considerably; when completely distended, it is said to be capable of containing ten quarts of water. The internal part of the pouch appears to possess the same structure as the rest of the oesophagus; the skin covering it externally, is clothed with a short down, smooth and soft, like silk.

The *pelican* derives a double advantage from this enlargement of the fauces; it enables it to provide a supply of food and water for future necessity, and to transport nourishment to its young, until they can acquire it for themselves: in disgorging the food for her family, the parent presses the bottom of the sack against her breast, and thus discharges its contents; from which probably arose the absurd fable of her opening her breast, and feeding her young with her blood.

A very remarkable provision of this kind has been described in the *bustard*, by Dr. James Douglas. In this animal there is a membranous bag, extending for some way down the fore part of the neck, capable of containing seven quarts of water; it communicates with the mouth by an aperture beneath the tongue. See *Plat. I. fig. 1.* in the *Anatomy of Birds*, in which this part is represented, as it has been figured in Edwards's *Natural History of Birds*, vol. ii. p. 73. *a* the pouch, upon which a ligature is fastened near its connexion with the mouth, *b* the trachea, and *c* the oesophagus.

The pouch of the *bustard* is confined to the male bird, according to most authors; some have, however, ascribed it

to the female, and others have doubted its existence altogether. The Parisian academicians dissected six *bustards*, and do not describe the throat sac, although all their subjects were males.

The *bustard* is said to use the pouch as a temporary reservoir of water, from which it supplies the female during the period of incubation, and likewise the young brood, until they can move from the nest. It has been also occasionally employed as the means of defence. Barrington relates in his *Miscellanies*, p. 553. that at Morocco, where it is usual to fly the hawk at the *bustard*, the latter has been known to eject the water contained in the sack against his assailant, who is not uncommonly by this means baffled in the pursuit.

The *crop*, or *craw*, is a term applied to another species of dilatation of the oesophagus of birds.

When this enlargement is single, it is situated upon the right side of the oesophagus, and placed so low on the neck, that a portion of the bag is accommodated in the space left at the upper part of the thorax, within the fork-shaped bone. Its form is in general globular, but rendered somewhat irregular, from its connexion with the oesophagus, which enters at the superior part, and appears again on the middle, by which means the greater part of the crop is formed into a cul de sac.

It is obvious, that the effect of this structure is not only to receive a greater quantity of food than can be digested, but also to detain it in the *craw* until it has suffered some change.

The birds in which the *craw* is found of the figure just described, feed usually upon grain or other hard substances, which require to be softened by maceration in the mucous secretion of the oesophagus. Of these we may mention as instances, the *pheasants*, the *common fowl*, the *pintado*, the *turkey*, the *Indian cock*, the *pea-fowl*, &c.

Fig. 2. of *Plate I.* in the *Anatomy of Birds*, exhibits the *crop* of the *pheasant*, *a* the oesophagus above the *craw*, *b* the same going on to the stomach, *c* the dilated part forming the *crop*.

The Parisian anatomists found the oesophagus very much enlarged in the *ostrich*, but so close to the gizzard that these two parts appeared to be confounded with each other; so that it was difficult to mark the superior orifice of the ventricle; the situation of the bag also was very unusual, being lower than the gizzard, into which the entrance was by the bottom, and thus what is commonly called the superior orifice, was really the inferior.

It is somewhat remarkable, that the *bustard*, which is a graminivorous bird, and in most respects resembles those which have crops, should be quite without this provision, its oesophagus consisting of an equal and regular tube.

The *parrot* has a dilatation of the lower part of the oesophagus, which is commonly reckoned to be a crop, though perhaps improperly, as the enlargement is neither so suddenly produced, nor in such a degree, as to obstruct the passage of the food into the stomach; the *craw* of the *parrot* is only calculated, therefore, to afford a temporary accommodation to its food.

Some *carnivorous* birds are furnished with a *craw*, which only serves the purpose of a reservoir, as their food does not stand in need of maceration to soften it, which is so necessary with hard and dry grain.

The most singular kind of crop is that found in the *pigeon* genus. The oesophagus in these birds is of great capacity, from its very commencement, and at its lower part it swells out into two large sacks, between which and the stomach it suffers a considerable contraction. See *Plate I.* of the *Anatomy of Birds*, *fig. 3.* *a* the upper portion of the oesophagus,

b, b, the two crops, *c* the contracted part of the œsophagus.

In some species, as the *pouter pigeon*, the œsophagus above the crops, is of such great dimensions, that the latter are hardly discernible; these birds also have the power of distending their œsophagus with air, which gives them that grotesque appearance from whence they derive their name. A capacious crop is more necessary to the pigeon than other birds, both because its food requires long maceration, and because the young, and even, on some occasions, the female, draw their subsistence from this repository. The extraordinary change which occurs in the structure of the inner membrane of the crops of the pigeon, by which a milky fluid is secreted, for the nourishment of the young birds, will be described in its proper place.

Although there is all the variety in the form of the œsophagus we have described, the internal structure appears to be the same in all birds. Beside the external cellular covering, by which it is connected to the adjacent parts, it possesses a muscular coat, an internal vascular tunic, and a cuticular lining. The muscular coat consists of two layers of fibres; in the external layer these are transverse, or more properly circular; the other stratum is composed of longitudinal fibres. The muscular coat is most strongly marked at the top of the tube, where the actions of deglutition commence, and upon the crops, where support and motion are required. The internal coat resembles in structure that which is usually met with upon the inner parts of cavities; with this difference, that it is provided in birds with an extraordinary number of follicular glands, which pour out their fluid through numerous foramina, resembling pin-holes, upon the internal surface. These glands secrete a quantity of mucus, which is employed in macerating the food, while it is detained in the œsophagus, or crop. This secretion is remarkably copious. Spallanzani introduced a piece of sponge into the crop of a *pigeon*; and after it had remained there twelve hours, he expressed from it above an ounce of mucus, and the quantity obtained from a *turkey*, amounted to seven ounces in ten hours. The follicular glands are most numerous at the commencement of the œsophagus, and towards the termination of this tube in the stomach, the internal surface of the crop is but sparingly supplied with them. See *Plat. I. of the Anatomy of Birds, fig. 2.* in which the œsophagus and crop are inverted, for the purpose of exhibiting the orifice of the mucous follicles, and in *fig. 3.* they assume beautiful and regular appearance below the dilated parts of the œsophagus. It is very common for the mucous glands to be assembled in a regular and marked manner round the very termination of the œsophagus, as a in *Plat. II. fig. 2. of the Anatomy of Birds.*

The cuticle, which it vests the œsophagus, is generally so thin and tender, that it might escape observation. It is, however, sufficiently plain in many large birds, and almost always visible, upon the inside of the crop or the other dilated parts, which are more exposed to friction from extraneous substances. The inflexible lining of the œsophagus terminates abruptly at the zone of gastric glands.

It may be remarked with respect to the œsophagus of birds, that its chief peculiarities consist in the great size of the fore enlargement, and number of mucous glands. These circumstances are attended with the very singular structure of the stomach, which we shall next describe.

Stomach.

The organ of digestion in birds consists of two parts; one for producing the digestive fluid; the other the receptacle in which the conversion of the food is effected. The apparatus for the secretion of the gastric juice is called,

The *Bullus glandulosus*, or the Zone of Gastric Glands.—

This part is situated at the termination of the œsophagus, and appears in most instances to be the continuation of that tube. It has the same cellular and muscular coats, which obscure its real structure, when perceived externally, especially in the granivorous birds, which have strong muscles upon the œsophagus. When the outer tunics are removed, a number of small glandular bodies are exposed, arranged with the most perfect regularity, and closely applied to each other. They assume an indistinct granular appearance in small birds generally, and even still more so in those which subsist on animal food, as the *aviparine* and *fishivorous* birds; but in the *ratites*, and the large *granivorous water* birds, as the *falcon*, the *osprey*, &c. the gastric glands, when divested of their coats, are readily discovered, by the naked eye, to be small cylinders, or tubes, placed horizontally with respect to the pariete of the stomach; the external end is close and of a round figure; the internal extremity of the tube is somewhat concave, and contains a small foramen, which is applied to a corresponding hole in the internal membrane of the *bulbus glandulosus*. See *Plat. II. in the Anatomy of Birds, fig. 1.* *a* represents a number of the gastric glands, with their external extremity exposed, by a portion of the muscular coat being removed; and in *fig. 2. b* shows the orifices of these glands upon the internal coat of the stomach, and *c* the cut edge of the *bulbus*, with the cylinders as they are placed between the muscular and internal coats. The subject of both the figures is the *wild swan*.

The gastric glands commonly encircle the beginning of the stomach as a perfect and equal zone. In some instances, however, where they are not large, as in the *vapacious* and *fishivorous* birds, they are more numerous at one part of the stomach than another; see *Plat. III. fig. 2.* which exhibits the stomach of the *heron*, *bb* the gastric glands.

The form of the *bulbus* is not quite regular in the *ostrich*; the structure of the glands also is not the same as in other birds: instead of being placed in regular and close order, they are disposed in masses of an unequal form and size, separated for some distance from each other. On making a section of the masses, they are found divided, or interrupted by processes of strong white cellular substance; from which it would seem, that they are composed of several glands, although there is but one foramen belonging to each mass on the internal tunic of the *bulbus*. The magnitude of the orifices of the gastric glands, even exceeds the proportion to be expected from the size of the bird; being capable of receiving the head of a large pin, they stand at the distance of about the 1/10th of an inch asunder, and do not open with perfect regularity upon the internal surface of the stomach, being most crowded towards the centre, where also their apertures are largest; the internal tunic of the *ostrich*, from these circumstances, exhibits a worm-eaten appearance.

The gastric glands in all birds like other parts, which produce an important secretion, are endowed with an extreme degree of vascularity.

Some authors have described a cuticular coat, on the internal surface of the *bulbus glandulosus*, which they have compared to velvet on account of its soft and spongy texture; it appears, however, very doubtful, whether this covering should be considered a tunic or not; we have observed that it is readily detached, and soluble in water; it certainly does not resemble the epidermis of the œsophagus, and still less to the substance which invests the remaining portion of the stomach, or gizzard.

No very satisfactory experiments have yet been made upon the nature of the digestive fluid of birds. When it is expressed from the gastric glands, which is the only mode of obtain-

obtaining it pure, it is observed to be of an ash or pale yellow colour, turbid, and of a tenacious consistence, like mucus. Spallanzani found it in several birds to have a bitter and salt taste, which he attributed to admixture with some of the fluids contained in the intestines; he discovered also, that the turbidity and the colour were produced by the existence of a number of yellow particles, too minute to be distinctly seen without the aid of the microscope, and which in a few hours subsiding to the bottom, left the supernatant liquor as transparent as water. He has remarked the yellow tinge to vary in intensity, according to the species; in the eagle, for instance, it is caieritious, and in the crow a reddish yellow colour, like the yolk of an egg.

A number of the experiments performed by Spallanzani, although in some instances he failed, shew that the gastric fluid of *carnivorous birds* will act upon vegetable matters; and upon the other hand, that *graminivorous birds* can digest animal food: but his most interesting and important experiment on the properties of the gastric fluid, is that made to determine its powers of resisting the operation of cold. "On a very cold day in winter," he says, "I exposed a small quantity (of the gastric juice of the eagle) in a glass, on a window, along with two other glasses containing water, in one of which was dissolved a quantity of common salt, sufficient to give it a stronger taste than the gastric fluid had. The thermometers set beside the glasses stood at five degrees below 0 (twenty and three-fourths, Faren.). Of the three liquors, the first that was frozen, was the common water, the next was the salt water, and the last was the gastric fluid. When I carried them into my apartment, where the temperature was three and an half deg. above 0. the first that thawed was the gastric fluid, next the brine, and lastly the water." The conclusion which necessarily results from this experiment is, that the gastric juice of birds, and from analogy, that of other animals, is capable of resisting the effects of cold more than common fluids, or even those impregnated with a great quantity of salt; and therefore it may be considered as possessing some degree of vitality. If this supposition be admitted, it determines the nature of the digestive process, so long a question in physiology.

The gastric fluid of the *crow* has been submitted to chemical examination by Scopoli, by which he discovered that it contained a quantity of gelatine and saponaceous substance, some muriate of ammonia, and phosphate of lime, with a large proportion of water.

The second part of the organ of digestion of birds, is not less singular than the structure just described; it immediately succeeds the zone of gastric glands, and when in the natural situation, occupies the left region of the abdominal cavity, in which position it is retained by the several reflexions of peritoneum, which constitute the air cells. From being the part into which the food is received in order to undergo the process of digestion, it has commonly received the distinctive appellation of *Stomach*: but it would seem more consistent, not only with the form of the digestive organ in some birds, and with its functions in other animals, to apply the term *Stomach*, both to the gastric glands, and to the muscular bag which immediately receives their secretion, and the food; or for the greater convenience and clearness of description, the lower portion of the stomach might be distinguished from the *bulbus glandulosus*, by the name of *ventricle*.

The greatest variety exists with respect to the structure of this part of the organ of digestion in birds: when it possesses a certain degree of muscularity, it is well known under the name of the *gizzard*; and when its muscles are so thin as to give it the appearance of a simple bag, it is commonly, though erroneously, called a membranous stomach.

Fourcroy attempted to establish two classes of birds, according to the formation of their stomachs, calling the one *myogastriques*, and the other *hymnogastriques*, but these terms were only applicable to the two extremes.

Vic d'Azir has admitted three distinctions in the structure of the ventricle; the first that of the true gizzard, of which he gives instances in the *galline*, the *swan*, the *goose*, &c.; the second where the muscles which compose the gizzard are not distinct from the other parts, nor very strongly marked, as in the *thrush* and *jay*; the third is the membranous stomach as it is called, which is found in the *heron*, *eagle*, *cormorant*, &c. See the introduction to Vic d'Azir's great System of Anatomy.

These distinctions are not, however, just; the gradation from the most muscular gizzard to the thinnest ventricle, is regular and uninterrupted; in order to understand which, and the other variations in structure, it is necessary that the true gizzard, or muscular stomach, be first described.

The external form of this organ is usually an irregular oval, the two ends of which are made of the great *lateral or digastric muscle*.

This muscle constitutes the principal mass of the gizzard; its attitude with respect to the *bulbus glandulosus* is oblique. The two fleshy portions are united by means of a strong flat tendon, on each side of the gizzard, which in the centre is distinct from the parietes of the ventricle.

The portion of the stomach, which appears between the two fleshy masses of the digastric muscle, and which is crossed by the tendon, belongs to the cavity of the ventricle; it is composed of fleshy fibres, passing in several directions, as may be most convenient for diminishing the cavity. Many of these fibres are continued into the substance of the digastric muscle, and others run in its outer margin, thus giving integrity and connexion to these two portions of the ventricle. See *Plate II. fig. 1.* in the *Anatomy of Birds*, which represents the external appearance of the stomach of the *wild swan*, *bb*, the fleshy parts of the digastric muscle, *c*, the tendon connecting them to each other, *d*, the parietes of the ventricle on the superior part, *e*, the same, inferiorly, *f*, the margins of the digastric muscle, with fibres passing along them.

The disposition of the fibres in the interior of the digastric muscle is exceedingly curious. They appear, upon a superficial view, to be arranged in thin concentric laminae, separated from each other by the most delicate tendon. These layers pass to the lateral tendons on the circumference, so that their force is exerted upon them. See *Plate III. fig. 1.* which is the section of the gizzard of the *goose*, *aa*, the two great masses of the muscular substance, *bb*, the tendons by which they are connected to each other. But if another section be made, parallel to the sides of the gizzard, or across the concentric layers, we have found each of the laminae to be divided by a great number of delicate tendinous processes which form with each other squares and triangles of various shapes, producing a reticulation, not unlike a honeycomb. The extraordinary multiplication of muscular fasciculi, which arises from the lamellated and reticulated structure of the gizzard, creates a force which almost surpasses calculation.

On laying the gizzard open by cutting through the tendon, which is the thinnest part, it is observed to be covered internally with a rude, callous substance, of a dark brown colour; this is thin and pliable upon the portion of the ventricle, not inclosed by the digastric muscle, and partakes of the motions of the cavity; but when it covers that muscle, it becomes as tough and inflexible as the hoof of a quadruped; two oval surfaces are seen to project beyond the other parts; they are raised upon the interior of the thickest portions of the digastric muscle, and the horny integument

when passing over them acquires nearly the thickness of an eighth of an inch. *Plate II. fig. 2.* in the *Anatomy of Birds*, shews the gizzard of the *wild swan* laid open, *d* the divided tendon, *e* the cuticular or horny covering of the gizzard, ending decidedly at the commencement of the intestine, and below the zone of gastric glands; at the latter place the edge is shewn detached, *ff* the two prominent oval surfaces, *g g* the origin of the intestine, which being cut off short on the outside permits the light to appear through it.

The cavity of the gizzard differs very much in shape and extent from what might be expected, from the external figure of that organ. When all foreign matters have been expelled, the two prominent oval surfaces approach each other, leaving only a slit between them: any thing that deserves the name of a cavity, is situated above and below the place where the tendons cross (see *Plate II. fig. 2.*), for just within the tendon there is not cavity sufficient to contain the end of a finger. See *Plate III. fig. 1.* which shews a section in which the two oval surfaces are applied to each other, leaving at either end the appearance of a round hole, by means of which the superior and inferior cavities of the ventricle have communication.

When the horny or insensible lining is removed, there appears another coat to the gizzard. This is soft, somewhat spongy, and endowed with vascularity; it is intimately united to the muscular substance of the ventricle, on one side, and on the other affords a surface for the adhesion of the horny coat; the connexion with which appears to depend upon the mutual insertion of villous processes, too fine to be distinctly perceived by the naked eye.

Such is the description of the muscular ventricle, or *true gizzard*, as it exists in the *swan*, the *goose*, the *duck*, the *pheasant*, and *common fowl*, the *piutado*, the *turkey*, and a few others. In by far the greater number of birds, there is a deviation from the structure of the gizzard. The digastric muscle is less powerful, its tendon is incorporated with the parietes of the ventricle; the oval, or grinding surfaces, are little or not all distinguishable from the rest of the cavity, which is therefore of larger capacity; and, lastly, the substance lining the ventricle is less tough, thick, and hard, approaching more to the nature of cuticle. It would be endless to enumerate all the different instances of intermediate structure, which we and others have observed; suffice it to say, that it exists in almost all the *passeres*, or small birds which subsist upon a mixed food, such as grain, worms, insects, and fruits; also in most of the order *scansores*, and in many of the *gralle* and *anseris*, which are pursued as game. In all which instances the deviation from the true structure of the gizzard varies in degree according to the nature of the food used by the bird; nay, differs from this cause in the same individual. Thus the *gull* has a strong muscular ventricle, when fed upon grain, which, if the bird be supported by fish, becomes so thin as to approach the membranous stomach.

It is remarkable, that many birds which live upon grain and hard substances, have neither a very muscular ventricle, nor the horny integument very thick. This is the case with all the *struthious* birds, and some *gallinae*, as the *bullard*.

The stomach of the *ostrich* is capacious; the digastric muscle is thin, considering the size of the bird, and the nature of its food; and the cuticular coat is so soft, that it has been aptly compared by several authors to flannel. The Parisian anatomists describe the stomach of the *casowary* as being thinner than that of the *ostrich*, and divided into two parts by a valvular projection of the inner coat.

When the digastric muscle becomes so thin as to form a mere layer of fibres, in close union with the other coats of the stomach, and its tendons only fine aponeuroses, expanded

on each side, the ventricle is termed *membranous*; an improper appellation, inasmuch as the very same parts exist, which belong to the powerful and massy gizzard, although in a disguised and diminished form, and unequal to the same functions; affording thus a curious example of the uniformity with which nature copies her own works.

This species of stomach is almost confined to the *accipitrius*, or rapacious birds, and those amongst the *gralle* and *anseris*, which feed on fish. The *woodpeckers* also possess it, and probably it may be found in some foreign birds, which live on insects and soft fruits.

The substance lining the membranous stomach is much thicker than common cuticle. It is occasionally soft, and almost of a gelatinous consistence, and easily detached from the internal coat of the ventricle.

The shape of this kind of stomach is usually a semi-oval, or the section of an egg. Several of the *piscivorous* birds, as the *heron*, *bittern*, *pelican*, &c. have, however, a second chamber, through which the food passes in its way to the intestine. See *Plate III.* in the *Anatomy of Birds. Fig. 2.* is the stomach of the *heron*; *a* the lower part of the oesophagus, appearing smaller than it really is, from being thrown into folds; *b* the zone of gastric glands, distinctly seen through the coats of the stomach, in consequence of the cavity being distended with a transparent fluid, and afterwards placed against the light. If Spallanzani had employed the same expedient, he could not have denied the existence of a distinct glandular structure to the *heron*; *c* the inferior part of the stomach, chiefly composed of muscular fibres, spreading in a radiated manner from the lateral aponeurosis; *d*, which supplies the place of the great tendons of the digastric muscle; *e* the second stomach, furnished with circular muscular fibres; *f* the first intestine arising from the additional ventricle. The communication between the two stomachs is very straight in the *pelican*.

Having described the structure of the digestive organ of birds, it remains to consider its functions. In those cases where the muscular power of the stomach is inconsiderable, and the cuticular coat thin and soft, digestion is carried on in the same way as in man and other animals, with this difference only, that the gastric fluid is furnished by a distinct apparatus of glands, instead of being secreted by the whole surface of the cavity. In the true gizzard, however, we perceive an extraordinary departure from the common structure of the organs of digestion. This part supplies the place of the teeth of other graminivorous animals. In its mechanic powers and action it resembles a mill: the upper part serves as the receptacle for the grain; the two internal projecting oval surfaces correspond to the mill stones, and the first intestine receives the substances in the ground or divided state. The experiments made at the academy of Cimento, and those of Reaumur, Spallanzani, and others, shew that the gizzard is a machine of no ordinary powers. These experiments consisted in compelling birds to swallow hard and unyielding substances, and, after some hours, examining what were the effects produced upon them.

When balls of glass, or other brittle substances, were employed, they were speedily reduced to powder: metals and precious stones were indented or abraded. Spallanzani introduced into the gizzard of the turkey, and common fowl, leaden balls, armed in one instance with twelve sharp needles, one quarter of an inch long; and in another, set with as many lancet points. Upon destroying the bird: 18 hours afterwards, the needles and lancets were found broken off, and marks of impression appeared even upon the balls themselves; and, what he considered more extraordinary, the coats of the gizzard were perfectly unharmed. When we con-

sider the immense strength which is obtained by the arrangement of the muscular fibres in the gizzard, and the horny consistence of its inner coat, there appears nothing incredible in these effects. And there is still another circumstance, not before mentioned, which fully accounts for such extraordinary powers of trituration: every muscular stomach or gizzard contains a number of small stones or pebbles; the size of the stones is proportioned to that of the bird. Their number is subject to vary from many accidental causes. Two hundred have been reckoned in a *turk-y-ben*, and above a thousand have been taken from the gizzard of one *goose*.

Spallanzani denied that these stones were at all required for the comminution of the food. He has endeavoured to support his opinion by several experiments, which are, however, not clear or consistent with each other, and in contradiction to general observation; for it is well known, that birds do not thrive when they cannot obtain small stones, and that it is part of the duty of the parent to provide them for their young, before they leave the nest. Spallanzani acknowledges that he could not procure any bird to young, that it had not some stones in its gizzard; and therefore he was obliged to rear pigeons and turkeys even from the shell, before he was able to succeed. Birds, so far from swallowing stones from keeness of appetite, or in mistake for food, seek out and select those most suitable to their purpose, which are almost all bits of quartz, of an equal size, and a roundish figure, with many small sharp angles.

Large birds, as the *strubious* kind, the *bustard*, &c. are in the habit of swallowing coins and pieces of metal, which necessarily suffer a reduction by the friction to which they are exposed; and hence has arisen the ridiculous notion of the *ostrich* digesting iron.

We have no hesitation in deciding, that the extraneous bodies found in the gizzard are absolutely required for the perfect division of the food used by those birds that employ them. In further proof of which opinion it may be mentioned, that they are proportioned in quantity to the degree of muscularity possessed by the ventricle, and the nutritive quality of the food; and that those birds which have thin stomachs, and live upon animal food, never designedly swallow stones, or other indigestible substances.

In order to ascertain the mode of operation of the gizzard in the living body, Reaumur opened several fowls during the process of digestion. One instance alone shewed any motion in the part, which consisted in alternate contractions and dilatations, slowly and gradually performed. Spallanzani instituted similar experiments upon several birds, with no better success, being seldom able to detect the least motion; and when he did perceive any, it was irregular, partial, and indistinct. This he attributed to the violence committed by opening the animal's body, which no doubt causes the motions to be less strong and regular; but the gizzard's exhibiting externally so little action, depends upon the disposition of the fibres in the interior of the digastric muscle, which are calculated, not for performing extensive motions, but for exerting an immense concentrated force upon whatever may come within their influence.

The most satisfactory, as well as convenient, mode of examining the actions of the living gizzard is, to provide a very lean, young bird, which has thin parietes to the abdomen. The side of the belly being deprived of feathers, all the motions of the gizzard can be both felt and seen. We have thus ascertained them to consist in alternate contractions of the digastric muscle, and of the intermediate parts of the ventricle. When the muscle acts, its figure is not perceptibly changed, but it feels as hard as a stone: upon its relaxation, the parietes of the ventricle urge their

contents again between the two grinding surfaces, when the muscle repeats its powerful contraction, by which the substances interposed are submitted to a pressure like that of a vice, accompanied by a slight rolling motion of the surfaces upon each other. These alternate actions succeed each other very slowly, but with regularity.

When the food and stones roll under the pressure of the digastric muscle, a sound is heard exactly like what is produced by the tide coming upon a shore, where there are many loose stones. This occurs with the same intervals of time, also, which are observed between the flux and reflux of the tide; and if the ear be applied to the body of the bird, during the time that the gizzard is in action, the sound of the ebbing and flowing of the tide is imitated so perfectly in loudness, and every other respect, that it is difficult to conceive it is occasioned by any other cause.

During the time that the food is undergoing a very minute division, in the manner described, the gastric juice is distilled from the *bulbus glandulosus* in greater quantity than usual, and a more intimate mixture is formed of the digestive fluid and the triturated food, than could be accomplished under any other circumstances; and therefore we may look upon the process of digestion in graminivorous birds, as not only more complicated, but more perfect than it is in animals in general.

Intestines.

These are divided in birds, as in other animals, into great and small, although the terms are not very appropriate; there not being in general any material difference in the magnitude of each.

The *small intestines* exceed the large very much in length; they are situated chiefly in the anterior and right side of the abdomen, where they are strictly confined by the processes of peritoneum, which form the air-cells. The convolutions of the intestines are very regular, and consist in successive doublings one shorter than another, which give the appearance, on opening the abdomen, of a coil of rope, particularly in those birds which have the small intestines of considerable length. This effect depends upon the figure of the mesentery, which is not composed in quite the same manner as in mammalia.

The distinction of the small intestines into duodenum, jejunum, and ileum, is at all times to a certain degree arbitrary, and is still less allowable in birds. The only portion which deserves to be distinguished from the rest of the tube, is the first coil; which ascends on the right side of the stomach, including in its reflection the pancreas, and receives the biliary and pancreatic ducts.

The length of the intestines is determined usually according to the nature of the food upon which the bird lives; they are longest in the *graminivorous*, and very short in the *accipitres*. Many birds, however, which use a mixed food, or even live altogether upon fish, have the small intestines of great length; this is the case with the *heron*, and several others. The whole of the intestines of the *cormorant*, according to the Parisian anatomists, measured seven feet long; and what is difficult to explain, those of the *bustard* and *cas-sowary*, although large and graminivorous birds, were only four feet in length. The different *ostriches* dissected by the Academy, varied materially with respect to the length of the intestinal canal, one subject measuring fifty feet, another forty-two, a third thirty-three, and a fourth twenty-nine feet.

There is very little peculiar to be noticed in the structure of the small intestines. They are, as in other animals, covered externally by peritoneum, have two layers of muscular fibres, and their internal surface is furnished with those innumerable fine vascular processes called *villi*. The *graminivo-*

vous birds have commonly the longest villi; in the *goose* and *swan* they are singularly beautiful, floating a considerable way into the cavity of the intestine. The birds of prey, and those which feed on fish, have the villi in general so small and indistinct, that on a slight inspection, the inner surface of the intestine appears quite smooth. The *owl*, however, forms a remarkable exception to this observation in having long and pendulous villi.

The vascular processes upon the internal surface of the small intestines of the *ostrich* do not possess the usual villous or hair-like form, but consist of very thin plates, or lamellæ. These are short, with the edges somewhat round, and placed not in succession, but alternately one with respect to another, so that each lamella stands opposite to the interspace of the two adjoining, by which means the surface of the intestine puts on very exactly the appearance of twilled cloth. The structure producing this effect cannot be seen completely, as may be supposed, without a magnifying glass.

We have not observed in birds any thing analogous to those projections of the internal coat of the small intestines, which in other animals are called *valvule conniventes*. The Academicians, however, relate that they found in the *buffard* the inner tunic of the ilium folded longitudinally, in the manner of the last stomach of ruminating animals, and that towards the extremity of this intestine there were some transverse wrinkles, which supplied the place of the valve of the colon.

Throughout the tract of the intestinal tube, we have discovered several clusters of mucous glands: where these are situated, the internal coat appears as if slightly ulcerated, or not unlike a dysenteric intestine, instead of that regular dotted figure which the mucous glands commonly exhibit in mammalia.

The *great intestines*, as they are called, bear no sort of proportion to the small, in point of length: in many instances, even where the latter are of considerable extent, they do not exceed a few inches. They only admit of division into two parts; the cæcal appendages, and the continuation of the tube until it terminates at the anus. The first correspond with the intestinum cæcum of mammalia; and the other takes the place of the colon and rectum; but which from its extreme shortness and direct course to the anus, would appear to deserve only the name of rectum.

The *cæcal appendages* are subject to as much variety as perhaps any other part of the structure of birds. Generally, they are two in number; in which case, they arise rather abruptly from opposite sides of the intestinal tube, about the place where the convolutions cease, and the intestine becomes straight.

It may be received as a general rule, to which, however, there are some striking exceptions, that the magnitude of the cæca is in proportion to the muscularity of the stomach; we accordingly meet with this organ of the greatest size, and the strongest characters in the *gallina* and other *graminivorous* birds, from which it will be found most convenient first to take the description.

The cæca in these birds commonly ascend for some way quite close to each side of the intestine, from which they arise; during which they are less than the other parts of the intestinal canal; they then make a slight curve outwards, and become somewhat enlarged, and towards the superior extremity they again diminish before their termination in the cul de sac. These parts reach up in the abdomen to near the liver, and often make a slight curve round the spleen; they are connected to each other, and to the intestine between them, and also retained in their relative situation in the abdomen, by reflections of peritoneum, of which some are analogous to the meso-colon and meso-rectum, and others con-

tribute to the formation of the air-cells. See *Plate III.* in the *Anatomy of Birds*. *Fig. 3.* represents those parts in the *pintado*, or *guinea-hen*; *a* the tail portion of the small intestine placed between the two cæca, *b b* the cæca, *c* the rectum, *d d d* the peritoneum connecting those parts, *e* a process of peritoneum passing across from the top of one cæcum to another. If the cæca be slit open, it is found that they communicate with the rectum by an aperture which is smaller than their own cavity at the place; and consequently, any substance will pass with difficulty into them from the other intestines, and likewise be obstructed in its return.

Just within the entrance of each cæcum, there is a cluster of mucous glands, which appear like two spots of ulceration. These are particularly useful in this situation to smooth the passage of substances in and out of the cæca.

The contracted parts of the cæca are in some degree villous on the inner surface, and resemble in structure the rest of the intestinal canal; but the dilated parts are deprived of villi, possess very little vascularity, appear to have few, if any, muscular fibres, are without mucous glands, and are little better than simple membranous tubes. These parts contain the exuvie of the food.

All the uses which the cæca serve to animals are certainly not yet known; and the functions of these organs in birds are amongst the least understood. The magnitude of their cæca is not always in proportion to the apparent necessity for such reservoirs; often, where they might be expected large, they are small, or absent altogether, and sometimes, where the nature of the food would not seem to need these repositories, they are of considerable size. With the view of determining their uses, they were removed from the living hen, and the consequence is said to have been, that the animal would not admit any food from the crop into the gizzard, from which it might be inferred, that these organs serve other and more important purposes in the animal economy, than mere reservoirs of excrement; that, however, they are employed as a sort of temporary sewers, to receive the undigested parts of the food, is obviously true; and that in doing so, they answer an useful purpose, appears to be proved, in despite of many exceptions, by the more numerous instances of their bearing a decided relation to the digestive organs, and the quality of the food.

The same structure which has been described in the *guinea hen*, or *pintado*, is to be found with little variation in all the *gallina* except the pigeon, and in the *herbivorous anseres*, such as the *swan*, the *goose*, &c.

Daudin describes the cæca of the *beath-cock* (*tetrao urogallus*), and of the *white grouse* (*tetrao lagopus*), as grooved or fluted longitudinally.

The cæca of the *ostrich* are different from those of other birds; they are large where they commence, and diminish gradually towards their termination; they suffer many convolutions in consequence of a longitudinal band upon the posterior side, which is only two-thirds of their length; they are sacculated, or divided into loculi, throughout their whole extent, by means of a valvular projection of the internal coat, which winds in a spiral manner, similar to the valve of the cæcum in the *hare* and *rabbit* in mammalia, or the *ray* and *hark* kind amongst fish.

The spiral lamina is about five lines in breadth, but becomes somewhat less towards the extremities of the cæca. This lamellated structure is continued for some way into the other great intestine, and even into the small intestines; not, however, as one spiral valve, but in several transverse projections, which have a femilunar figure, and are placed alternately, so that one lamella is received between two others, in the manner of the *denticuli* of the bivalve shells. *Plate III. fig. 4.* is a portion of the first part of the great intestine

or colon of the *ostrich*, represented of the natural size and cut across to shew the femicircular lamina on the inside.

The effect of this structure is obviously the retention of the excrementitious part of the food for a longer time in the cæca; which is accomplished in other instances by the smallness of the aperture through which these parts communicate with the other intestines. This organ is not similar in the other *struthion* birds. According to the Parisian dissectors, the *casowary* is not provided with any cæcum. In the *casowary*, or (with more propriety) *ostrich*, of New Holland, we have found two cæcal appendages, which opened into the rectum by orifices not much larger than pin-holes. The internal surfaces had none of the laminae, or valvular projections, but were furnished with fine vascular flocculi, similar to those of the small intestines of the *ostrich*; with this difference, that in the New Holland bird, they are placed longitudinally, and are more loose and pendulous, looking somewhat like lacerated portions or shreds of the inner coat of the intestine.

In by far the greater number of birds the cæcal appendages are too small to serve any purpose, and appear only as useless imitations of the structure described in the *graminivorous* kinds. Many, that live on a mixed food, and whose stomachs are of an intermediate strength, amongst the larger *passeres*, the *picæ* of Linnæus, the *gralle*, and the *anseres*, have two cæca measuring in length usually about twice or thrice the width of the intestine from which they take their origin. See *Plate III. fig. 5.* which exhibits these parts in the *gull*. Cæca of this size have hardly any cavity, and seldom receive any of the contents of the other intestines; in the small *passeres*, which feed upon seeds, as the *sparrow* and *finch* tribes, the cæca bear a still less proportion to the size of the rest of the intestinal canal; see *fig. 6. of Plate III.* in which the cæca are represented as they are commonly found in those birds.

In the *pigeon* the cæcal processes are so small, that they escaped the notice of so accurate an anatomist as Severinus, who described the pigeon as wanting them altogether. *Fig. 7. of Plate III.* exhibits their appearance in the *dove*.

The carnivorous birds of all others have the cæca of the smallest dimensions; so much so, in many instances, that their existence has been often denied. *Fig. 8. of Plate III.* is copied from the Memoirs of the Royal Academy of Paris; it shews the slight dilatation which was found in the *bold buzzard* (*falco halietus*, Linn.) in place of the cæcal processes. On the internal side, however, this enlargement was furnished with a valvular membrane, by which a pouch was formed on each side.

The *owl* appears a very remarkable exception to the common structure of the *accipitres*, which respect to the formation of the cæca, which both in figure and magnitude are similar to those parts in the *gallina*. It is difficult to account for this singularity, unless it be supposed necessary to receive the indigestible parts of the animals, which this bird swallows entire.

Some of the *piscivorous* birds, as the *heron*, &c. have only one cæcal process; it is very short, and in the *heron* terminates in a pointed manner. See *Plate III. fig. 9.*

There are instances of the cæcal appendages being altogether wanting. They have not been found in the *casowary*, the *cormorant*, the *bittern* (*ardea stellaris*), the *parrot*, and the *wood-pecker*.

That portion of the intestinal canal which corresponds to the colon and rectum of mammalia, as already observed, is very short in birds. In its external characters, it resembles the rest of the intestinal canal, of which it appears to be simply the continuation. The internal surface is provided with villi, which, however, are not so long and delicate as

those of the small intestines. They are rather very minute eminences than villous processes, especially towards the termination of the rectum, at which place they often assume a decided granular appearance. The inner surface of the rectum in the *New Holland ostrich*, however, presents an exception to this observation; it is covered with fine and truly hair-like processes; in this bird also the internal coat of the great intestine is slightly folded or wrinkled transversely, in a manner somewhat similar to the valvula conniventes of the small intestines of the human subject.

The termination of the rectum in birds is very usually called the *cloaca*, on account of its receiving, as a common sink or sewer, both the excrements of the intestines and the urine. There is at this place a dilatation of the gut, which is often only a slight and gradual enlargement just within the margin of the anus; but sometimes it swells out suddenly into a pouch or sack. A remarkable example of which occurs in the parrot; see *Plate IV. in the Anatomy of Birds, fig. 1. a* the rectum, *b* the pouch.

The cloaca of the *buffard* has been found large enough to contain an egg. It is of an oval form; it is situated about an inch from the anus, and the rectum again experiences a contraction previous to its termination in the vent. See *fig. 2. of Plate IV. in the Anatomy of Birds; a*, the rectum before it enters the pouch; *bb*, the pouch laid open to expose its interior; *c*, the contraction within the anus.

In the *ostrich*, this dilatation is of great size; being capable of receiving one's two fists, according to the report both of the anatomists of the French academy, and of Mr. Warren, who published a dissection of this bird, in the *Philosophical Transactions*, see N^o 394. p. 113.

The use which the anal pouch answers is almost too obvious to be mentioned, which is that of a temporary accommodation to the excrements of the bird, by which their ejection is rendered less frequent.

The cloaca is furnished with somewhat stronger muscular fibres than the rest of the intestine, and is invested with a reflection of cuticle, which in the larger birds is very palpable. Connected with the cloaca, there is a bag, or purse, which, taking the name of the anatomist who first described it, is called *bursa Fabricii*.

The *purse of Fabricius* is usually of an oval or round figure, depressed on the anterior and posterior sides, and thence always appearing empty. It is furnished with a narrow process, or neck, which is most contracted about its middle. Its situation is on the back part of the cloaca, to which it is closely connected, being inclosed in the same reflection of peritoneum which envelops the rectum. When the peritoneum is dissected off, it is found to be a distinct bag or sack, united only to the rectum by means of its neck, which passing obliquely in the coats of the cloaca, opens into the intestine by a slit-shaped aperture. The internal coat of the cloaca projects over the opening like a penthouse, and performs the office of a valve, readily allowing the contents of the bag to pass out, but standing in the way of any regurgitation from the intestine. See *Plate IV. of fig. 2.* and the *purse of Fabricius* in the *buffard* which is of an oblong shape in this bird; *c*, the slit by which it communicates with the cloaca.

The size of this bag is in general fairly proportioned to that of the bird in which it is found. In the *buffard* it has been stated to be two inches long; in the *goose*, it measures about an inch and a quarter in length, and half an inch in breadth; and in the *sparrow*, it is about a quarter of an inch long, and half as broad.

The external side of the bursa is smooth and equal, but the internal part is thrown into deep rugæ. The folds are disposed in an arborescent form, and branch off with great regu-

B I R D.

regularity from a stem which is lodged in the neck of the bag. See *Plate IV. fig. 3.* in which the purse of the *goose* is delineated, with its cavity laid open, to exhibit the folds upon the inner surface.

When more closely examined, the structure of this part is very curious. Under the peritoneal covering, it is surrounded by a very delicate expansion of muscle, the fibres of which take a transverse direction. The internal tunic of the purse is made of a thin pellucid membrane, and the folds which have been described, consist entirely of glandular bodies, which are too minute to be distinguished with the naked eye. By employing a lens of common magnifying powers, we have discovered them to bear a great resemblance to the gastric glands, being, like them, little cylinders, which are perforated at one extremity to give passage to their secreted fluid; indeed, the only difference which appears between them, is, that the glands of the purse are shorter, being so much compressed in some instances, that they are nearly of an annular form. *Fig. 4. of Plate IV.* exhibits a portion of the bursa of the *goose*, highly magnified; *a, a,* the glands composing the folds; *b, b,* the spaces left between the folds, which consist only of the tunics of the purse.

The fluid produced by these glands, and of which the purse always contains a greater or less quantity, appears to differ in no respect from common mucus. The necessity, however, for so ample a supply of mucus, as these glands are capable of furnishing, does not seem very plain, especially when it is considered that the purse of Fabricius is not met with in all birds. Amongst others, the *parrot* is without it, as appears by *fig. 1. of Plate IV.* in the *Anatomy of Birds*; and yet the parrot has a very large cloaca, and might thence be supposed to need this glandular apparatus, even more than many birds, admitting its use to be the secretion of a mucous fluid, to sheath the cloaca against the acrimony of the excrement and urine.

Although the functions of the purse of Fabricius cannot be stated with certainty, it may be conjectured that they are not unimportant, from the delicacy of its organization, and its being so rarely wanting. There are a number of black points to be seen within the anus of the *parrot*, which appear like the orifices of mucous glands: may not these supersede the necessity of the purse in this bird?

The excrements of birds have been ascertained by Vauquelin and others, to possess an acid. This is increased by fermentation, into which feculent matters rapidly tend, and as it proceeds, the acid gives place to ammonia, which is evolved, towards the end of the process, in great abundance. The dung of the *pigeon* is found to contain an acid of a peculiar kind, which is increased by the mixture of the feces with water. It is from its chemical properties that the dung of pigeons becomes so serviceable as a manure, and that it is employed in the process of some manufactures, and for domestic purposes, such as cleansing clothes, &c.

Vauquelin has also analysed the fixed parts of the excrements of fowls, which being compared with those of the food, afforded some very singular and important results.

For this purpose he fed a *hen* for ten days upon oats, of which she consumed during that time 11,111,843 grains troy weight; these contained

136,509 grains of phosphate of lime,
219,548 silica,

—————
356,057.

In the course of these ten days the hen laid four eggs; the shells of which yielded 98,776 grains of phosphate of lime, and 453,417 grains of carbonate of lime. The whole

quantity of excrement ejected during the ten days contained 175,529 grains of phosphate of lime, 58,494 grains of carbonate of lime, and 185,266 grains of silica. The amount, therefore, of the fixed parts discharged from the system during this period were as follows:

274,305 grains of phosphate of lime,
511,911 grains of carbonate of lime,
185,266 silica,

Given out 971,482
Taken in 356,057

—————
Surplus 615,425

Hence it appears, that the quantity of solid matter parted with by the system during ten days, exceeded the quantity taken in by 615,425 grains.

The amount of the silica received was 219,548 grains,
The quantity given out was only 185,266 grains,

Deficient 34,282 grains.

Consequently there disappeared, during ten days, 34,282 grains of silica.

The quantity of phosphate of lime
taken in was - - - 136,509 grains,
That given out was - - - 274,305 grains, -

—————
137,796

There must have been formed, by digestion in this fowl, no less than 137,796 grains of phosphate of lime, as well as 511,911 grains of the carbonate of lime. It may thence be presumed, that lime (and perhaps phosphorus) is not a simple substance, but compounded of ingredients which exist in oats, water, and air, which were the only matters that could be introduced into the body of this fowl; as a quantity of silica had disappeared, it might be supposed, that it had contributed to the formation of the additional products; but if so, it must have entered into combination with a great quantity of some other substance. See *Annal. de Chim.* xxix. 16.

Notwithstanding these experiments were conducted by the ablest chemist of the age, they ought not perhaps to be ascribed to without being repeated under every circumstance which could lead to the detection of any error that might possibly arise.

This is not only necessary on account of the extraordinary nature of the results, which could only be produced by a creative power in the assimilating organs of the animal; but from other analogous experiments yielding results of a contrary kind. Dr. Fordyce, for instance, found that a certain quantity of calcareous matter was required by birds during the period of laying; and if the bird was deprived of this, the shell never was formed, and the bird frequently died from the eggs not coming properly forward. The method he adopted to prove this was simple and satisfactory: he took a number of canary birds, when about to lay; some he inclosed, so that they could have no access to any calcareous matter; and to others he gave a piece of old mortar, which they swallowed with avidity, and they laid their eggs as usual; whilst, on the other hand, those birds he had not furnished with the mortar were unable to produce eggs, and in several instances died. See *Fordyce on Digestion*, p. 25 & 26.

Liver.

This viscus is situated about the middle of the common cavity of birds. Its form, as in other animals, is much influenced by the shape of the parts which are immediately adjacent. The left side lies on the stomach, the right covers the

the intestines, and the apex of the heart is accommodated in the middle, and wherever the liver comes into contact with these parts, it receives in a degree an impression of their form.

Vic d'Azir, in his great system of anatomy, says, that the liver of birds is divided into only two lobes; and Cuvier has repeated the assertion in his *Tableau Elementaire de l'Histoire Naturelle*. The observation, nevertheless, is not in all cases strictly true. In many birds there is a third lobe, situated at the back of the liver, between the right and left lobes: this appears to be analogous to the lobulus *spigelii* of the human subject, both from its most usual figure, and from its position. See *Plate IV.* of the *Anatomy of Birds.* *Fig. 5.* represents the liver, &c. of the *goose* reviewed on the posterior or reverse side; *a* the right lobe reaching lower down than the other, and exhibiting impressions corresponding to the convolutions of the intestines; *b* the left lobe, with two prominent parts, and a depression extending along the lobe between them; *c* the third, or intermediate lobe. In the *common fowl*, the left lobe is cleft on the anterior part so deeply as almost to form two lobes on the left side. The French academicians allow three lobes to the liver of the *cormorant*; they are all very small. A third lobe has been described also in the *pigeon* by Borrichius, and in the *swan* by Bartholine. The liver of the *ostrich* consists of four imperfect lobes.

There is considerable variety in the shape and relative size of the two principal lobes; generally the right lobe much exceeds the other in bulk, and is somewhat longer. This character of the lobes is to be seen in the liver of the *goose*, *Plate IV.* *fig. 5.* but is more remarkable in the *casorvatory*, and even still more so in the *bustard*, in which the right lobe descends to the bottom of the belly; both lobes are short in the *eagle*, the *Indian cock*, the *parrot*, the *owl*, and many others; and in the *eagle* the left lobe has the greater bulk.

The two lobes are nearly of equal size in the *heron* kind, and both long-shaped. However much the livers of birds may differ in external forms, the internal structure is the same in all cases, as we have proved by numerous observations. The secretory vessel is produced from the veins of the neighbouring viscera, as in mammalia, and after entering the liver by the depression or fissure on the lower surface, which corresponds to the *porta* or *gates* of the human liver, it is distributed throughout the substance of the organ, and terminates in the same manner as the *vena porta*, i. e. in five radii, or penicilli towards the surface of the liver.

As there is no muscular septum between the thorax and abdomen of birds, their liver has not the advantage of that mode of connection, which is called in mammalia the coronary ligament: it is however amply supplied by the duplicature of peritoneum, which corresponds to the falciform ligament; this process divides the two principal lobes, passing deeply between them; it is connected to the peritoneum, which forms the air cells, in the sides and back part of the abdomen, is incorporated with the pericardium, and joins the sternum and the linea alba on the fore part of the abdomen, and then becomes reflected on each side of the common cavity, which is thus divided almost for its whole extent, in the same manner as the mediastinum divides the thorax in mammalia. The extended attachment, which is in this way procured for the liver, renders this viscous more steady in its situation than it is in other animals, which birds require on account of the rapid and violent motions of their bodies during the act of flying. As the falciform ligament goes on to the fore part of the cavity, the margin which forms the round ligament is necessarily wanting, but the remains of the umbilical vein

may be traced running between the duplicature of the peritoneum.

The *gall-bag*, or reservoir of the secreted fluid of the liver, in almost every instance where it exists, is situated upon the lower surface of the right lobe, somewhat nearer its central than its external edge. It is commonly received into a slight depression of the liver, so that about one-half of the bag is brought into contact with that viscous, nothing being interposed between them but the connecting cellular substance. The surface of attachment is occasionally less extensive; thus in the *eagle*, *bustard*, and *cormorant*, the bag stands out from the liver being only united to it by one end.

The form of this bag is commonly that of an egg, or a globe, or often something between these two figures. In a few instances it is elongated, as in the *bustard* and *casorvatory*; it measured in the latter bird only one inch in diameter, although it is seven inches in length.

The structure of the *gall-bag* appears to differ in no respect from that described in mammalia; its coats discover no trace of muscular fibres, and its internal surface exhibits the same kind of reticulation or net-work which is found in the gall-bladder of the human subject. See *Plate IV.* and *fig. 5.* in the *Anatomy of Birds*; the letter *d* indicates the *gall-bag* of the *goose* viewed particularly in its natural position; the reticulated structure is visible on the outside, but to bring it more perfectly into view the cavity is exposed by the removal of a portion of the bag.

The bile does not flow into the *gall-bag* by regurgitation from the common duct, but is conveyed directly thither by means of a particular tube designed for that purpose. This duct arises from the right lobe, passes on the side of the bag, which is in contact with the liver, then becomes involved in the coats of the cyst, which it perforates about the distance of one-third from the posterior end.

The orifice by which the duct opens into the cavity of the bag, is very small, and is surrounded by a smooth projection of the inner membrane, which added to the obliquity of the duct, affords the effect of a valve, and entirely prevents any return of the fluid upon the liver; for the more the cyst is distended, the more pressure will be laid upon the duct, in its passage.

It would seem that the cysto-hepatic duct is situated nearly in the same way in all birds, where it exists, but the present description is taken from the *goose*. See *Plate IV.* and *fig. 5.* in which *e* points out the termination of the duct in the *gall-bag*, upon the papilla above-mentioned, and the course of the duct also is to be indistinctly seen behind the tunics of the cyst.

The *ducts* which carry the bile to the intestines, are two in number, the *hepatic* and the *cystic*. The first arises by two branches, generally from the right and left lobes of the liver, and while within the fissure or *porta* of the liver, they unite to form the trunk which proceeds to its insertion into the intestine, and usually crosses the duct of the *gall-bag* in its way thither.

The *cystic duct* comes forth abruptly from the most posterior part of the *gall-bag*, which is not prolonged into a neck, as in other animals. The duct makes a turn round the end of the bag, along the side of which it then proceeds so closely applied, that upon a slight examination it might be supposed to commence from that part, or even from the anterior end of the cyst.

The cystic and hepatic ducts never unite to form the ductus *coarumis*, as in many animals; but proceed distinctly to the intestine, into which they always enter separately; sometimes very near each other, and at others removed to a little distance. Two hepatic ducts have been found

found in the *Indian cock* or *curassow*, which also had a distinct insertion in the intestine.

The part of the intestines where the biliary ducts penetrate, is commonly at the conclusion of the first doubling or convolution, which occurs after the origin of the intestine from the stomach; or, in other words, it might be said to be at the termination of the duodenum. The bile duct of the *ostrich* is very large and enters the intestine near the stomach.

As in mammalia, the passage of the ducts through the coats of the duodenum is somewhat oblique, and they open upon a papilla or prominence of the internal coat, thus gaining the effect of a valve, and preventing the regurgitation of their fluid. In addition to which, the *buffard* is described as having a fold of the inner coat of the intestine projecting over the orifices of the biliary and pancreatic ducts.

Plate IV. and fig. 5. in the *Anatomy of Birds*, exhibits the origin, course, and termination of the biliary ducts in the *goose*; *f* the hepatic duct, formed of two branches in the fissure of the liver: *g* the origin of the cystic duct from the end of the bag, appearing internally like a puckered hole; *h* its course behind the hepatic duct, beyond which it terminates in the intestine; *ii* the first convolution of the intestine; *k* the portion from which the gizzard has been cut away; *l* the commencement of the second fold of the intestines, or the beginning of the jejunum.

Both the cystic and hepatic ducts of the *gull* become slightly enlarged just at their insertion in the intestine, which is produced not so much from a dilatation of their cavity as a thickening of their coats. The more minute structure and the functions of the bile ducts are in every respect analogous most probably to those of the same parts in other animals. A very curious observation has been made on this subject by Borrichius, which deserves to be mentioned. He opened a pigeon while yet alive, and discovered in the hepatic duct a pulsatory motion, by which it was alternately distended and emptied of its contents, the intervals between each contraction were somewhat longer than they occur between the systole and diastole of the heart. If this had been related by a less accurate anatomist than Borrichius, one would be led to suspect that a blood-vessel had been mistaken for the biliary duct; but he watched the moment that the action of the heart subsided, and still the duct was alternately emptied and distended with a green fluid as before.

The gall-bag is occasionally wanting in birds, and it should be remarked, that this irregularity is not governed by any general rules of structure, as two species which agree in every other respect, are observed to differ in this; nay, according to the French academicians, the gall-bag is not constantly found even amongst the individuals of the same species; thus in dissecting six *demoiselles of Numidia* (*ardea virgo*), it was absent in two of them, and the others had it very small. Amongst ten *pintados*, also, they only met with the gall-bag twice, and differing very much both in size and shape; and in these instances where the bag was absent the hepatic duct was found very large.

The species known to be deprived of the gall-bag, are the *ostrich*, the *parrot*, the *pigeon*, the *bittern*, the *crane*, and the *cuckoo*; in some of these, dilatations of the ducts have been observed which may be supposed to supply in a degree the office of the gall-bag, which appears from this, as well as other circumstances, to be simply a reservoir for the bile, and not an organ for working any change in the properties of that fluid. Being, therefore, a convenient, rather than a necessary structure, its absence need not be expected to be marked with any clear relation to the other functions of the animal economy.

No experiments have yet been instituted with the design of procuring a chemical analysis of the bile of birds; it is most probable, however, that these would discover nothing peculiar, as in sensible properties such as colour, taste, &c. it perfectly resembles the bile of mammalia.

The Pancreas

Consists of two distinct glands, for the most part, in birds. Their common situation is between the coil of the first intestines, to which they are very firmly bound by their peritoneal coat; they have a very elongated figure, furnished with decided sides, angles and edges, which are irregularly notched or indented. These clefts mark out imperfectly the original lobules of which the glands are composed. They appear to possess the same internal structure which is described in mammalia, though not so palpably as to be discovered without some pains; to a slight observation their substance seems to be a white homogeneous mass, instead of that congeries of lobules, cells, blood-vessels, and ducts, which really enter into its composition. Each of the glands produces a principal duct, which separately runs in the reflection of peritoneum, into which intestine they are inserted, at a variable distance from each other, in the manner of the two biliary ducts. Their entrance is, with scarce an exception, adjacent to that of the bile ducts, and often so near that one projection of the internal coat of the intestine serves for the termination of all the ducts.

See Plate IV. in the *Anatomy of Birds*, in fig. 5. the letters *nm* indicate the two pancreatic glands of the *goose*, a little separated from each other, and their other peritoneal connections, to exhibit more clearly their figure; *nn* the ducts from each gently curved in their passage to the intestine. The pancreatic and biliary ducts are at a considerable distance in the *ostrich* and the *gull*. In the first, as already mentioned, the hepatic duct enters the intestine near the stomach; but the pancreatic duct passes as usual into the last portion of the duodenum. The pancreatic ducts of the *gull* penetrate the duodenum at its commencement, whilst the biliary prefer nearly the common situation. It is not very unusual for these ducts to enter the intestine alternately, or for the two pancreatic to pass between the two biliary; this may be observed in the *eagle*, the *heron*, &c.

Considerable varieties have been described in the number, external figure, and magnitude, &c. of the pancreas in different birds. The French academicians have represented it as a single gland, with only one duct in the *ostrich* and *curassowary*. In the latter it was extremely small in proportion to the size of the bird, being only two inches long, and its duct a line and a half in length. In the *eagle* it appeared to be single, although in one instance it sent forth two ducts, and in another three; it was enlarged and round at the head, at which place it was perforated by the hepatic duct in its way to the intestine. They also describe that this gland varies in different individuals of the same species; thus in one *curassow* they found the pancreas double, and in another single. De Graef in most *fowl* found three pancreatic ducts, and also in the *pigeon*, and Bartholin observed only one pancreatic duct in the *peacock*.

The Spleen

Has been described as occupying different situations by different authors. Thus Cuvier, and other anatomists, have stated its common position to be the middle of the mesentery. The French academicians found it closely adhering to the side of the ventricle, in one species of eagle (*falco chrysaetos*) and in another (*falco haliaetos*), it was met with under the right lobe of the liver; and Severinus mentions the spleen of the *crow* being situated upon the first intestine. In every bird, however, which we have examined with the view of

ascertaining the situation of the spleen, it has been uniformly discovered underneath the left lobe of the liver, placed a good deal backwards, and on the right side of the zone of gastric glands. Its peritoneal connections to the neighbouring parts are loose and permit it to be displaced, when the other viscera are removed from their situations, which circumstance may have occasioned some difference in the observations made upon the subject. The situation we have described is the most convenient for its being supplied with blood, which it receives from the gastric artery, and is besides consistent with general analogy.

The figure of the spleen is most commonly round; it is, however, in some birds, a little different in form. The most usual deviation is the oval or kidney shape, which has been observed in the *cormorant*, the *eagle*, the *pintado*, the *common foral*, &c. In the *ostrich* it is cylindrical, and in the *casowary* it has been likened in figure to a foal fish. In the *gull* it is much elongated and pointed at both ends, as it is shewn in *Plate IV.* in the *Anatomy of Birds*, and *fig. 6.*

The spleen assumes rather an irregular form in the *goose*; it is slightly compressed and round on the one side, and flat on the other. The outline presented on either side is triangular, and one of the angles is prolonged as a mamillary process, which is distinguished from the rest of the spleen by a slight cleft or fissure. This is represented in *fig. 7.* of *Plate IV.* of the *Anatomy of Birds*; *a* the body of the spleen viewed on the flat surface; *b* the papilla-shaped process; *c* the entrance of the splenic artery, upon the edge; *d* the vein penetrating the flat surface.

The texture of the spleen is so much more close and firm in birds than in mammalia, that one might be easily led to suppose its structure was different; but when prepared by being injected with coloured substances, and submitted to examination through a lens, we have discovered, as in mammalia, the splenic artery to terminate in numerous minute branches, and the veins to take their rise from cells. The only difference which exists, is with respect to the magnitude of the cells which are extremely minute; and thence arise the peculiar compactness and density of the spleen of birds.

The structure of this organ being so very similar to that of the spleen in mammalia, it is fair to conclude that their functions are also analogous. The situation of the viscus in birds might be considered, therefore, as affording an objection to that theory, which supposes this organ was designed to regulate the quantity of blood employed by the arteries of the stomach during the secretion of the gastric fluid; for, in birds, the spleen receives no pressure as occurs in mammalia by the introduction of food into the stomach, and consequently, cannot affect the distribution of the blood in the collateral arteries, more under the circumstance of a full stomach than an empty one. In order to put the spleen of birds in the same conditions to which it is subject in man and quadrupeds, it should be placed under the crop in the graminivorous tribe, or between the ventricle and the ribs in the other kinds.

Although it would be often wrong to determine the uses of an organ in one class of animals, from the circumstances in which it may be placed in another; yet no theory can be considered as well founded, unless it be framed in the contemplation of all the varieties of comparative structure.

Absorbents.

One of the most remarkable and inexplicable circumstances in the anatomy of birds is, that the nutritious fluid of the intestines, or the chyle, is as transparent as the lymph which is taken up from the common interstices, or the surface of the body. The absorbents of the intei-

lines, therefore, do not deserve to be called *lacteals*, an appellation they have received in man and quadrupeds, in consequence of the opacity and milky appearance of their contents.

The discovery of the lymphatic system in birds may be reckoned amongst the modern improvements in anatomy. Before Mr. Hunter, about the middle of the last century, described the absorbents of the neck, it was generally supposed that the office of these vessels was fulfilled in birds by the minute branches of veins. This opinion was rendered the more probable as several able anatomists had sought in vain for those white vessels, and their glands, which are so easily detected in the mesentery of the smallest quadruped. It was not then known, however, that the lymphatic vessels of the intestines were always pellucid in birds, and unprovided with glands, and accordingly Mr. Hunter's discovery was not generally admitted as decisive on the question, until some years afterwards the whole of the lymphatic system had been described by Mr. Hewson; he employed for this purpose a young and very lean goose, which had been recently fed, and having secured it upon a table, he opened the abdomen whilst the bird was yet alive, and passing a ligature round its mesenteric vessels, as near to the root of the mesentery as possible, the lymphatics of this part became apparent in a few minutes. The same method also was pursued to expose the absorbents of the neck. A ligature was placed round the jugular vein at the lower part of the neck; and to be more certain of inclosing the lymphatics which are near it, a sufficient quantity of the surrounding substance was included by the ligature. In this way he succeeded in tracing the lymphatic system, in more instances than one, after having filled the vessels with quicksilver. He published a description of the absorbents, illustrated by two drawings, in the *Philosophical Transactions* for the year 1748, and in his *Experimental Inquiries into the lymphatic system.*

As no accounts or figures of the absorbents of birds have been offered to the public since Mr. Hewson's time, we cannot do better than adopt the description, and copy the representation left to us by that indefatigable anatomist; in doing which, we shall transcribe his own words.

“ This system consists in birds, as it does in the human subject, of three parts, viz. the lacteals, the lymphatic vessels, and their common trunk, the thoracic duct. The lacteals indeed, in their strictest sense, are in birds, the lymphatics of the intestines, and like the other lymphatics, carry only a transparent lymph; and instead of one thoracic duct there are two, which go to the two jugular veins. In these circumstances, it would seem, that birds differ from the human subject, so far at least as I may judge from the dissection of a goose, which was the bird I chose as most proper for this inquiry, and from which I took the following description, after previously injecting its lymphatic system with quicksilver.

“ The lacteals run from the intestines upon the mesenteric vessels. Those of the duodenum pass by the side of the pancreas, and probably receive its lymphatics: afterwards they get upon the cœliac artery. Whilst they are upon this artery they are joined by lymphatics from the liver. Here they form a plexus which surrounds the cœliac artery: at this part they receive a lymphatic from the gizzard; and a little farther, another from the lower part of the œsophagus (or zone of gastric glands). Having now got to the root of the cœliac artery, they are joined by the lymphatics from the glandulæ renales, or renal capsules; and near the same part, by the lacteals from the other small intestines, which vessels accompany

“ the mesenteric artery. These last mentioned lacteals, before they join those from the duodenum, receive from the rectum a lymphatic, which runs with the blood-vessels of that gut. Into this lymphatic some small branches from the kidneys seem to enter, which, coming from those glands upon the mesentery of the rectum, at last open into its lymphatics. At the root of the cœliac artery, the lymphatics of the lower extremities probably join those from the intestines. The former,” he says, “ I have not yet traced to their termination, though I have distinctly seen them on the blood-vessels of the thigh; and in one subject which I injected, some vessels were filled, contrary to the course of the lymph, from the network near the root of the cœliac artery. These vessels ran behind the cava, and down upon the aorta, near to the origin of the crural arteries; and I presume they were the trunks of those branches which I had seen in the thigh. At the root of the cœliac artery, and upon the contiguous part of the aorta, a net-work is formed by the lacteals and lymphatics above-described. This net-work consists of three or four transverse branches, which make a communication between those which are lateral. In the subject from which this description was taken there were four. From this net-work arise the two thoracic ducts, of which one lies on each side of the spine, and runs upon the lungs obliquely up towards the jugular vein, into which it opens, not indeed into the angle between the jugular and subclavian vein, as in the human subject, but into the inside of the jugular vein, nearly opposite to the angle. The thoracic duct of the left side is joined by a large lymphatic which runs upon the œsophagus, and can be traced as far as the lower or glandular part of that canal, from which part, or from the gizzard, it seems to issue. The thoracic ducts are joined by the lymphatics of the neck (and probably by those of the wings), just where they open into the jugular veins.

“ The lymphatics of the neck generally consist of two pretty large branches on each side of the neck, accompanying the blood-vessels. Those two branches join near the lower part of the neck; and the trunk is in general as small, if not smaller, than either of the branches. This trunk runs close to the jugular vein, gets on its inside, and then opens into a lymphatic gland. From the opposite side of this gland a lymphatic comes out, which pours the lymph into the jugular vein. On the left side, the whole of this lymphatic joins the thoracic duct of the same side; but, on the right, one part of it goes into the inside of the jugular vein a little above the angle, whilst another joins the thoracic duct, and with that duct, forms a common trunk, which opens into the inside of the jugular vein, a little below the angle which that vein makes with the subclavian.

“ To this description it may be necessary to add, that though it be taken from one subject, yet in three others of the same species, which I examined carefully, I saw nothing which disagreed with it. I particularly attended to the number of the thoracic ducts, suspecting that possibly in this subject the two that I had seen might be only a variety, which is a circumstance that, as we are told, has occurred even in the human body. But in three others of this species, which I likewise successfully injected, I still saw two ducts; and therefore I am inclined to believe, that this is the constant number. I likewise carefully attended to the vessels coming from the gland on the right side; and in the only two subjects in which the lymphatics of the neck were properly filled,

“ I observed that one part of it opened immediately into the vein, and the other joined the thoracic duct. In all the four subjects I evidently saw that the thoracic ducts opened into the inside of the jugular veins.

“ This system in birds differs most from that of quadrupeds. 1st, In the chyle being transparent and colourless; 2dly, In there being no visible lymphatic glands, neither in the course of the lacteals, nor in that of the lymphatics of the abdomen, nor near the thoracic ducts; 3dly, In the several parts of this system in birds being more frequently enlarged, or varicose, than in quadrupeds. In particular, this appears to be the case of the vessels which constitute the net-work at the root of the cœliac artery, in that subject from which the drawing was taken. The lacteals are frequently enlarged in some places; so are the thoracic ducts; and the lymphatics on each side of the neck are commonly, when taken together, larger than their trunk, which opens into the lymphatic gland. In one subject, when, instead of two lymphatics on the left side, I found only one, that vessel was as large as a crow quill, whilst the lower part of it, which entered the gland, was much smaller.”

The figures which explain the foregoing description are to be found in *Plate V.* of the *Anatomy of Birds.* *Fig. 1.* shews the absorbents in their natural situation, with respect to the other parts of the body; A, the neck; B, B, the clavicle divided near its middle; C, the left subclavian artery; D, D, the jugular veins; E, E, the pulmonary arteries; F, F, the two branches of the trachea; G, G, the lungs; H, the aorta; I, the cœliac artery; L, the œsophagus turned to one side; M, M, the renal capsules; N, a small part of the liver fixed to a rib by a thread; O, O, O, intestines; P, the duodenum; Q, the pancreas fixed to a rib by a thread; R, the gizzard. *Fig. 2.* exhibits the absorbents, and their more immediate connexion with the vessels, in outlines: *a*, the lacteal, or more properly lymphatic, which come from the *duodenum*; *b*, the lymphatics of the liver; N; *c, c*, a plexus formed by the above-mentioned lacteals and lymphatics, which surrounds the cœliac artery; I; *d*, a lymphatic from the gizzard; *e*, a lymphatic from the lower part of the *œsophagus*; *f, f*, a net work formed by the lymphatics upon the *aorta*; H; *g, g*, the two thoracic ducts; *i, i*, the trunks of the lymphatics of the neck; *k, k*, the glands through which the lymphatic vessels of the neck pass: that of the left side is oblong, and could not well be represented in a Figure; *l*, the thoracic duct of the left side, and the lymphatic vessel of the neck, opening together into the inside of the jugular vein; *m*, a part of the lymphatic of the right side of the neck, opening into the jugular vein; D; *n*, the thoracic duct of the right side, joined by a part of the lymphatic vessel of the right side, and then opening into the inside of the jugular vein.

Heart.

This organ occupies the centre of the superior portion of the common cavity of birds. It is placed usually in the line of the body, as in quadrupeds; the heart, however, is inclined in the slightest degree to the left side in some instances, and in others a little to the right side. The apex of the heart is commonly received between the two chief lobes of the liver, which are hollowed out for its accommodation.

The membranous bag, which contains the heart, is formed like the pericardium of other animals, and is reflected in the common manner upon the origin of the great vessels, and the heart. The pericardium of birds is generally considerably larger than the heart, and especially at the lower part,

which is often prolonged for some way between the lobes of the liver. It deserves remark, that notwithstanding the great size of the pericardium, the air, which pervades almost all the cavities of birds, is not admitted into this. The Parisian academicians, it is true, observed the pericardium to swell when they inflated the lungs and air-cells of the *pintado*, and thence concluded that the air had admission to the heart, for which they assigned some curious reasons; such as the heart requiring compression and evaporation from its surface. They appear, however, to have been equally in error with respect to the fact and the reasoning; for, in a great number of species we have examined for the purpose, the pericardium was uniformly found to contain a certain quantity of water, and had not the least communication with either the lungs or air-cells. The Parisian anatomists must have been led into this mistake by the distension of the air-cells around the pericardium.

The heart is of a longer figure in birds than in other animals; and the outline of the right side is slightly concave, in consequence of the parietes of the right ventricle being relatively thin. In the *ostrich*, the heart has been described as nearly round; measuring six inches from the base to the apex, and five inches across.

Birds have, like mammalia, four distinct cavities in the heart, which bear the usual proportions in magnitude with respect to each other. The auricles however, and especially the right, are commonly more muscular than in other animals; and the left ventricle is always much stronger than the right.

The internal surface of the auricles is very irregular, in consequence of the shape and size of the muscular fasciculi. There is one very strong portion of muscle, which enters into the composition of the auricular part of both cavities, from which other fasciculi proceed in a regular and radiated manner, at least in the right auricle. See *Plate V.* in the *Anatomy of Birds. Fig. 3.* shews the heart of the *goose*, with the auricle and ventricle of the right side laid open, *e* the principal muscular fasciculus of the auricular portion of the cavity passing backwards towards the left auricle; *f* the lesser fasciculi, which depart from the other as branches from a trunk; *g g* the deep fossæ which exist on each side of the large fasciculus.

The blood of the viscera and lower limbs is conveyed into the right auricle by a vein corresponding to the inferior vena cava of mammalia. There is, however, no vein strictly analogous to the superior cava, the veins of the right wing and that side of the head and neck, form a distinct trunk, which enters the upper part of the auricle; while those of the opposite side also produce another trunk, which passes along the posterior surface of the left auricle, to which it is closely united, and opens into the right auricle beside the inferior cava.

The anatomists of the French academy observed, in most of the birds they dissected, a valvular projection of the inner membrane of the heart, over the entrance of the inferior vena cava into the right auricle. This valve resembles in form that of the coronary vein of the human heart, and by its means, the orifice of the cava, which is really very large, puts on the appearance of a narrow slit. A similar valve hangs over the entrance of the veins which return the blood of the wings and head to the auricle. See *Plate V.* in the *Anatomy of Birds, fig. 3.* *a a* a point out the veins, which terminate in the right auricle with their valvular orifices, into each of which a bristle has been introduced.

The analogy between the valves of the veins entering the right auricle of birds, and the Eustachian valve of the human

heart, is very obvious, and demonstrates, as far as analogous structure can, that the latter serves the purpose of a valve to the vena cava in the human subject.

There are commonly two or three orifices for the coronary veins in birds, one is always larger than the rest, and transmits the blood of the principal vein of the heart. They are each provided with a slight projection of the inner membrane, which acts imperfectly as a valve.

The right ventricle is of a triangular figure, and is quite smooth on the internal surface; there being none of those processes of muscle which are called *carneæ columnæ*.

The valve, which is placed at the mouth of the right ventricle, is of a peculiar shape and structure in birds. Instead of those thin and membranous folds, which usually surround the orifice of the ventricle, and are moved by means of their connexion with the *carneæ columnæ*, and which from their figure in the human subject are called the *tricuspid valve*; there is a single projection of the flesh of the heart, of a triangular figure, and nearly as thick as the parietes of the cavity in which it is contained. The triangular valve is joined by its superior edge to the margin of the orifice of the ventricle, and is united by another of its edges to the right side of the cavity almost to the bottom. The third edge is unconnected, except by a small process, which goes off near one of the superior angles to the parietes of the ventricle on the left side. See *Plate V.* in the *Anatomy of Birds, fig. 3.* *b* the triangular valve, exposed by means of the anterior parietes of the right ventricle being cut off, a bristle is passed under the valve from the auricle; *d d d* the external surface of the heart; *e* the process connecting the floating edge of the valve to the parietes of the ventricle, with a bristle lying under it.

The triangular valve, from its thickness and muscularity, would seem to operate chiefly by means of the contraction of its own fibres changing its figure, and thus obstructing the return of the blood into the auricle. Borrichius discovered a foramen in the septum of the heart of the *pigeon*, large enough to admit a bristle, by which the two ventricles had a direct communication with each other. See *Act. Dan. anni 1. observ. 96.*; and we have observed the same foramen at the upper part of the septum of the heart of the *goose* in one instance; it was of sufficient size to receive a crow quill. Such a communication does not appear, however, to be an uniform or natural structure, as we failed to discover it in other *geese*, and in different species of birds examined for the purpose. Indeed, a ready communication between the ventricles of an adult bird, would be inconsistent with the mode in which the functions of respiration and circulation are carried on in this class of animals.

The pulmonary artery is provided with three semicircular valves, as in mammalia. It divides also, as usual, into a vessel for each lung, and that of the right side passes under the arch of the descending aorta.

The blood is returned from the lungs by two pulmonary veins, which open very near each other into the upper and posterior part of the left auricle.

The mechanism of the cavities of the left side of the heart more nearly resembles that which exists in mammalia. The sinus, or membranous part of the left auricle, is however very small, and of an oblong shape; and at the place where the pulmonary veins enter into the auricle, there appears to be a projection of the internal membrane, which performs the office of a valve to their orifices.

The valve of the left ventricle is thin and membranous, and resembles so much the *mitral* valve of the human heart, that the same name might with propriety be given to it.

The tendinous cords, however, which are attached to the margins of the valve, are not moved by distinct muscular fasciculi, or *carinae columnae*, but proceed immediately to be lost in the sides of the ventricle. The lower part of the cavity is fasciculated, although not so remarkably as the internal surface of the ventricle of man or quadruped.

The aortic or bicuspid valves are to be found at the origin of the great arterial trunk from the left ventricle.

The above account of the mechanism of the heart of birds shows that this organ is calculated to exercise its functions precisely in the same manner in these animals as in mammalia; and that the pulmonary and general circulations are maintained by different chambers of the heart; consequently every particle of blood is exposed to the influence of the air in the lungs, previous to its distribution throughout the system for the purposes of nutrition, excretion, &c. Before the description of the vessels of general circulation is entered upon, it is in order therefore to treat of the organs of respiration, or the

Lungs.

These bodies are situated on each side of the dorsal spine, upon the surface of the ribs and intercostal spaces, usually reaching in length from the second rib to the last intercostal space but one, and extending in breadth from the spine to about that part of the ribs, where the processes are sent from one to the other. In the *strich*, the lungs were found to measure ten inches long, and three and an half broad, and were one inch and an half in thickness.

The lungs of birds never move from their position, as they adhere to the inside of the chest, and are covered over by a strong membrane or aponeurosis.

They are smooth and even on the anterior part; but their figure posteriorly exactly corresponds with that of the parts upon which they are laid. The ribs and intercostal spaces serve as a mould, of which the lungs are the perfect cast, presenting a remarkable projection for each depression between the ribs. These eminences are of course most striking next the spine; and towards the anterior edge of the lungs, which is very thin, they are scarcely visible.

The lungs have two coverings; one is somewhat analogous to the *pleura*, though not exactly similar to it in structure, being more like condensed cellular substance. It closely invests each lung, and appears to be flocculent on some parts of its surface, and to adhere to the parietes of the chest. The other coat is common to both lungs; it is extended from each side of the chest to the dorsal spine across the anterior surface of the lungs. It is connected in a degree to the fore part of the spine, and inclines at this place the trunk of the descending aorta, forming the *costal* artery to pass through it. It has no intimate union with the proper tunic of the lungs except at the openings of the air-cells, and around the entrance of the great vessels of the lung. The texture of this coat appears to be tendinous; its fibres all run in the transverse direction; and in large birds they are evidently white. This aponeurosis is not equally strong upon every part of the lungs; at the upper part, and especially above where the vessel enters, it is so weak as often to be hardly visible.

In all birds there would appear to be some muscular fibres passing from the side of the chest upon the aponeurosis of the lungs. These are very distinctly to be seen in the larger species, in some of which the muscles of the lungs are of considerable strength. The anatomist of the French academy observed six strong slips of muscle on each side of the body in the *strich* and *caffowary*. They arose from the ribs which come from the spine, near their junction with

those which belong to the sternum, and terminated in the aponeurosis which covered the lungs. Mr. Remy discovered eight muscular fasciculi to each lung of the *strich*. See *Phil. Trans.* N^o 586, p. 223. We have noticed only four broad thin slips of muscle in the *strich*, which proceed from the articulation of its many vertebral ribs with the sternum; in the common *fowl*, the muscles of the lungs do not present the appearance of distinct slips, as in other instances, but are spread as a single layer upon each lung.

It is difficult to speak with certainty of the uses of the pulmonary muscles. The effect of their contraction appears to be the tension of the aponeurosis, and consequently the deviation of it into a flat surface which is ordinarily concave or depressed. This would necessarily produce some dilatation of the lungs; and therefore these muscles might be reckoned amongst the agents of inspiration, although their operation in this way would be very trifling.

The Parisian anatomists attributed several uses to them; they supposed that these muscles had the power of depressing the anterior part of the thorax, in consequence of their attachment to the movable angle of the ribs, and their oblique course upward to the spine. If they be allowed to perform this effect, they must be considered as muscles of expiration.

They imagined also that they caused, when in action, a constriction of the foramina through which the air is admitted into the great air-cells of the thorax or upper part of the body, and thus enabled the bird to maintain a continued dilatation of these cells, in order to diminish the specific gravity of its body during the time it remained on wing; or (what the academicians thought more probable) furnished the bird with a supply of common air to carry with it into the regions of the atmosphere, in which the air would be too thin and light for respiration; in the last conjecture, however, they seem to have forgotten the effect that the temperature of the bird's body would produce in the rarefaction of the air contained in the cells.

When the lungs of birds are stripped of their coverings, they are still found to be a connected, uniform substance, and not reducible into lobes or lobules as in mammalia; they appear, to a superficial view, solid and fleshy, but if examined more clearly, are seen to be made up of the ramifications of the great blood-vessels, the bronchiæ, and very minute air-cells.

When the bronchiæ enter the lungs, their chief branches, instead of being regularly and equally distributed, pass directly to certain points upon the surface of the lungs, and there terminate in several foramina, which communicate with the great air-cells of the body; these branches also of the bronchiæ retain in their structure, almost throughout their extent, some cartilaginous rings. The ramification of the air tube which really supply the substance of the lungs, are but branches of those which go to the cells. They are comparatively small, and entirely composed of membranes. This structure accounts for the fleshy appearance and solid feel of the lungs, and explains why birds are able to fill their air-cells with so much ease and rapidity.

Air-Cells.

Although physiologists are not agreed with respect to the uses which these parts serve in birds, yet as they are immediately connected with the lungs, it seems most proper to describe them in this place. It is one of the most remarkable and peculiar circumstances in the anatomy of birds, that the atmospheric air has a ready passage to almost every part of the interior of their bodies.

The air-cells, according to their situation, may be divided

into three kinds. 1. Those of the great cavity of their body which takes the place of the thorax and abdomen. 2. Those situated amongst the muscles; and lastly, those in the interior of their bones.

It has been already stated, that the body of birds is not divided into two parts by a transverse muscular partition or diaphragm. This common cavity is intersected by a great number of membranes, some of which simply enclose the several viscera, but the greater number form cells, which are filled from openings upon the surface of the lungs.

These membranes are in most birds extremely fine and delicate, often so much so, that the viscera are perfectly visible through them; they are almost impossible to be dissected unless when kept continually inflated, by blowing into the trachea; it is said, however, that in the *ostrich* and *casowary*, they are as strong as a hog's bladder.

The anatomists of the academy describe the heart and liver of the *ostrich* as contained in one cavity, which was unfurnished with air, and was separated from the air-cells on the side by two longitudinal membranes, and from the stomach and intestines below, by a transverse membrane, situated like the diaphragm of mammalia, and covered on its inferior surface by a layer of fat, of the thickness of a finger; in all the birds, however, which we have examined, we have found a membrane inclosing the pericardium, in the manner of the mediastinum, and afterwards reflected upon the liver, and then forming two sacks, of which one contained the right lobe of the liver, and the other inclosed the left lobe, along with the anterior surface of the gizzard; and in the *goose*, and some other birds, the membranous sack of the left side of the liver only admitted into it the upper half of the anterior part of the gizzard; in general, no air is found in the cells which enclose the liver and the anterior part of the gizzard; we, however, once inflated them from the trachea in the *goose*, in which they had a communication with the cells of the abdomen, by means of three large holes; but it is probable, that this was from mal-conformation of the membrane.

The *air-cells of the great cavity* of birds, according to the academicians, who take their description from the *ostrich* and the *casowary*, are five on each side of the body. The four superior cells are immediately next the aponeurosis of the lungs, and are separated from the rest of the cavity by a strong membrane which descends from the top of the thorax upon each side to be joined to the transverse membrane which divides the heart and liver from the stomach and intestines. The inferior cells are by much the largest, and are kept distinct from the intestines by a strong membrane, similar to the other partitions of the cavity; they come in contact with the aponeurosis of the lungs, only at their superior part, where they receive their air. The uppermost cell is the smallest, and derives its air from an opening at the superior part of the lungs. The next cell is of a square figure, and is filled by means of two foramina situated upon the external edge of the lungs. The third cell of each side is not a regular square, being of greater extent where it joins the lungs than at the opposite; it has but one communication with the bronchia, which is placed upon the internal margin of the lungs. The fourth cell is of a very irregular elongated form, reaching down to the bones of the pelvis; it is less extensive in the *casowary* than in other birds. The air hole of this cell is situated at the lowest part of the lungs. The last or inferior cells are long, and somewhat of an oval shape; they communicate with the most inferior point of the lungs.

The Parisian anatomists describe all these cells as being formed of distinct tunics, so that each is a separate bag, instead of being made by continuous and reflected membranes. They represent the bags to be distinct also from the great membranous partitions of the cavity. See *Plate V.* in the *Anatomy of Birds*; *fig. 4.* is copied from the memoirs of the French academy, and exhibits the air-cells, &c. of the *ostrich*; *a* the trachea; *bb* the two bronchiæ passing to the lungs; *c* the heart; and *dd* the liver, seen in the superior division of the cavity; *e* the transverse membrane which separates, like the diaphragm, the common cavity into two parts; *f* the stomach; and *ggg* the convolutions of the intestine, seen in the lower or abdominal portion of the cavity, *bbbb* the lateral partitions which inclose the four superior cells; *12345* indicate the different cells; the air-holes are apparent in each, except the inferior or abdominal cells, which cannot be brought into view, as they lie behind the fourth cells.

The air-cells of birds in general do not exactly accord with the description given of the *ostrich* and *casowary*, by the members of the Royal Academy; we shall therefore proceed to give an account of what we have observed on this part of the anatomy of birds in the *goose*, *duck*, *common fowl*, *pigeon*, &c.; and in order to make this description more intelligible, we shall take the liberty of naming the cells according to their situation with respect to other parts, although some of the terms must be adopted upon the strength of analogy, as the distinctions of thorax and abdomen do not with strictness belong to birds.

The first is the *superior thoracic*, or *jugular air-cell*. When it is distended with air, it becomes evident upon the outside of the thorax, between the two branches of the fork; it is large enough in the *goose* to contain an apple in its anterior part, and posteriorly it extends on each side of the basis of the heart, over the lungs. This cell contains the divisions of the trachea into the bronchiæ and the trunks and primary branches of the blood-vessels which supply the wings and head. A great number of membranous septa pass through it in various directions, which serve to connect and keep steady the different vessels, and also divide this cell into several chambers, which, however, have all a free communication with each other. The air is transmitted from the superior part of each lung by two openings which are placed in the posterior chambers of this cell. These chambers do not appear to extend so far upon the lungs in other birds as they do in the *goose*; it is from this cell that the air passes into the cells of the axilla, and under the fork-shaped bone, into the deep seated cells of the neck, and to those about the shoulder.

The next cells may be called the *intermediate thoracic*. They are generally two in number, one to each side; they lie immediately upon the lungs, and are in a degree covered by the anterior thoracic cell. That of the right side is usually larger than the one on the left; the latter is particularly small in the *goose*, being almost concealed by the two adjoining cells, and extending under the posterior part of the liver. The cell of the right side is of an oblong square figure, and is prolonged under the termination of the inferior vena cava in the right auricle, as far as the left side of the bulbus glandulosus. The intermediate thoracic cells receive their air through a large foramen, situated upon the inner edge of each lung, just at the basis of the heart. At the upper and inner angle of these cells also there is an opening which appears to lead to some small cells under the pericardium and œsophagus, and to communicate indirectly with the anterior thoracic cell.

The *lateral thoracic cells* are amongst the largest of the body. They are of a pyramidal figure, their basis being applied to the intermediate thoracic cells, and their point reaching as far down as the bones of the pelvis; they cover the inferior portion of the lungs, and occupy a space between the ribs and the lobes of the liver. They have a very free communication with the branches of the bronchizæ, at the external edge of the lungs.

As the intermediate thoracic cells are small on the left, and large on the right side, these cells are larger on the left side than on the right: this disproportion is most observable in the *goose*, and very trifling in the *duck*, in which the two intermediate thoracic cells are nearly of an equal magnitude.

The air-cells, which are found in the lower or abdominal portion of the cavity of birds, are composed of thinner membranes than the others; in some parts they are so tender, that they are ruptured with the slightest touch, from which they become very difficult to examine.

Underneath the lateral thoracic cells, at the very lowest part of the lungs, on each side of the spine, the branches of the bronchizæ open into the cavity of the abdomen, by which means air is conveyed directly into the two great *lateral abdominal cells*, and from these it would appear that it passes into the others.

The *lateral abdominal cell* of the right side is by much the largest in the body; it reaches from the last ribs to the anus, and lies over and includes almost all the small intestines, the renal capsule, and the kidney. It appears in the *goose* to be divided from the opposite cell by a membrane which passes obliquely from the right side of the anus to the lower part of the gizzard.

The *left lateral abdominal cell* contains the intestines of that side; it is attached to the margin of the gizzard, under which it is prolonged as far as the lungs, where it is supplied with air, as already mentioned.

The lateral abdominal cells transmit air to the inguinal cells, and to several chambers formed by the most delicate membrane, amongst the intestines. One of these being somewhat stronger than the others, there was an opportunity of observing it more distinctly. It makes a circuit around the right side of the gizzard to which it is attached, and incloses the duodenum and pancreas; it might thence receive the name of the *duodenal cell*.

Interposed between the parietes of the belly and the lateral cells there is frequently found a considerable quantity of tender fat; especially in aquatic birds, such as the *goose*, &c. By this means a soft cushion is provided for the small intestines to press and move upon, thus supplying the use of the *omentum*, which is a part not met with in birds.

The structure of the air-cells of birds in general does not appear to be the same described in the *ostrich* and *casowary* by the academicians. The membranes composing them, instead of being distinct bags, as they relate, resemble rather the pleura or the peritoneum, and like them, seem to produce all the different cavities by the means of reflection. It must be confessed, however, that the membranes of the cells, especially in the abdomen, are very easily separable into different lamina, or layers, which, it might be supposed, could be ultimately resolved into distinct sacks.

It deserves to be mentioned, that each of the air-holes in the surface of the lungs opens obliquely into the air-cells; there being a slight projection of thin membrane over the aperture. The Parisian anatomists ascribed a valvular effect to this structure, which they supposed of great consequence, as it would serve to continue the distension of the air-bags, after they were once inflated. The projection of the mem-

brane over the air-holes does not however appear to be sufficient to cause any obstruction to the regress of the air from the cells; nor would it seem necessary or convenient to interrupt in the least degree the expulsion of the air contained in the cells.

The membranes of which the air-cells are composed, are reflected into the apertures of the air-holes, and are there perforated by a great number of small foramina, which correspond to the termination of the ramification of the bronchizæ, through which the air has a ready passage. When these foramina are brought into view, by dissecting of the coverings of the lungs, they give the anterior surface an appearance of being pricked by pins.

The air-cells which are found amongst the muscles and integuments of the external parts of the body, vary in number and magnitude, according to the structure and economy of the bird. In every instance, perhaps, the anterior thoracic or jugular cell is continued along with the vessels and nerves into the axilla, making what may be called an *axillary cell*, and in most birds others go off from this anteriorly under the pectoral muscle, and backwards under the muscles of the scapula, forming *pectoral* and *subscapular cells*. In the *eagle*, *hawk*, *stork*, *lark*, and other high flying birds, these cells are very large, and in many of these birds there are still larger cells, ascending under the integuments of the neck, and passing beneath the skin of the inside of the arm, and the back of the shoulder. In the *stork* we found these cells large enough to admit the finger to pass a considerable way down upon the inside and the back of the wing. They are also large in the *osol* and other birds of prey.

Most birds of flight have a number of cells placed under the lateral muscles of the neck. These are opposite to the bodies of the cervical vertebræ, and communicate with one another. It is from the different cells about the axilla and neck, that the bones of the shoulder, the humerus, and the vertebræ, receive the air which they contain.

The *inguinal* and *gluteal cells* are filled from the great lateral cells of the abdomen, with which they have a communication, where the blood vessels of the lower extremities pass out of the pelvis. The inguinal and gluteal cells surround the neck of the femur; they are in most birds very small, but in those which are much employed in flight, especially if the thigh bones receive air, they are larger, extending for some way amongst the muscles behind the joint. Camper observed two air bags between the glutæi muscles of the genus *spoonbill* (*ptaralea*), although no air was transmitted into the femur.

The subcutaneous air-cells of the *pelican* are very large, and were described long ago by Mery, in the early Memoirs of the Academy of Sciences of Paris.

Several means have been employed to prove that the air is permitted to enter the cavity of the bones in birds. The air-cells and the lungs have been inflated from the bones, and injection being thrown into the trachea, was found, after distending the air-cells, to have passed into the interior of the bones. A still more decisive experiment (although a cruel one) is to cut the humerus across in a living bird, and introduce the extremity of the divided bone into water, in which some soap has been dissolved, when it is perceived that bubbles are produced by the exit of the air from the end of the bone. This expedient not only ascertains the existence of air in the bone, but shews that there is a motion or circulation of it, which is the effect of the actions of inspiration and expiration.

This subject has been very extensively investigated by Camper;

per; he discovered the communications between the cavities of the bones and the air-cells of the soft parts, and ascertained in a great number of species what bones were filled with air.

The result of both his observations and our own tends to shew, that the bones of birds are supplied with air, according as they are employed in the locomotion of the animal's body. In birds of flight, therefore, almost all the bones are hollow, and receive air; thus in the *eagle* Camper found the air-cells communicated with the thigh bones, those of the pelvis and coxyx, all the vertebræ, the sternum, clavicles, scapulae, and fork-shaped bone, and the bones of the wing. The air was also admitted into the bones of the head from the cavity of the tympanum. We have observed the bones in the *hawk* and *stork* to want marrow in the same manner as those of the *eagle*. Most of the bones are hollow in the *owl*; but the os femoris is filled with marrow. The *pigeon* kind in general also have no air in their thigh bones, although the *crozen pigeon* has been observed by Camper to possess it.

Birds even of moderate powers of flight, receive some air into the sternum and other bones of the trunk, and between the plates of their cranium; and all birds, whose wings are not incapable of flight, have the humerus filled with air, with the exception of the *woodcock*, which has been observed to possess marrow in the humerus; but to counterbalance this impediment to the velocity of its motion, it is provided with pectoral muscles of unusual strength.

Those birds which are unable to transport themselves for any distance by the effort of their wings, are deprived of air in the humerus; of these may be instanced all the *struthious* kind, the *penguin*, the *puffin*, &c. It is worthy of remark, however, that the *struthious* birds, which run with great rapidity, have most of their other bones hollow; Camper discovered the air to pass into the thigh bones and lower jaw of the *ostrich*, and we have observed that it fills not only these bones, but the sternum, the ribs, the vertebræ, and the bones of the pelvis, in both the common *ostrich* and that from New Holland.

The internal surfaces of those bones which contain air have been described by Camper as being in some cases lined with periosteum, and in others entirely deprived of it; thus he states the internal part of the femur of the *eagle* to be cancellated and furnished with a periosteum, upon which several blood-vessels are ramified, and the humerus of the same bird to be a simple ossific tube, without membrane, vessels, or cancelli. It appears to us, however, that the membranes of which the air-cells are composed, are continued in every instance into the interior of the bone, to which they may serve, it is true, the purpose of a periosteum, although in structure they are much more fine and delicate, and when these membranes cease to be vascular, they become dry, and adhere so closely to the surface of the bone, that they are not easily perceived.

The internal parts of the bones of birds which are filled with air consist of cells, like those of other animals; the only difference that can be observed is, that the cancellated structure is less close, and that the tube of the cylindrical bodies, such as the humerus and femur, is larger than usual.

It has been already mentioned, that the bones derive their air in general from those cells which are placed next them amongst the muscles. Some, however, are filled immediately from the lungs, or the large internal air-cells, and the bones of the head and jaws have communications with the Eustachian tube, the cavity of the tympanum, and the sinuses of the nose.

The humerus is supplied with air by the axillary cell, by means of an opening situated at the inner and back part of the head of the bone. See *Plate VI.* in the *Anatomy of Birds*; *fig. 1.* represents the superior half of the humerus of the *American turkey (melagris)*; *a* the air-hole, which like the air-holes of the lungs does not open immediately into the cavity of the bone, but contains a number of smaller foramina, that are produced by the cancelli, and have a direct communication with the internal part of the humerus.

The fork-shaped bone is filled from the jugular air-cell, from which also the superior dorsal, and the lowest cervical vertebræ, receive some air, through several small holes scattered upon their lateral and anterior parts. The air-hole of the fork is placed upon the side of its scapular extremity, next the spine. See *Plate VI.* in the *Anatomy of Birds*; *fig. 2.* is the one half of the fork-shaped bone of the *stork* viewed upon the inside, *a* the air-hole.

The clavicle appears to obtain its chief supply of air from the cells which are continued from the jugular air-cells backwards upon the shoulder joint.

The principal foramen is found on the inside of the clavicle, where that bone is connected to the branch of the fork. There are, besides this, some very minute holes upon the outside of the clavicle, immediately above the shoulder joint; and on each side of the sternal extremity of the bone, there is a hole large enough to admit a bristle. See *Plat. VI.* in the *Anatomy of Birds*. *Fig. 3.* shews an internal view of the clavicle of the *stork*; *a*, the larger air-hole at the joint of the shoulder; *b*, one of the small foramina which opens into the chest containing a bristle.

The scapula derives air also from the process of the jugular cell behind the joint. It is transmitted through several holes upon the very extremity of the bone. See *fig. 4.* of *Plate VI.* of the *Anatomy of Birds*, *a* the air-holes.

We have discovered the openings by which the air is conveyed into the sternum, to be exceedingly numerous. The principal foramina are situated all along the middle line of the bone, upon the internal surface, which appears reticulated, or made of cancelli. Towards the anterior part there is one hole much larger than any of the rest; and in addition to those of the middle of the bone there are many others passing into the edges of the sternum to which the ribs are articulated. All these foramina would appear to communicate with the thoracic cells. See *Plate VI.* in the *Anatomy of Birds*; *fig. 5.* exhibits the internal surface of the sternum of the *stork*; *aaa* the small foramina in the middle of the bone, *b* the principal air-hole near the top of the sternum, *cccc* many little foramina seen between the sternal ribs which lead to the lateral parts of the bone.

The vertebræ of the back seem to procure air immediately from the lungs; the foramina are numerous, and placed along the sides of the bodies of the vertebræ and at the roots of their transverse processes. The foramina which conduct the air into the cervical vertebræ, occur with as little regularity; the three first have their largest holes upon the sides of their bodies, and in the rest they are to be found within the canal of the transverse process for lodging the vertebral artery, and along the course of the spinal canal, at least so they have appeared in the *stork*. See *Plate VI.* in the *Anatomy of Birds*. *Fig. 6.* shews one of the cervical vertebræ of that bird, *a* the body of the bone, *b* the spinous process, *c c* the transverse processes forming a portion of the vertebral canal, on the inside of which are perceived several foramina leading into the substance of the bone, *d* the tube behind the body of the vertebra for containing the spinal marrow, exhibiting many small holes upon its internal

nal surface. The foramina of the cervical vertebræ have communication with the lateral air-cells of the neck.

The air-holes of the anterior ribs are placed upon the ends of these bones, where they are joined to the sternum. They are supplied from the intermediate and lateral thoracic air-cells. See *Plate VI.* in the *Anatomy of Birds*, *fig. 5.* *dddd* refer to the opening upon the internal ribs.

The air passes into the posterior or vertebral ribs by a number of foramina, situated upon the internal surface of their extremities next the spine. These foramina appear to have from their situation a direct communication with the posterior surface of the lungs. See *Plate VI.* in the *Anatomy of Birds*. *Fig. 7.* is a vertebral rib of the *stork* seen upon its inner side, *a* the process which articulates with the bodies of the dorsal vertebræ, *b* the part joined to the transverse processes, *c c* the several air-holes.

The air-holes of the bones of the pelvis are so numerous, and occur with so much irregularity, that they do not admit of a particular description. They are all situated upon the internal surface of the bones, and appear to be confined to that space covered by the kidneys, under which the air must insinuate itself from the abdominal cells, in order to reach them.

The passage of the air into the femur of the *eagle* and *stork* is through an opening upon the fore part of the bone, just within the process corresponding to the great trochanter. It is a round depression, under the edge of which the apertures leading to the cavity of the bone are situated. See *Plate VI.* and *fig. 8.* of the *Anatomy of Birds*, which represents the femur of the *eagle* seen upon the anterior side; *a* the air hole, *bb* the cavity of the bone laid open, exhibiting a number of osseous processes, passing in all directions, dividing the bone on the inside into many irregular cells; these are most numerous towards the extremities of the femur, and are hardly to be seen in the centre; *c* an artery distributing its branches to the membrane which lines the internal part of the bone. The air-hole of the femur in these birds communicates with the gluteal cells.

In the *struthious* birds the air-holes of the femur are placed upon the posterior part, and are found upon both the upper and lower portions of the bone. See *Plate VI.* in the *Anatomy of Birds*. *Fig. 9.* shows the posterior surface of the femur of a *young ostrich*; *a* a depression on the upper part of the bone, containing a number of air-holes, *b* the inferior depression with only three foramina.

The air-holes of the lower jaw have been observed in the *African* and *New Holland ostrich*, the *stork*, the *buceros nasutus* and *buceros rhinoceros*, and the *crow*; and in all these they consist of two holes situated upon the two extremities of the jaw behind the articulation. See *Plate VI.* in the *Anatomy of Birds*. *Fig. 10.* is the lower jaw of the *crow*; *aa* the two air-holes. These foramina communicate by a tube with the cavity of the ear.

The air does not penetrate the bones of the head and jaws in *water-fowls*.

Having described the distribution of air, which takes place throughout the bodies of birds, it remains to assign an use to this most curious and peculiar circumstance in their anatomy. It has been already stated, that the opinions of anatomists upon this subject are different. The members of the French academy supposed that the air-cells were necessary to carry on the actions of respiration in birds. Camper thought that air was admitted into the bodies of birds for the purpose of diminishing their gravity in relation to their bulk, and thus facilitate their motion; while Mr. Hunter, the greatest physiologist of this or any other country, felt unwilling to confine the functions of the air-cells

to any one purpose, and suspected they might be useful in giving tone and strength to the lungs of birds.

The observations of the academicians appear to us perfectly satisfactory with respect to the connection between the existence of the air-cells, and the office of the lungs. They have related, that during the act of inspiration the sternum was elevated, and the thoracic air-cells distended at the same moment with the lungs, and that when the air was expelled from the lungs and thoracic cells, by the depression of the sternum, one portion of it was expired by the trachea in the usual way, and the rest was urged into the cells of the abdomen, the two parts of the cavity thus becoming alternately enlarged and diminished. In order to ascertain with the more certainty the condition of the air-cells during respiration, the academicians subjected several large birds, such as the *turkey*, *goose*, &c. to the experiment, of having the parietes of the belly dissected off without injuring the air-cells, while the animal was still alive, by which they had an opportunity of observing, that the air-cells below the sternum were rendered tense during the time the thorax was diminished for expiration, and that as soon as the sternum was raised to increase the capacity of the thorax, the abdominal air-bags become flaccid. We have made an experiment of a similar kind, with the same result; the abdomen of a living *goose* was laid open, from which no air proceeded during inspiration, but while the air was discharged from the lungs, it passed into the abdominal cells and through the opening of the belly with so much force as to blow out a candle. The necessity of having the cavity filled with air in birds, obviously arises from the circumstance of the lungs being confined to the posterior part of the thorax, and consequently not capable of suffering any compression from the contraction of the chest, but by the interposition of some other parts.

Many have supposed that the air-cells were not only mechanically subservient to the actions of respiration, but answered another important purpose by collecting a quantity of air, which in repassing the lungs effected a further change upon the blood, thus producing a sort of double respiration; but the free communication which exists between the lungs and the cells, renders it probable that the air on its return passes directly by the air-holes into the branches of the bronchiæ, and, consequently, is never brought into contact with the blood. It would therefore appear that the only part the cells perform in the process of respiration is to supply an elastic medium, by means of which the motion of the sternum and ribs, equally and regularly affect every part of the lungs.

The air-cells making part of the mechanism of the organs of respiration, does not preclude them from answering other purposes in the animal economy. It is plain to demonstration that the bodies of birds lose much of their relative weight by containing air in their cavities, and still more from its admission into the external parts and the bones; the advantages of which in transporting themselves through so light a medium as the air, or even in locomotion upon a solid surface, are too obvious to be mislaid upon.

The air, while it remains in the body, necessarily acquires the temperature of the living bird, which renders it much lighter even than atmospheric air, and therefore it acts like that contained in the swimming-bladder of fishes.

A comparison of the structure of one bird with another proves that the quantity of air is in proportion to the rapidity and continuance of the animal's motion, all other circumstances being the same; and that the air is distributed always in preference to those members which are most employed in locomotion, as has been already pointed out.

It might be offered in objection to this opinion of the use of the air-cells in birds, that the *bat*, which is an animal very remarkable for the velocity of its flight, and its long continuance on the wing, is unfurnished with any apparatus except its lungs for containing air. The answer to this, however, is very easy; the extent of the wing of the *bat* is singularly large for the animal, and its membranous structure enables it to give impulse to a larger volume of air than could be produced by a wing composed of feathers, even of an equal extent; and farther, the pectoral muscles of the *bat* are larger in proportion to the animal than they are found in any species of birds, even those of the highest flight; so that the structure of the *bat*, instead of proving any objection to the use assigned to the air-cells in birds, affords the strongest confirmation of the theory.

Notwithstanding the respect which is due to every physiological opinion of Mr. Hunter, we cannot perceive that there is the least relation between the air-cells and the organs of voice in birds. With a view of determining this, we have compared the structure of different birds, and have not found the air-cells larger in singing birds, than others. The *nightingale*, so eminent for its loud and protracted notes, is formed, with respect to the air-cells, exactly like the *common sparrow*.

Animal Heat.

Although it is not yet proved that the vital temperature of animals is the result of that process which is called respiration; yet, as it is generally supposed to be so, it would appear most proper to notice the animal heat of birds, immediately after the description of the lungs and their appendages. It is remarkable, that birds possess a higher standard of vital temperature than all other animals. Camper states it to vary from 104 to 107 degrees of Fahrenheit's scale. Mr. Hunter found the rectum of the *common fowl* to be 103, 103½, and 104 degrees; and in a young *goose*, we observed the thermometer to stand at 103 degrees in the rectum, and when inserted into the cavity of the body, to rise and remain at 104 degrees. It is difficult to explain either the cause or the necessity of the high temperature of birds. It has been accounted for by their respiration being more perfect than the air passing twice through their lungs; but even supposing this would alter their degree of animal heat, the occasion does not seem to exist, as birds have not that double respiration which is supposed, as has been already shewn.

It is to be presumed, that the warmth of birds may depend in a degree, upon the structure of their skin, and the nature of their coverings, which are not designed to admit of much evaporation from the surface of their bodies; but it can hardly be supposed, that this, of itself, would be sufficient to produce a temperature so much higher than is found in other animals, and maintain it so uniformly and permanently as it exists throughout the whole class of birds.

No experiments have yet been made to determine the powers which birds possess of resisting the influence of external temperature; but it is to be inferred from analogy, that they can sustain greater extremes of both heat and cold than other animals, without suffering an alteration in their proper degree of temperature; but that, at the same time, birds would soonest yield to dissolution upon any material change in their natural standard, it being found that animals generally enjoy independence of temperature, in proportion as it exceeds that to which they are commonly exposed, and that the higher their natural standard, the more inconvenience arises from any alteration of it.

Blood Vessels.

The organs of circulation in birds have obtained but little of the attention of comparative anatomists. The larger branches of the arteries and veins, which lie near some of the viscera, have alone received any description: and that rather from being involved in the account of other parts, than for their own sake. The distribution of the blood vessels of birds, notwithstanding this, is not the least interesting part of their anatomy, as will appear from the ensuing description, which has been taken chiefly from the *swan*, *goose*, *duck*, *stork*, and *common fowl*, in which it was found to be much alike, that it may be presumed the same arrangement of the blood vessels prevails with little variety in all birds.

The Arteries

Proceed from a single trunk which arises from the left ventricle of the heart. This trunk is so short, that it is concealed by the other parts on the basis of the heart, and is only brought into view after the reflections of the pericardium, and the adjoining vessels are detached by dissection. It is from thence, that as the parts are commonly beheld, there appear to be three great arteries issuing together from the middle of the heart, which are the primary branches into which the aorta is divided. The first branch is to the left side, and after it is sent off, the trunk affects to turn over the auricle, before it gives the branch of the right side; these two branches pass in a curved manner from the heart towards the axillæ, in the form of horns, and each is analogous to the *arteria innominata* of the human subject, so that instead of one, there may be reckoned two *arterie innominatæ* in birds. After these branches are parted with, the arterial trunk is continued over the auricles, and on reaching the back part of the heart, becomes the *descending aorta*.

The *arteria innominata* first sends off the common trunk of the carotid and vertebral arteries, which before its division gives off one or two small branches; one of these runs down upon the lungs in company with the *par vagum*, and appears to supply branches to the aponeurosis of the lungs, and the air-cells at the upper part of the thorax; the other branch, after supplying the lymphatic gland of the neck with several small arteries, ascends upon the side of the œsophagus, to which, and the inferior larynx, the divisions of the trachea, and to the parts and integuments of the side of the neck, its branches are distributed, anastomosing with the superior œsophageal and tracheal arteries. This branch is often sent off until the trunk divides into the vertebral and carotid, in which case it comes from the latter artery. Sometimes in the *duck*, the *supra-scapular* artery, which is usually derived from the vertebral, is a branch of the common trunk.

The *carotid* artery, after parting from the vertebral, proceeds to the middle of the neck, and soon disappears; being covered by the muscles of the anterior part of the neck, under which it lies hidden, and in close contact with its fellow of the other side, to very near the head. If, during its course in this situation, it gives any branches, they are too insignificant to be noticed.

The *carotid* artery emerges from between the muscles of the neck, at about the third or fourth vertebra from the head; and after giving a branch downwards, amongst the lateral muscles of the neck, it runs along the outer edge of the *rectus major anticus* muscle, to behind the angle of the jaw, where it divides into its several branches.

An artery first goes off posteriorly, which passes a little forwards under the branch of the *os hyoides*, and after send-

ing some blood to the muscles of the neck, makes a turn backwards, enters the foramen in the transverse process of the second vertebra, and terminates by a singular anastomosis in the vertebral artery.

The next branch is analogous to the *internal carotid*; it goes forward also under the os hyoides, and passes behind the muscles of the jaws close upon the lower part of the skull, at which place it sends a branch upwards, which appears to penetrate the bones on the outside of the ear, and supply the organ of hearing, sends a branch into the skull, and another through the articulation of the jaw, to unite with the ophthalmic, and contribute to the plexus at the back of the orbit. The internal carotid then enters an osseous canal, which runs along the basis of the cranium, between the tables of the bone, and at the lower and back part of the orbit, the artery receives a remarkable anastomosing branch of the internal maxillary, which almost equals in size the carotid itself; and these two vessels produce by their union, one, which passes almost directly into the cranium at the usual place for the entrance of the carotid artery. This vessel forms within the skull an anastomosis similar to the circle of Willis; but the branch which occupies the place of the *basilar artery*, is very small, and appears to be furnished entirely from the anastomosis of the carotids, and designed only to supply the medulla oblongata and spinal marrow. The branches of the internal carotid are thickly spread in an arborescent form upon the surfaces of the brain; some on the outside, and others on the internal superficies of the ventricles, and the fissure between the two hemispheres. The carotid also, as usual, sends off the *ophthalmic* artery, which, besides supplying the eye and the parts in the orbit, produces several anastomoses with the branches of the external carotid, which will be noticed hereafter. After the trunk of the carotid has parted with the two branches just described, it passes for a little way downwards and forwards behind the angle of the jaw, and divides at once into different branches, corresponding to those of the external carotid in mammalia, the first of which might be called the *oesophageal* or *laryngeal* artery. This vessel sends a branch to the muscles upon the horn of the os hyoides, and then turns downwards and divides into two branches, one to the trachea, and the other to the oesophagus, upon the side of which parts they descend to near the thorax, where they anastomose with the tracheal and oesophageal branches of the common trunk of the carotid and vertebral arteries.

The *external maxillary artery* dips in between the pterygoid muscle, and that which is situated at the back of the lower jaw for opening the mouth; it then passes behind the articular bone, and gives twigs upwards to the muscles of the jaws, and to the plexus at the back of the orbit: upon emerging from behind the articular bone, it lies under the zygomatic process of the jaw, and sends an artery upwards, which is distributed to the temporal and masseter muscles; and proceeding under the triangular tendon that comes from the inferior margin of the orbit to the lower jaw, it divides into two principal branches: one of these passes along the side of the upper jaw, gives a branch upwards to the fore part of the orbit which unites with the ophthalmic artery, and is lost at the top of the head. This branch is very large in birds with combs, as in conjunction with the ophthalmic, it furnishes numerous vessels to these vascular parts. The artery then goes on and supplies branches to the sides of the head before the orbits, and to the integuments and substance of the upper mandible, anastomosing with the palatine branches of the internal maxillary artery. The second portion of the external maxillary proceeds to the lower jaw, to which, and the lower part of the masseter

muscle, it is distributed. The external maxillary supplies the place of the *temporal, labial, angular, nasal, and mental* arteries of mammalia.

The *laryngeal*, or *posterior palatine* artery is a little branch of the external carotid, which is sent off posteriorly opposite to the external maxillary artery. Its branches are exhausted upon the back part of the fauces, the muscles for moving the upper jaw, and posterior nares.

The *lingual*, or *sub-maxillary* artery passes under the muscles which connect the os hyoides to the lower jaw, and close upon the back of the membrane of the lower part of the mouth, it sends a branch to the oesophagus and trachea, supplies the muscles of the os hyoides, the tongue, the lower surface of the mouth, and furnishes the artery which enters the substance of the lower jaw.

Just at the origin of the sub maxillary artery, there is another little branch of the carotid, which is lost upon the muscles of the os hyoides.

The *internal maxillary* artery is, as usual, the continuation of the trunk of the external carotid; it runs forwards between the pterygoid muscle, and the lining of the mouth, upon the side of the long muscle for moving the upper jaw, and divides into two principal branches; one of them proceeds under the tendon of the long muscle to get upon the palate, where it forms two branches, of which one runs along the external side of the palate, between the membrane and the bone of the mandible to the extremity of the bill, where it becomes united to the same branch of the opposite side, as also to the middle artery of the palate. The other branch lies also superficially under the membrane which lines the mouth. It passes onwards to meet its corresponding vessel of the opposite side with which it becomes actually incorporated, and by their union a single artery is generated, which runs along the middle line of the palate to the end of the mandible, where it unites with the lateral branches as already mentioned. At the junction of the vessel of each side to form the middle palatine artery, two branches go off, which are lost upon the lining of the mouth, and the interior of the organ of smell.

The other branch of the internal maxillary artery is reflected upwards towards the orbit, below which it divides and unites again forming a triangle, through which the vein passes; at this place it produces a remarkable plexus of vessels, like the rete mirabile of the carotid artery of quadrupeds, which is increased by branches from the ophthalmic and the palatine arteries, and from which the back part of the organ of smell receives its supply of blood.

The internal maxillary artery then runs directly backwards below the orbit, passes between the radiated or fan-shaped muscle which moves the upper jaw, and the pterygoid process; and turning inwards round the basis of the cranium becomes incorporated with the *internal carotid* artery just as it enters the bony canal, which conducts it to the brain.

The *vertebral artery*, soon after it parts from the carotid, sends off a branch backwards, which passes over the neck of the scapula and is lost among the muscles on the posterior part of the shoulder, anastomosing with the articular and other arteries about the joint; this branch might be called the *supra-scapular*. In the *duck* we have observed it before it makes the turn over the scapula to send an artery upwards along the muscles of the neck.

The trunk of the vertebral artery proceeds obliquely upwards, and having entered the foramen in the transverse process of the second cervical vertebra, give off a large branch downwards, which is distributed between the vertebrae, and to the spinal canal in the manner of the intercostal arteries, with which it anastomoses upon arising in the thorax.

B I R D.

The remainder of the vertebral artery is continued upwards in the canal formed in the transverse processes of the cervical vertebrae, diminishing gradually in consequence of branches it sends off between each vertebra to the spinal marrow and the muscles of the neck. Near the head, the artery is found considerably reduced; and within the last foramen in the transverse processes, terminates entirely by inosculation with the reflected branch of the carotid, as before noticed.

The extraordinary anastomoses and the plexuses which are to be observed in the arteries of the head in birds are not easily accounted for. It seems possible that they may be required in consequence of the great length of the neck in these animals; it being well known that frequent communication amongst the vessels, although it diminishes the impetus of the circulation, insures a free and uninterrupted motion of the blood.

After the common trunk of the carotid and vertebral is detached from the *arteria innominata*, this vessel may assume the name of the *subclavian*. While passing under the clavicle, it sends off some important branches: the first might be called a *pectoral artery*, it proceeds upwards upon the internal surface of the pectoralis minimus muscle, which it supplies; and then dividing into two branches, one passes over the anterior edge of the clavicle, and under the pectoralis medius, between which and the sternum it runs, detaching its branches to the muscle; the other sends first along the under side of the clavicle a branch which is again subdivided and distributed to the outside of the shoulder joint and to the deltoid muscle, in which it inosculates with the articular artery. The vessel then passes between the clavicle and the fork-shaped bone, and on a ligament which connects the head of the clavicle to that of the scapula, and disperses its branches upon the upper part of the shoulder joint forming anastomoses with the neighbouring arteries.

The next branch of the subclavian is the *humeral artery*; it arises from the upper side of the vessel, and make a slight curve to reach its situation on the inside of the arm, in order to dispense its branches in the manner hereafter described.

The *internal mammary artery* is given off just as the subclavian leaves the chest. It divides into three branches, one ramifies upon the inner surface of the sternum; another upon the sternal ribs, and the intercostal muscles; and the third runs along the anterior extremities of the vertebral ribs, supplying the intercostal muscles, &c.

The chief peculiarity of the arteries of the superior extremity in birds, consists in the great magnitude of the vessels which supply the pectoral muscles; these, instead of being inconsiderable branches of the axillary artery, are the continuations of the trunk of the subclavian, of which the humeral is only a branch.

The *great pectoral or thoracic artery* passes out of the chest over the first rib, and close to the sternum, and immediately divides into two branches. One of them ramifies in the superior part of the pectoralis major, and the other is exhausted in the lower part of the muscle, and sends off a branch analogous to the long thoracic artery of mammalia.

The *humeral artery*, while within the axilla, gives a small branch backwards to the muscles, under the scapula, and upon reaching the inside of the arm produces an artery, that soon divides into the articular and the profunda humeri. The *articular artery* passes round the head of the humerus, underneath the extensors; its branches penetrate the deltoid muscle, and anastomose with the other small arteries around the joint.

The *profunda humeri* as usual turns under the extensor muscles, to reach the back of the bone, at which place, in birds, it separates into two branches, of which one descends

upon the inside, and the other upon the outside of the articulation of the humerus with the radius and ulna, and there inosculates with the recurrent branches of the arteries of the fore arm.

After the humeral artery has sent off the profunda, it descends along the inner edge of the biceps muscle, detaching some branches to the neighbouring parts; upon arriving at the fold of the wing it divides into two branches, one of these is analogous to the ulnar artery, and the other from its position deserves to be called rather the interosseous than the radial artery.

At the place where the humeral produces the two arteries of the fore arm a small branch is sent off, which is lost upon the fore part of the joint, and it anastomoses with the recurrent of the ulnar, and the profunda humeri.

The *ulnar artery* is the principal division of the humeral; it proceeds superficially over the muscles which are analogous to the pronator, sends a large recurrent branch under the flexor ulnaris to the back of the joint upon which it ramifies and forms anastomoses with the profunda humeri. The artery then proceeds along the inner edge of the ulnar muscles, to which it distributes branches. It is afterwards seen passing over the carpal bone of the ulnar side, and under the annular ligament, at which place it sends off some branches which spread upon the joint and inosculate with similar ones of the interosseous artery. Very soon after the ulnar artery gets upon the metacarpus it dips in between the bones and re-appears upon the opposite side lying under the roots of the quills, to each of which it sends an artery; it preserves this situation to the end of the metacarpal bones, where it passes between the style analogous to the little finger and the principal or fore finger, and pursues its course along the edge of the latter, to the extremity of the wing, supplying each of the true quills with an artery and sending at each joint of the finger, a cross branch to communicate with the anastomosing branches on the opposite side.

The *interosseous artery* detaches first a branch of some size to the membrane which is spread in the fold of the wing, upon which it forms several ramifications. After this the artery dips down behind the pronator muscles to get into the space between the ulna and radius. It here gives a branch backwards to communicate with the others about the joint, and proceeds in the interosseous space as far as the carpal joint, during which course they become much diminished from giving off several branches which are distributed to the integuments and the quills placed upon the outside of the ulna. The remainder of the interosseous artery is expended in small branches upon the back of the carpal joint, the bastard quills, and along the radial edge of the metacarpus and bones of the fore finger, where it forms communications with the cross branches of the ulnar artery already mentioned.

From this description it will be perceived, that no artery exists in birds strictly analogous to the radial; that there are no palmar arches; and that the size of the interosseous artery, and the course of the ulnar along the outside of the metacarpus are peculiarities which arise from the necessity of affording a large supply of blood to the quills during their growth.

The *descending aorta* makes a curve round the right auricle in order to get upon the posterior surface of the heart, after which its course is close along the spine, in which situation it is bound down by cellular substance, and the strong membrane or aponeurosis, which covers the lungs on their anterior part. The first branches which this vessel appears to send off are *bronchial arteries*; they arise from the fore part of the aorta just when it arrives upon the spine; and having entered

entered the lungs, their ramifications accompany those of the pulmonary arteries. They appear also to send branches to the spine, and the spaces between the ribs.

The *intercostal arteries* do not take their origin from the aorta in numerous and regular branches as in mammalia, but consist originally of but few vessels, which are multiplied by anastomosis with each other, and with the arteries which come out of the spinal canal. An arterial plexus is thus formed round the heads of the ribs, from which a vessel is sent to each of the intercostal spaces. Many of these branches, besides supplying the intercostal muscles and ribs, are continued into the muscles upon the outside of the body and the integuments. The anastomosis of the intercostal arteries round the ribs is very similar to the plexus which is produced by the great sympathetic nerve in the same situation.

The aorta produces no branch which deserves the name of the *phrenic artery*, as birds do not possess that muscular septum of the body, to which the artery of this name is distributed in other animals.

The *coeliac artery* is a very large single trunk, and arises from the fore part of the aorta, even higher than the zone of gastric glands. It descends obliquely for a short way and then gives off a branch which soon divides into two or three others that are spread upon the lower parts of the œsophagus, and the side of the zone of gastric glands, uniting with the other arteries of the œsophagus above, and extending downwards upon the posterior side of the ventricle, and anastomosing with the anterior gastric artery. The trunk of the coeliac now divides into two very large branches, which from their distribution we have chosen to call the posterior and the anterior gastric arteries.

The *posterior gastric artery*, almost as soon as it is formed, detaches the *splanchnic artery*; and very soon after, it furnishes from the posterior side of the vessel, the *right hepatic artery*. This branch proceeds to the right lobe of the liver, which it enters on the side of the hepatic duct; after having divided into two or three minute arteries on its way to the liver, it supplies the hepatic duct with a branch which accompanies the duct to the intestine, and is there lost. The posterior gastric artery then runs down upon the back of the gizzard, and opposite to the origin of the first intestine it sends off an artery which proceeds directly to one of the cæca, upon which and the side of the next intestine it is expanded, insensuating at the end of the cæcum, with branches of the mesenteric artery, which are distributed to the adjoining portion of the small intestine. The posterior gastric then furnishes a large vessel which runs upon the gizzard and divides into two chief branches, which penetrate the substance of the digastric muscle, in which they are lost.

The next branch of the posterior gastric artery is the *pancreatic*. It runs between the two pancreatic glands, dispensing branches to each, and to the duodenum. After this the trunk of the posterior gastric divides into two branches which furnish twigs to the muscular parietals of the ventricle, and run along the margins of the upper and lower portions of the digastric muscle, supplying them with numerous twigs, and anastomosing with the ramifications of the other gastric arteries.

The *anterior gastric artery* descends to the angle formed by the bulbous glandulous and the gizzard, and there sends off a small branch which spreads upon the zone of gastric glands, and insensuates with the first ramifications of the coeliac, and immediately afterwards it detaches a large artery, which runs round the superior margin of the digastric muscle, which it furnishes with many twigs, and communicates freely with the corresponding branch of the posterior gastric artery.

Three small *hepatic arteries* take their origin from this

branch of the anterior gastric, just as it passes over the highest part of the margin of the gizzard; these vessels enter the fissure in the left lobe of the liver. The anterior gastric artery now proceeds along the fore part of the gizzard, sending one or two branches into the muscular substance, and near the tendon it terminates in two large vessels, one of which is distributed upon the left side of the digastric muscle and the other passes a little over the tendon and then divides into two arteries; which produce several branches that disappear in the substance of the gizzard, and between the digastric muscles and the parietals of the ventricle, anastomosing with the vessels of the posterior side.

The *superior mesenteric artery* takes its origin from the fore part of the aorta a little below the coeliac, and proceeds for some way without detaching any branches; after which it experiences the same kind of division and subdivision that takes place in mammalia; and the numerous arteries which are thus ultimately produced are spent upon the small intestines. One of the first and largest branches of the superior mesenteric, however, is allotted to supply one of the cæca, and establish a communication with the inferior mesenteric, and gastric arteries. This branch, soon after it leaves the trunk of the superior mesenteric, divides into two. One descends upon the rectum, where it meets with the inferior mesenteric artery, with which it produces a very remarkable anastomosis, similar to the mesenteric arch in the human subject: this united artery supplies the rectum and origin of the cæca. The second portion of this branch of the superior mesenteric, runs in the space between the last part of the small intestine, and the cæcum of one side, sending numerous branches to each, and at the end of the cæcum, communicates in a palpable manner with another branch of the superior mesenteric artery, which runs upon the adjoining part of the small intestine.

A branch arises from the anterior part of the aorta, just below the lungs; it is designed for the nutrition of the organs of generation, and except in the season for propagation, is so small as to be discovered with difficulty; but when the testicles become enlarged, it is considerably increased in size in the male bird, and much more so in the female, when the ovary and oviduct are developed for producing eggs. It nearly equals the superior mesenteric artery during the period of laying, in which state we shall describe it. It is a single artery like the coeliac and the mesenteric, proceeds at a right angle from the aorta, and soon sends off a branch which goes into the kidney of the left side, to which it gives some twigs, and afterwards emerging from the kidney, it runs in the membrane of the oviduct, upon which it is distributed. After this branch is detached, the artery projects a little farther forwards into the cavity and divides into two branches. One of these goes to the ovary, in which it ramifies, and furnishes an artery of some size to each of the cysts containing the ova. The other is distributed in numerous branches to the membrane and superior parts of the oviduct, and insensuates with the other arteries of the oviduct. It deserves to be remarked, that this and all the other arteries which are furnished to the oviduct, have a tortuous or undulating course, in the same manner as the vessels of the uterus of the human subject.

There are no regular emulgent arteries in birds; the kidneys deriving their blood from various sources, which will be pointed out as they occur.

The inferior extremity is supplied with two arteries, which have a separate origin from the aorta. One corresponds with the *femoral artery*, and the other deserves the name of *ischialic artery*.

The *femoral artery* is a small trunk which takes its origin from the side of the aorta, opposite to the notch in the bones of the pelvis immediately under the last rib. This notch is formed into a round hole in the recent subject, by a ligament which is extended from it to the rib; and it is through this hole that the femoral artery makes its exit from the pelvis; just before it passes out upon the thigh, it sends off a long branch which runs backwards the whole length of the margin of the pelvis dispensing arteries to the abdominal muscles on one side, and the obturator internus on the other. This branch also appears to supply one to the oviduct. The femoral artery, immediately after leaving the pelvis, separates into two branches; one goes upwards and outwards, ramifying amongst the muscles in that situation; the other turns downwards, and is distributed to the flexors of the limb, and round the joint, and sends an artery to the edge of the vastus internus, which can be traced as far as the knee. The kidneys appear to derive some irregular inconsiderable branches from the femoral artery while it is within the pelvis.

The *ischiodiac artery* is the principal trunk of the lower extremity, exceeding very much in size the femoral. When it is produced by the aorta, it appears to be the continuation of that trunk; the remaining part of the aorta becomes so much and so suddenly diminished, and seems as it were to proceed as a branch from the back part of the vessel.

The ischiadic artery, while in the pelvis, is concealed by the kidneys, in which situation it gives a branch from its lower side, which divides into three others that are distributed to the substance of the kidneys: one of these on the left side is continued out of the kidney to be lost upon the oviduct. The artery leaves the pelvis by the ischiadic foramen, in company with the great nerve; while within the foramen, it gives a branch obliquely downwards under the biceps to the muscles lying on the pelvis; and as it passes over the adductor, it sends off another along the lower edge of that muscle, which is chiefly lost in the femimembranosus. It then detaches several small branches to the muscles on the outer and fore part of the thigh, some of which anastomose round the joint with the branches of the femoral artery. Just as the ischiadic arrives in the ham, it furnishes a very large branch downwards, which divides into two; one goes under the gastrocnemius, to which and the deep seated flexors its branches are distributed as far as the heel; the other is analogous to the *peroneal artery*; it goes to the outside of the leg, supplies the peroneal muscles posteriorly, and passes along the outer edge of the flexors of the toes to the heel, above which, and behind the flexor tendon, it divides, running on each side of the heel, and forming several articular arteries around the joint, and communicating with the other branch, and with the anterior tibial, and the metatarsal branch of the plantar artery.

The *articular arteries* go off next from the artery in the ham; the two principal ones are deep seated. One proceeds under the vastus internus to the external part of the joint; the other is large, and situated upon the inside. It forms two vessels, one is the true articular artery, and spreads upon the ligaments of the joint, the other is distributed in the substance of the flexor of the heel, which is placed upon the inside and fore part of the leg, and comes out upon the edge of this muscle to be lost in the integuments.

The *posterior tibial artery* is extremely small; it only supplies muscular branches to the internal head of the gastrocnemius, and some of the flexors of the toes; it is lost on the inside of the heel in anastomoses with the peroneal artery, and other small superficial branches.

The trunk of the artery of the leg now gets upon the posterior surface of the tibia, and sends off through the deficiency left between the tibia and fibula at the superior part, a branch, which is distributed to all the muscles upon the fore part of the leg. The artery then creeps along the back of the bones for some way, and passing between them above, where the fibula is ankylosed with the tibia, it re-appears on the anterior part of the leg in the situation of the *anterior tibial artery*; at this place it detaches some very small branches, which frequently divide and unite again, to produce a most singular reticulation or plexus of vessels, which closely adheres to the trunk of the artery, and is continued with it as far as the articulation of the tibia with the metatarsal bone, where it disappears without seeming to answer any useful design. This plexus resembles in appearance exactly the division of the arteries of the extremities, which has been described by Mr. Carlisle in the tardigrade quadrupeds, but differs from it in this circumstance, that the trunk of the artery is preserved behind it, without suffering any material diminution of its size.

The anterior tibial artery furnishes no branch of any importance during the time it is proceeding along the fore part of the leg. It passes under the strong ligament which binds down the tendons of the anterior muscles of the leg, and over the fore part of the joint on the inside of the tendon of the tibialis anticus; at which place it distributes some branches which inosculate with the other arteries round the joint; it then pursues its course in the groove along the anterior surface of the metatarsal bone, and covered by the tendon of the flexor digitorum. On coming near the foot, it sends off an artery, which divides, behind the joint of the internal toe, into two branches; one goes between the internal and middle toes, ramifies upon both their joints, and unites with the artery in the sole of the foot; the other is distributed between the internal toe and the pollex or toe which occupies the place of the great toe; the main artery now passes to the sole of the foot through a hole in the metatarsal bone left for the purpose, when the original parts of this bone were united by ossification. In this situation the artery might receive the name of the *plantar*. It has scarcely passed through the bone, when it divides into six branches; three of these are distributed to the tendons and ligaments, &c. on the outside of the foot and the back of the metatarsus, anastomosing with the descending branches of the peroneal artery; the fourth branch supplies the pollex, and also sends a branch upon the metatarsus. The remaining branches are designed for the three principal toes; one dips in between the internal and middle toe, unites with the anterior branch of the metatarsal artery, and is distributed to the sides of these toes as far as their extremity. The other divides, between the external and middle toe, into two branches, which run upon the opposite side of each of these toes to the end.

When the feet are webbed, the digital arteries send off numerous branches, which ramifying in the membrane between the toes, establish a communication with each other. The present description has been taken from birds which possess three principal toes, and the back toe, or pollex; but no material difference can be expected in those with a greater number of toes.

After the trunk of the aorta has detached the ischiadic arteries, it is continued along the spine, sending small branches analogous to the *lumbar arteries*, one of which ascends upon the rectum, supplies the place of the *inferior mesenteric*, and unites with the superior mesenteric, as already mentioned. The aorta separates above the coxal vertebræ into three branches; two of these proceed

terally, and are distributed to the neighbouring parts, and to the kidneys and oviduct; the third branch descends to the very point of the tail, upon the muscles and quills of which its branches are exhausted.

The arterial system of birds differs from that of other animals chiefly in the frequent anastomoses, which exist more especially amongst the arteries of the head and the viscera. Similar communications occur between the veins, which are even in some instances more singular and unaccountable, as will be perceived by the following description, which has been taken principally from the *goose, duck, and common fowl*.

Veins.

The venous system returns the blood to the heart by means of three trunks; two of these, for the convenience of description, we shall call the subclavian veins, although they do not correspond in every respect with the veins of this name in mammalia; the other trunk is analogous to the inferior vena cava.

The *subclavian vein* is composed of the jugular and vertebral, and the veins which belong to the superior extremity or wing.

The *vertebral vein* is lodged in the same canal with the vertebral artery; it anastomoses between the vertebrae with the veins upon the sheath of the medulla spinalis, which are the continuation of the sinuses of the brain; in conjunction with these, therefore, the vertebral vein may be considered as answering the purpose of the internal jugular of mammalia. It appears also to form at the basis of the cranium a free communication with the jugular vein, and to receive by occasional branches, blood from the muscles of the neck.

The *jugular vein* is a single trunk in birds, and does not admit of the distinction into external and internal; it proceeds superficially along the side of the neck in company with the par vagum nerve. The vein of the right side exceeds the other in size; it is often twice as large. The jugular vein receives several lateral branches from the muscles and integuments of the neck, the œsophagus, &c.; one of those near the head is much larger than the rest; it lies deep amongst the muscles, and appears to communicate with the vertebral vein. There is a branch of the jugular which goes amongst the muscles of the tongue and of the os hyoides, and another for the muscles within the jaws and the integuments in the back of the mouth; these might be called the *lingual and submaxillary veins*.

The two jugular veins form a most remarkable communication with each other immediately below the cranium, by means of a cross branch, generally of an equal size with the trunks themselves. From each side of the arch thus formed there issues a large vessel, which is made up of the veins of the external part of the head; one of these passes round the articular bone, and apparently penetrates the joint of that bone with the lower jaw; it appears in several branches upon the side of the cheek, and spreading from the ear, in the manner of the portio dura nerve of the human subject, and contributes to form a plexus of veins below the posterior part of the orbit, similar to the arterial plexus already described in that situation. The principal branch of the veins of the head passes obliquely round the inter-articular bone, and below the orbit divides into several large vessels; one of which belongs to the back part of the palate; another ascends in the orbit, and unites with the ophthalmic vein; and a third is distributed to the anterior of the organ of smell, the palate, and the external parts of the upper and lower jaws. These branches produce plexuses along the base of the orbit and the external edge of the palate,

which correspond to those of the arteries before described.

In all the subjects we dissected for the veins we failed to discover any direct communication between the jugular vein and the sinuses of the brain; and in every instance the external veins of the head appeared to be sufficiently large of themselves to produce the trunk of the jugular. It may therefore be presumed, that if any branch analogous to the internal jugular vein passes through the posterior foramen lacerum, it is very inconsiderable, and incapable of transmitting the blood of the brain.

The *sinuses of the brain* seem to discharge their contents principally into some veins, which lie in the membrane forming the sheath of the spinal canal, and these appear to dispose of their blood gradually, as they descend in the neck, by means of lateral communication with the vertebral veins. The sinuses, which immediately open into the spinal veins, are situated upon the back of the cerebellum, and produce by anastomoses with each other, with the superior longitudinal sinus, and with others along the sides of the brain, an union of vessels, of a diamond shape.

The sinuses of the brain in birds generally are irregular in their form, and consist of flattened canals; and not only the sinuses on the back of the cerebellum, but the spinal veins appear so like extravasation, that accurate and repeated observations are necessary to discover them to be real vessels.

The principal sinuses, besides those upon the cerebellum, are the superior longitudinal, and one which runs along the lower edge of each hemisphere of the cerebrum; there appears to be also one upon the side of the cerebellum, corresponding to the lateral sinus. All these sinuses communicate with each other on the back of the cerebellum as already mentioned. The superior longitudinal sinus is continued at its anterior part under the frontal and nasal bones, and anastomoses with the ophthalmic and nasal veins. There are other sinuses in the several duplicatures of the dura mater, which are too small to be easily traced, or to deserve much regard.

The *veins of the wing*, or superior extremity, have a less curious distribution than those of the head. The branches which are derived from the parts within the chest, the muscles about the scapula, and the pectoral muscles, accompany the arteries of the same parts, so regularly that their course does not require description.

The vein lies considerably lower in the axilla than the artery, but still continues to receive corresponding branches. The trunk of the vein descends in the course of the humeral artery, but more superficially; in this situation it may be called the *basilic*, or more properly the *humeral vein*. There is no vein in birds which deserves the name of the *cephalic*; there are branches of the humeral vein, accompanying the articular and profunda arteries, and at the middle of the humerus, a large branch of the vein enters the bone; there are also two very small branches which lie in close contact with the humeral artery, which they accompany nearly its whole length.

The principal vein of the wing divides into two, opposite to the joint of the humerus with the fore arm. One of these branches belongs to the sides of the radius; it receives blood from the muscles and skin on the upper part of the fore arm, but its chief vessels lie between the integuments of the fold of the wing. The other branch of the humeral vein crosses the fore arm, just below the articulation, in company with the nerve, and running along the inferior edge of the ulna, receives a branch from between the basis of each quill, is continued along the ligament which sustains the rest of the

the quills to the extremity of the wing, receiving many veins of the joints from the opposite side of the fingers. Besides these large superficial veins of the fore arm, there appears to be one, and sometimes two, small accompanying veins to the ulnar and interosseous arteries.

The *inferior vena cava*, before it enters the auricle, receives as usual the hepatic veins; these are numerous, and open into the cava, as it passes behind the liver, or more frequently within the substance of that viscus in that back part. We have reckoned in the *cock* two large and two small hepatic veins from the right lobe, and one large branch from the left lobe, besides six minute veins, which came indifferently from both lobes.

The trunk of the vena cava is very short in the abdomen; it separates into two great branches analogous to the *primary iliac veins*, opposite to the renal capsules; these turn to each side, and experience a very singular distribution. On coming near the edge of the pelvis each of these two veins forms two branches; one of which collects the blood of the lower extremity, as hereafter described; the other passes straight downwards unbedded in the substance of the kidney, and admits the several emulgent veins, which are very large, and are seen to pass for some way obliquely in the kidney, before their termination. The descending branch of the iliac also receives the ovarian veins, and when arrived at the lower end of the kidney, divides into three branches; one transmits the blood of the muscles of the tail and parts adjacent; another accompanies the ureter to the side of the rectum, and is distributed about the anus and parts of generation, answering to the *hemorrhoidal veins*; the third passes inwards to the middle line between the kidneys, and there unites with the corresponding branch of the opposite side. The vessel which is in this manner produced, receives all the blood of the rectum from the anus to the origina of the cæca, anastomosing below with the branches of the hemorrhoidal veins; and at the upper part of the rectum, it becomes continuous with the trunk of the veins of the small intestines, forming the most remarkable anastomosis in the body, both on account of its consequences and the size of the vessels by which it is effected. By means of this communication, the blood of the viscera, and the external parts of the body, flows almost indifferently into the vena cava and vena portæ; for the anastomosing vessels are sufficiently large to admit the ready passage of a considerable column of blood in proportion to the whole mass which circulates in the body of the bird: for instance, in the *goose*, the communicating veins of the pelvis are equal in size to a goose quill, and in the *ostrich* and *casowary* they are as thick as a finger. The advantage which appears to result from this remarkable union of vessels, is the prevention of congestion, or the overloading either the heart or liver with blood, as the one organ has the power of relieving the other. It would seem from this, as well as several other provisions of the same kind, that the circulation would be more liable to obstruction in birds than other animals. It is difficult to say, however, to what cause such an effect ought to be ascribed. Is it from the compression sustained by the heart and other viscera, by means of the air-cells during respiration? Or, is the mode of progression by flight capable of impeding the motion of the blood?

The anastomosis of the pelvic veins, in being the means of conveying common venous blood into the liver, goes to prove, that the blood of the vena portæ does not require any peculiar preparation by circulation in the spleen or other viscera, which has been conceived as necessary by some physiologists to fit it for the secretion of bile.

The *vena portæ* belongs almost exclusively to the right or

principal lobe of the liver. It is formed by three branches. The *splenic vein* is the smallest, and is added to the vena portæ, just as it penetrates the liver on the side of the hepatic duct. The next is made of two branches; of which one returns the blood of the posterior gastric artery, and therefore may be called the *posterior gastric vein*; and the other is furnished by the pancreas and duodenum, and therefore is the *pancreatic vein*. The third and largest branch of the vena portæ is the *mesenteric vein*, which not only collects the blood from all the small intestines, but likewise receives the *inferior mesenteric*, or vein of the rectum, which forms the communication that has been described with the pelvic veins.

The *veins of the left lobe of the liver*, are furnished in the *goose* by those which accompany the anterior gastric artery, and some branches from the head of the duodenum.

The *anterior gastric veins* produce two small trunks, which enter at the two extremities of the fissure, in the concave surface of the left lobe of the liver, as it lies upon the edge of the gizzard; the veins from the head of the duodenum furnish a small vessel which passes backwards to penetrate the posterior part of the fissure in the left lobe.

In the *cock*, the veins that the left lobe of the liver derives from the anterior gastric, are more numerous than in the *goose*.

The veins of the zone of gastric glands, and of the lower portion of the œsophagus, do not contribute to the secretory vessels of the liver, but proceed to the superior part of that viscus, to terminate in the vena cava; as does also the umbilical vein.

The vein which returns the blood of the inferior extremities, is divided in the pelvis into two branches, which correspond with the femoral and ischiadic arteries; the one passes through the ischiadic foramen, and the other through the hole upon the anterior margin of the pelvis; but the proportion they bear to each other in magnitude, is the very reverse of what occurs in the arteries; for the anterior vein is the principal one, whilst the other is not a very considerable vessel, and receives its supply of blood from the muscles at the posterior part of the joint.

The *femoral vein*, immediately without the pelvis, gives branches on both sides, which receive the blood of the extensor and adductor muscles at their superior part: the trunk passes obliquely under the accessory muscle of the flexor digitorum, and over the os femoris, where it lies superficially; it then winds under the adductor muscles, and gets into the ham, where it receives many muscular branches, and comes into company with the artery and nerve. It here divides into the *tibial* and *peroneal* veins. The first is joined by some branches from the surface of the joint answering to the articular arteries; it also receives the *anterior tibial vein* which accompanies the artery of the same name. The tibial vein proceeds down the leg along with the artery on the inside of the deep-seated flexors of the heel: it turns over the fore part of the articulation of the tibia with the metatarsal bone, in order to get upon the inner side of the metatarsus; above the origin of the pollex, it receives a communicating branch from the peroneal vein, and immediately after, two branches from the toes; one of them comes from the inside of the internal toe; the other arises from the inside of the external and middle toes, unites at the root of the toes in the sole of the foot, and is joined by a branch from the pollex, before its termination in the internal vein of the metatarsus.

The *peroneal vein* derives its principal branches, along with those of the peroneal artery, from the muscles on the outside of the leg. The trunk of the vein comes out from the

peroneal muscles, and passes superficially over the joint at the heel, and along the outside of the metatarsus: near the pollex, or great toe, it sends a branch round the back of the leg, to communicate with the tibial vein; after which, it is continued upon the outside of the external toe to the extremity, receiving anastomosing branches from the tibial vein.

Where the veins run superficially upon the upper and lower extremities, they seem to supply the place of the branches of the *cephalic*, *basilic*, and the two *sapheneæ*; but the analogy is lost upon the upper arm and thigh: these branches forming deep-seated trunks: this constitutes the greatest peculiarity in the distribution of the veins in the extremities of birds.

Kidnies.

These organs occupy the posterior part of the common cavity of birds, from the last rib to near the coxigeal vertebrae: they fill all the cavities and depressions of the bones of the pelvis; the posterior surface, therefore, of the kidneys is extremely irregular; their anterior part is rather flat, and they are notched upon the external edge, which gives usually the appearance of their being composed of three lobes; but the inequalities of the edge seem to arise rather from the kidneys being larger at one place than at another, than from an original division into lobes: the prominences correspond to the most depressed parts on the pelvis; accordingly, the kidneys are observed to form a projection at the upper end, where they lye on the depression of the *ossa ilia*, again opposite to the hollow on the inside of the *ischiac foramen*, and lastly, at the lower part of the kidney, where it fills the concavity of the *ischium*.

The kidneys have a covering of thin peritoneum, and under this, they seem to possess another thin membranous tunic, which closely invests them, as well where they are applied to the bones, as anteriorly; this coat also appears to be reflected into the substance of the kidneys, and to form the cellular connections of the different parts which compose these organs. According to the academicians, the kidneys of the *corvina* are separated from the other parts of the lower belly, by a distinct membrane, and instead of being divided into three lobes, are toothed like a cock's comb on their gibbous part.

The texture of the kidneys is very fragile; readily giving way under the slightest injury. They yield to the pressure of the finger a granular feel, as if composed of a number of minute bodies, easily separable from each other: the surface of the kidneys, also, presents the appearance of an aggregation of small glands.

The trunks and larger branches of the blood-vessels of the kidneys have been already described. The termination of the minute ramifications of the artery cannot be so clearly perceived as in mammalia. When coloured fluids are thrown in by the artery, the whole substance of the kidney appears to equally admit the injection: the minute branches of the blood vessels are too numerous, therefore, to allow of a distinct view of the figure assumed by the secretory extremity of the artery; but it is probable, from the structure of the kidney differing in other circumstances, that it is not wound into a coil, as in man and quadrupeds.

The kidneys of birds, in general, do not possess any cavity for collecting the urine, previous to its expulsion by the excretory duct: each of the little masses which form the original glands, produces a duct; these are joined by the neighbouring ducts, and thus others are generated, which terminate in the *ureter* or common excretory duct of

each kidney. The ureter lies upon the anterior surface of the kidney, partially embedded in its substance, so that it is visible along the whole gland, except at the upper part.

The members of the academy describe the kidneys of the *ostrich* as being evidently composed of distinct glands, and that the ureter did not lie as in other birds, superficially, but was concealed in the glandular substance; in which situation it suffered a degree of dilatation, forming as it were, a *pelvis*, the whole length of the kidney, into which the different excretory ducts discharged their contents; not, however, from *papille*, as in mammalia, but by open and plain orifices. Mr. Ranby, in his account of the anatomy of the *ostrich*, states, that he found the ureters occupy their usual situation on the middle line of the anterior surface of the kidney; but that the superior branch of the ureter was very conspicuous, and entered the middle of the kidney, where it formed a very large *pelvis*.

The structure of the ureters appears to be exactly the same which these ducts possess in the human subject.

The course of the ureters, after leaving the kidneys, is behind the rectum, to which they become connected by the peritoneum covering the intestine: they proceed, for a very little way, involved in the coats of the back of the rectum, and open usually upon two little papillæ, which project into the cloaca, or termination of the rectum. The orifices of the ureters in the cloaca, are much less than the width of tubes to which they belong; this, therefore, added to the obliquity with which they perforate the cloaca, answers all the purposes of a valve, and prevents any regurgitation of the urine back upon the kidneys.

The Parisian dissectors observed in the *castor* and *demoiselle of Numidia* (*ardea virgo*), that the ureters became united to the excretory duct of the testicle, at the lower part of the kidney; the common duct produced by their union terminated, as usual, in the back of the cloaca. This structure certainly does not exist in the generality of birds.

The above description anticipates the observation, that birds are unprovided with any distinct reservoir for urine; analogous to the *bladder*: it is the case throughout the whole class, without an exception, that the feces and urine are expelled together; but the dilatation of the end of the rectum or cloaca, in some species, supplies the want of the urinary bladder in a great degree, and renders the ejections of both the urine and feces less frequent than they would otherwise be, by affording a temporary accommodation to a considerable quantity of excrement. These dilatations are remarkably large in the *ostrich*, *parrot*, &c. See that part of the article which treats of the great intestine of birds.

It is a matter of common observation, that the excrements of birds are of a white colour, and appear as if they contained some cretaceous substances: this effect is universally attributed to an admixture with the urine, which is supposed to be of this colour and consistence; it deserves to be mentioned, however, that if the urine be expressed from the kidneys, or examined before it has passed into the rectum, it is neither white, nor of a chalky consistence, but a limpid aqueous fluid, which exhales an innoxious smell, that is very perceptible in the larger birds, from which some quantity of the urine may be obtained, by compressing the kidneys. It would seem more probable, that the white and chalky appearance of the excrements of birds, depended upon the quantity of calcareous matter contained in the solid parts of the feces, than that it is derived from the urine. In proof of this supposition, it may be remarked,

that

that upon one occasion, where we fed a fowl with madder for a different purpose, the cretaceous part of the excrement lost its usual whiteness, and became of the pale pink colour which madder is well known to communicate to calcareous earths.

Renal Capsules.

These bodies hold the same situation in birds as in mammalia; they also usually possess an irregularly triangular figure. The proportion which they bear in size to the kidney, is perhaps less than generally occurs in quadrupeds. In the *goose*, they are each about as large as a pea. The colour of the renal capsules is in every instance more or less yellow. Several of the older anatomists have described a single renal capsule in some species of birds: the mistake seems to have arisen from their being occasionally so closely applied to each other, that they appear as one body.

The renal capsules of birds do not possess any cavity or dilated part for venous blood, which renders it probable that the enlargement of the capsular vein, which has attracted so much attention in the human subject, is no way concerned with the function of these bodies.

Having discussed the structure and operations of those organs which are more immediately concerned in supporting the life of the individual, we shall proceed to consider those which are subservient to the second order of functions.

ORGANS EMPLOYED IN THE EXERCISE OF THE GENERATIVE FUNCTIONS.

Male Parts of Generation.

The *testicles* of birds are always two in number; they are situated on the inside of the body, high up in the loins, upon the superior edge of the kidneys; from which position they never descend at any period of life, as in mammalia. Consequently, birds are not provided with a *scrotum*, or any external pouch for the accommodation of those glands. The figure of the testicles is most commonly oval; occasionally they are of an elongated form, as in the *casowary*. See *Plate VII.* in the *Anatomy of Birds*; *fig. 1.* Sometimes the testicles are nearly round, as in the *curassow*, and other instances.

The testicles appear to receive a covering from the peritoneum; but their proper tunic is remarkably strong, dense, and inelastic.

It will always be a matter of great difficulty, to exhibit satisfactorily, the intimate structure of the testes of birds, as a successful injection from the *vas deferens* is nearly impossible. The seminiferous tubes are so tender, that they do not sustain the least force without being ruptured; and at the period when the testes are fully developed, they are loaded with their own secretion, a circumstance highly unfavourable to the exposition of the structure of these organs by the means of injection. The blood-vessels of the testicle are easily traced; some of them pass in the usual manner directly from the back part, through the glandular substance, to the surface, where they unite with others which spread in an arborescent form, under the capsules of the testes. The great mass of these glands is evidently made up of tubes, which are convoluted in all directions, and are separated into bundles or packets, by very thin cellular membranes. Their connection with the secretory extremities of the spermatric arteries, and their termination in the excretory duct, are, however, involved in obscurity, for the reasons already given.

The testicles of birds differ very much in size at different seasons of the year. When these organs are not exercised in the act of generation, they become remarkably diminished; but, during the period in which the female lays her eggs,

they acquire a bulk even beyond what might be expected, from the size of the bird to which they belong. This subject has been strikingly illustrated by Mr. Hunter, in a series of figures representing the variation of bulk which takes place every spring in the testicles of the *common sparrow*; by which it is shewn, that the testicles of this bird are ordinarily about the size of pin-heads, but, during the season of propagation, acquire nearly the bulk of pistol balls. See *Plate VII.* in the *Anatomy of Birds*; N^o 1. exhibits the testes as they exist in the month of January; N^o 2. as they are in the middle of February; N^o 3. as they are found in the beginning of March; N^o 4. their size in the latter end of March; and N^o 5. the bulk they assume in the middle of April.

The *vas deferens*, or excretory duct, arises usually from the posterior part of the testicle, and probably always suffers a certain degree of convolution or coiling upon itself, corresponding to the *epididymis*, which generally differs more or less in colour from the body of the gland. In the *curassow* and *bustard*, it has been observed to be black; in the *casowary* yellow; and in the *ardea virgo*, a green colour. The academicians represent the *epididymis* of the *casowary* as being extended for some way above the testicle, and considerably enlarged at the top. See *Plate VII.* in the *Anatomy of Birds*. *Fig. 1.* *aa* the two testes; *bb* the *epididymis* of each side; *cc* the *vasa deferentia*; *dd* the ureters coming from the kidney to unite with the *vasa deferentia*; *ee* the excretory ducts common to both the kidneys and the testicles.

In the *ostrich*, the *epididymis* turns up on the side of the testicle; and in the *ardea virgo*, it is pendulous from it, and only connected by one end. The *vas deferens* also in this bird, appears to arise from the body of the testis, instead of the *epididymis*; and at its lower part, the duct unites with the ureters, in the same way as is represented in the *casowary*. In the *casowary*, the *epididymis* is situated below the testicle, which it almost equals in size.

In most birds the *vasa deferentia* proceed to their termination, without undergoing any remarkable degree of convolution, or experiencing any dilatation analogous to the *vesiculae seminales*; but in the *cock*, these ducts are composed of convolutions or reflections of a tube from side to side, which are so closely applied to each other, that a longitudinal section of the duct presents the appearance of a series of cells, which seem to communicate with each other in the middle. These become larger and more numerous towards the lower part of the *vas deferens*, and are capable of containing a considerable quantity of semen. It may be presumed, therefore, that the *cock*, and other falacious birds, are provided with these receptacles of semen to enable them to meet the exigency of frequent copulation; and it is also to be observed, that those birds which have the *vasa deferentia* more simply formed, do not perform the act of coition so rapidly as the gallinaceous fowl. See *Plate VII.* in the *Anatomy of Birds*. *Fig. 2.* exhibits the genital or organs of the *common cock*; *aa* the testicles of an oval shape; *bb* the *epididymis* at the posterior part of each; *cc* the *vasa deferentia*, one of which is cut open to expose the loculated appearance it presents internally.

The *penis*, in those birds where it has been observed to exist, is fixed upon the end of the rectum, immediately within the verge of the anus; it is usually of a pyramidal figure, and in its ordinary state is twisted like a screw; its external tunic is derived from the intestine, and is formed into a number of little rugæ, or processes, giving the edges of the penis, in its contracted state, a jagged or notched appearance. The body of the penis is composed of a white liga-

erentous substance, which supplies the place of the *corpora cavernosa*, but does not seem to contain any cells or cavity internally.

There is a groove, corresponding to the *urethra*, along the side of the white ligament; it takes the spiral course of the penis, and in no instance could we discover that it formed a distinct canal, the external coat of the penis appearing always to dip into the groove, so that it was visible externally; and hence it might be said that the *urethra* of birds is situated upon the outside of the penis. See *Plate VII.* in the *Anatomy of Birds*, *fig. 3.* represents these parts as they are found in the *gander*; *a* the penis, shaped like a screw, with the edges denticulate and notched by the folding of the external coat; *b* the *urethra*, commencing upon the left side of the penis, and continued upon the same side around the spine or screw; and at the end of the penis the sulcus gradually disappears.

The form of the *ostrich's* penis is not spiral; it is also smooth upon the surface, and in shape it has been likened to a calf's tongue. The *Panilian* anatomists describe it as being composed of white thick membranes, and of two strong hard ligamentous substances. They appeared to consist of very compact transverse fibres; one of the membranes was thicker than the other, and afforded a covering to the penis; the other enveloped immediately each of the two ligaments, which were separated from each other, and united about two fingers from the extremity. One was longer than the other, and measured two inches. The origin of the penis was at the cartilaginous swelling, which is situated at the junction of the bones of the penis; from thence it was turned downward, and contained in a little pouch, which was placed at the lower part of the cloaca, in which the penis was continued to the anus. This small pouch can be distinctly separated from the large bag of the cloaca, by the contraction of the margin of its foramen. The lesser pouch only permits the excrements to pass from the other occasionally, and when it is closed, forms a sort of sheath for the penis.

The penis of birds receives some distinct muscular fasciculi from the rectum, which are inserted into the root of the ligamentous body; they appear to have the power of retracting it, or rolling it into the spiral form, and may perhaps render it more steady during coition.

The muscles of the penis are large in the *ostrich*. The academicians describe four of them, two on each side. The two first took their origin from the internal part of the os sacrum, and descended along the pouch of the rectum, for the space of two lines, which they penetrated near the extremity, and passing under the sphincter ani, were inserted at the base of the penis. The two other muscles went from the internal part of the os ilium toward the bottom of the kidneys, and descended by the sides of the ureters, and after perforating the rectum, were attached to the lateral parts of the penis.

The penis of birds is unfurnished with any structure similar to the *glans* or *prepuce*; from which it might be questioned whether it is capable of receiving any peculiar sensations during the act of copulation. It would seem probable, however, that the penis is the chief seat of pleasure in birds as well as mammalia, because it changes its form during coition, and experiences a great degree of relaxation afterwards. The penis of the *drake* is protruded some inches out of the anus during the performance of the venereal act; and after the orgasm is concluded, it is so much relaxed, that the animal has not the power of retracting it for some minutes; in which condition the penis hangs from the anus, and so much resembles an earthworm, that the ducks mistake it for one, and attempt to swallow it. It is remarkable,

however, that the greater number of birds are either unprovided with a penis, or have merely a rudiment of it, which is incapable of conducting the semen into the organs of the female.

In those birds which want the penis, it is very easy to perceive the manner in which the vasa deferentia terminate; thus, in the *common cock* they can be readily traced passing along the sides of the ureters to the back of the cloaca, into which they open a little lower than the ureters upon two papillæ, which are elevated upon a ridge formed by the internal coat of the intestine, just within the verge of the anus. These papillæ are prominent and sharp pointed; and although the ducts are of some size immediately behind, the aperture on the point of the papillæ is so extremely small, that it is difficult to pass through it. See *Plate VII.* in the *Anatomy of Birds*, *fig. 2.* *c* the two sharp papillæ, upon the point of which the vasa deferentia terminate in the *cock*. A bistul is introduced into one of them, and above them, and nearer the centre of the intestine are seen the orifices of the ureters designated by the letters *d* *d*.

As these birds have no means of conveying the semen into the body of the female, a natural eversion of the extremity of the intestine always takes place during the copulation of fowls.

The termination of the excretory ducts of the testicle are difficult to discover in most of the birds which are furnished with a penis. This arises partly from the coats of the ducts becoming extremely thin and delicate near the extremity, and partly from the papillæ upon which they open into the gut, being in those cases so small as very easily to escape observation.

The academicians did not succeed in tracing the vasa deferentia; their termination in any of the birds they dissected. They relate, however, that the penis of the *ostrich* and *casowary* had no communication with the ducts, nor did they contain any tube in the internal part by which they could give passage to the semen. In all the birds we have examined, we could not perceive the least appearance of a canal in the interior part of the penis, or any means of communication between it and the vasa deferentia.

In the *gander* we have been able to discover the mode in which the semen is discharged from the excretory ducts. At some distance behind the root of the penis there are two papillæ, surrounded by a number of small follicular glands; they are not so far asunder as those of the *cock*, and so little prominent, that unless minutely examined, they are not distinguishable from the glandular parts of the surface of the intestine which lie next them, and might easily be mistaken for a prominent edge of one of the follicles: from the point of these papillæ a duct can be traced, as in the *cock*, to the back of the intestine; but furnished with coats so thin that it is perfectly transparent. See *Plate VII.* in the *Anatomy of Birds*, *fig. 3.* *c* the small papillæ on which the vasa deferentia terminate in the *gander*. Some small follicular glands are seen around them, and farther within the intestine the ureters open, as indicated by the letters *d* *d*; at these points also there are some small mucous glands.

Mr. Hone has described the penis of the *drake* as possessing a distinct canal analogous to the urethra of mammalia, into which the vasa deferentia enter close to its origin at the verge of the anus. He states the penis to measure, when pulled out to its full extent, six inches long, but that when left to itself it disappears within the verge of the anus, in consequence of the contractile power of the urethra. (See *Phil. Transact.* vol. xcii. p. 361.) The representation of the penis of the *drake* is copied in *Plate VII.* of the *Anatomy*

of Birds, fig. 4, *aa* the verge of the fundament surrounded by feathers; *bb* the urethra, or feminal canal laid open throughout its whole extent; *cc* the orifices of the vasa deferentia; *dd* the external tunic of the penis laid open, and from its elasticity thrown into serpentine folds.

It deserves to be mentioned, that Blasius also supposed the vasa deferentia of the *drake* terminated in the penis, although he spoke doubtfully, not having actually traced them thither. See *Anatome animalium Gerardi Blasii*.

In the *gander*, *swan*, *castrary*, and other birds which we have examined, the channel that runs upon the external part of the penis supplies the place of the urethra, and appears fully competent to answer the purpose of a conduit to the femens, when it is introduced into the organs of the female.

Besides the mucous follicles surrounding the termination of the ureters and feminal ducts, there are some others much larger upon the margin of the anus, on each side of the base of the penis. In the *gander* we have noticed twelve of these, six on each side. They appear like masses of fat lying under the inner membrane of the intestine. The three outer glands have wide orifices which lead to a cavity within of some size; they furnish specimens of simple mucous follicles, a greater size than are almost ever met with, even amongst the largest animals. See *Plate VII. in the Anatomy of Birds, fig. 3, ecc* the large follicular glands on the margin of the anus of the *gander*; *fff* the three smaller glands next the penis. The anal glands are very remarkable in the *castrary*.

No chemical analysis of the femens of birds has yet been attempted. The undertaking will be attended with some difficulty, from the small quantity which can be collected for investigation.

Female Parts of Generation.

There are no parts of the structure of birds which deviate, more from that of mammalia, than the female organs of generation: not only their construction, but their functions, differ so much, that the same names cannot be applied to each, without extending analogy beyond what is justifiable. The genital organs of the female bird strictly consist but of two parts, an *ovary* and *ovarian tube*; for the different portions of the latter, which have received the names of *uterus* and *vagina*, perform very different functions from the same parts in other animals.

The *ovary* of birds is always single, which is a peculiarity of structure hardly ever met with in the other classes of animals. It is situated over the descending aorta, above the kidneys. Instead of the ova being imbedded in a solid mass, as in mammalia, they are contained in membranous cysts, which are prolonged into peduncles, or footstalks, that are attached to the basis of the ovary, thus presenting the appearance of a cluster, or bunch of fruit, from whence the older anatomists were in the habit of calling the ovary of birds, the *racemus vitellorum*. Before the ovary, however, is developed, the rudiments of the eggs do not project beyond the surface, but lie in close contact with each other, and are inclosed by the external membrane of the ovary, something in the manner of the ova of fish, or amphibia. The capsules which invest the ova of birds in the mature state, appear therefore to be formed by the extension of the outer membrane of the ovary, just as the contents of a hernia obtain during their protrusion a covering of peritoneum. The membranous bags, in which the ova are included, adhere to the proper tunic of the egg at the anterior part only; for posteriorly they are quite distinct, being prolonged into a funnel, or tube, which forms the peduncle to each ovum.

The blood-vessels are transmitted through this funnel, and ramify in the space left between the capsule and the back part of the ovum, distributing their branches in a similar way to the central artery of the eye upon the back of the crystalline lens in mammalia. The capsules are extremely vascular at every part, except a certain portion of the anterior surface, which appears like a white streak, or broad line. When the eruption of the ovum takes place, this part of the capsule gives way, after which the cyst appears like the cup of an acorn, when the nut has been shed. The older anatomists almost universally believed that the capsules of the ova were imperfect at their anterior part, and that the white streak was owing to the proper tunic of the ovum being actually exposed at this place; they describe the capsule as being extended upon the ova in a manner similar to the internal coats of the eye, and, like them, terminating by a defined line at the anterior part. The celebrated Harvey, however, observed that the membrane composing the capsules was continued over the anterior part of the ovum, at which place it became very thin. The observations we have made on this subject confirm the assertion of Harvey; we have always been able to detect a very fine pellucid membrane extended over the white line, which has all the appearance of being the continuation of the capsule. The coat of the capsule consists of several indistinct layers; and it is one of these only which appears to pass over the white line. The separation of the tunic of the capsules into layers is probably not an original formation, but is produced by the increase which takes place in the number and size of the blood vessels, and therefore the part which lies over the white streak might be considered as more nearly resembling the membrane of the capsule as it first existed. There are many instances of parts, on changing their position, either acquiring or losing vascularity, and becoming so much altered in their structure and appearance, that separately they could not be recognized for the same. The tunica conjunctiva of the eye affords a well known example of this sort.

The portion of the capsule corresponding to the white line, from being bereft of blood-vessels, becomes thin, is easily ruptured, and is incapable of supporting any internal actions, in consequence of injury; we accordingly find, that this part suffers laceration when the ovum is shed, without the least inflammation succeeding, or any process similar to that which arises upon the rupture of the ovary in mammalia. There is no deposition of new substance in the cavity of the cyst, or *corpus luteum*, formed. The lacerated portions of the membrane disappear (probably by absorption), and the edges assume the appearance of being cut, the capsules become contracted and thickened, and remain hollow, presenting very exactly the resemblance of cups or the calyces of flowers, and thence they have been often called the *calyces*.

The base of the ovary, in which all the pedicles of the ova terminate, is of a peculiar texture. It is porous and tough, and seems to be composed of an intermixture of vessels and strong cellular substance; it adheres firmly to the parts upon which it is placed.

The *ova*, during the time they remain in the ovary, possess only the yolk and the cicatricula; the whites and the shell being added to them during their passage through the oviduct. Many of the blood-vessels which are distributed between the capsule and the ovum, penetrate the membrane of the latter, in order to supply blood for the nutrition of the egg during its growth. But when the ovum arrives at maturity, these branches degenerate, and disappear entirely before the ovum is expelled from its cyst.

For the illustration of the structure of these parts, see *Plate*

Plate VII. of the *Anatomy of Birds*. Fig. 5. exhibits the genital organs of the *hen* during the season for laying eggs; at the superior part is seen the ovary, or *racemus ovarum*, or *vitellarium*. The ova are arranged according to their state of growth. The largest are most external and pendent from their footstalks; those less advanced are close upon the matrix or basis of the ovary; many of them are as yet but imperfect rudiments of the ova, and appear but as white specks in the matrix. The capsules of the ova, near maturity, display a very beautiful and luxuriant distribution of blood-vessels upon every part of their surface, except where the ova are to come out; *aa* point out the stripe on the anterior part of each capsule, which is devoid of blood vessels; *b* a capsule which has shed its ovum, exhibiting the appearance of a cup or calyx.

The *ovarian tube*, or *oviduct*, during the season of laying, fills the greater part of the lower belly; it forms a number of curves or convolutions similar to the intestines, which, however, are not permitted the same latitude of motion amongst each other, because the prolongation of peritoneum, which includes the oviduct, is remarkably strong, and is not so long as the parts it contains, and therefore the convolutions are coiled close together, and even some of them are doubled up within the peritoneum. The disproportion between the oviduct and peritoneum, which invests it, arises from the additional bulk the ovary acquires when its functions are exercised, whilst the peritoneum must preserve at its back part its original extent, i. e. the length of the left kidney, from the middle of which it is reflected.

There is no decided muscular coat belonging to the oviduct; there are, however, muscular fibres between the peritoneal and internal coats of those parts, which have received the names of uterus and vagina; upon the former they are transverse, and upon the vagina the course of the fibres appears to be longitudinal.

The internal coat of the oviduct is the most remarkable part of its structure; and upon it chiefly depends the distinctions which have been made of the tube into *infundibulum*, *Fallopian tube*, *uterus*, and *vagina*.

The *infundibulum* is the extreme part of the tube next the ovary; it is composed apparently of a single thin membrane; the peritoneum and the internal tunic becoming both delicately fine, and so closely united to each other, at this place, that they seem to be but one. This membrane is expanded beneath the ovary in a loose manner, like the folds of a garment, and is fastened by its superior edge to the basis or matrix of the ovary; and inferiorly it is connected to the uterus: by which means the folds of the membrane are always kept spread out, ready to catch the ova as they are discharged from the racemus or vitellarium. The passage from the membranous expansion of the tube into the oviduct is contracted, and thence occurs the similitude of this part to a funnel, and the application of the term *infundibulum*.

The next portion of the oviduct, or *Fallopian tube*, is of considerable length, being several times coiled backwards and forwards upon itself. It is very nearly of the same width at every part; and the inner membrane is singularly soft, and forms numerous thick folds, which take an oblique or spiral course. The internal surface of this part of the tube resembles very much that of the digestive stomach in ruminating animals.

Where the part termed the *uterus* commences, there is a contraction of the tube, to which succeeds a dilatation of an oval or egg shape; in this the internal membrane acquires more firmness, and instead of the soft white spiral plicæ, produces an immense number of strong vascular processes or

flocculi, which give the internal part of the uterus the appearance of being fringed or foliated.

The tube again becomes diminished in capacity, and its structure changed, to form the portion considered analogous to the *vagina*. At the origin of this part from the oval dilatation there are several annular contractions; after which, the canal undergoes some degree of convolution, which is concealed by the peritoneal coat. The internal membrane produces longitudinal rugæ, or folds, which do not project far into the cavity of the tube.

The oviduct finally opens into the cloaca on the left side, not by a simple aperture, but the extremity of the vagina is protruded for some way into the cavity of the intestine, appearing as if a portion of the oviduct were turned inside out; and to the puckered foramen thus produced, the old anatomists, who were always desirous of comparing the structure of other animals with that of the human subject, gave the name of *velva*. See Plate VII. in the *Anatomy of Birds*, fig. 5; see the membranous expansion of the oviduct, *aa* its attachments to the ovary and the uterus, *e* the aperture leading from the infundibulum to the interior of the oviduct; *ffff* the convoluted part of the oviduct, which is supposed to be analogous to the Fallopian tube, and a part of it laid open to exhibit the spiral folds of the internal membrane; *bb* the oval cavity or uterus cut open, and a portion of it turned backward to expose the foliated structure of the internal membrane; *ii* the vagina detached in a degree from its peritoneal covering to bring it more into view; *k* the cavity exposed, shewing the longitudinal folds; *l* the projection of the end of the oviduct into the cloaca, with the corrugated foramen by which it opens into the gut; *m* a portion of the rectum, left to explain the connection these parts have to each other; *nn* the ureters, through which a bristle is introduced.

The uses which the several parts of the oviduct of birds serve, are very peculiar, and can hardly be compared with the functions of the genital organs of other animals. When the ovum is shed from the vitellarium, it is but imperfectly formed; and in passing along that portion of the oviduct which has been called the Fallopian tube, it meets with an albuminous fluid, which is secreted in abundance from the plicated membrane; a certain quantity of this fluid attaches itself to the ovum, and constitutes the whites and the chalyzes. The egg now assumes an oval figure, and while still soft, descends into the dilated part of the oviduct, in which it is detained for some time, and obtains the calcareous covering or shell; after which, the lower portion of the duct, or the vagina, suffers itself to be enlarged, and the egg is expelled from the body of the bird. For the further history of the formation of the ovum, we refer the reader to the article *EGG*. In birds, and all animals strictly oviparous, the evolution of the embryo, and the growth of the fœtus, is carried on without the body of the parent, and therefore the functions of the organs of generation in these animals are confined to the development and perfection of the ovum, which, as already observed, is partly accomplished in birds, while the egg remains in the ovary, and partly while it traverses the ovarian tube. It therefore seems improper to borrow the terms applied to the organs of viviparous animals in the description of those which only minister to the formation and support of the ova. The progress of the fœtus in birds; its mode of existence while in the egg, and the provisions for its subsistence afterward, will be treated of under the head of *INCUBATION*, which see.

It is not easy to determine how far the male semen is conveyed into the organs of birds during copulation. The older anatomists asserted, that the two papillæ on which the vasa

deferentia terminate, were introduced into the orifice of the oviduct within the cloaca; and it has been observed, that the hen, before coition, everts the intestine so much, that the orifice of the vagina is visible on the outside of the body, which would render the insertion of the male organ very practicable, especially in those birds which are provided with a penis. The impregnating liquor must be transmitted as far at least as the part in which the egg is clothed with the shell; for afterwards it would be incapable of exerting any influence upon it: and it is probable that it reaches the ovum even before it acquires the whites, otherwise the stimulus could not be immediately communicated to the *cicatricula*. Many have supposed, that the semen produced a vapour which was propagated to the ovary itself; but the existence and operation of the *aura seminalis* are now generally disbelieved.

Upon the margin of the anus of birds there is usually observed a projection which has been considered analogous to *clitoris*. The academicians observed, that it possessed in the *female ostrich* the same muscles which belonged to the penis. This part, from its situation, is little exposed to agitation or friction in venereal congress, and from its covering, which is the common integument of the anus, cannot be endowed with peculiar or delicate sensation. It may therefore be looked upon as one of the examples of uniformity of plan which are so often displayed in the works of nature, without the accomplishment of any immediate or obvious effect.

The female organs of generation of birds suffer even a greater alteration than the male parts, in consequence of the cessation of their functions. Before and after the period of laying has commenced, the ovary and oviduct, which in their developed condition are the largest of the viscera, are so diminutive, that they are hardly to be seen; the ovary is a very small mass, which appears to be composed of an aggregation of minute pale yellow grains; the oviduct is a mere membranous substance, with scarcely any cavity, like a degenerated blood-vessel; and the aperture, which at one period permits the egg to pass through it, is so nearly obliterated, that it is perceived with difficulty, and is so close that it does not suffer the smallest instrument, or even air, to escape from it into the intestine.

Mr. Hunter, and others, have observed, that even the sexual characters of some female birds have entirely changed, after the time they ceased to lay. This phenomenon has been remarked most frequently in the *praefowl*. Several hens of this genus have assumed the manners and plumage of the cock so nearly, that their real sex could only be decided by anatomical inspection.

ORGANS SUBSERVIENT TO THE PERFORMANCE OF THE ANIMAL FUNCTIONS.

Bones.

The osseous fabric of the bodies of birds constitutes one of the most curious and characteristic parts in the anatomy of this class of animals; being in many respects so curiously formed, that the analogy between them and the same organs of other animals can scarcely be traced.

The bones of birds have been observed to vary in their colour. The water birds have them of a duller white than the other species, in consequence of their abounding with marrow. The bones which contain air, are always of the finest colour, much exceeding in whiteness the bones of any quadruped: they are also of a harder and closer texture. Becmann, in the voyage of Dampier, has observed that the *black fowl* of the isles of Cape-Verd, and other birds of these islands, had black bones, and Daubenton reared some hens of this kind. The same peculiarity has been noticed in the

pintado; but some preparations, which were preserved by Mr. Hunter to illustrate this subject, shew that it is the periosteum in which the blackness resides.

The chemical principles of the bones of birds, do not differ from those of mammalia, except in there being a greater proportion of the calcareous phosphat in the long bones, filled with air. The arrangement of the osseous particles appears to be in layers, rather than fibres, successively formed, and closely applied to each other.

The *bones of the head*, as in the other animals with vertebræ, consist of those of the *cranium*, or brain-case; and those which contain the organs of sense, or, as they are commonly termed, bones of the *face*.

The *external form of the cranium* differs according to the species: a longitudinal and vertical section of it usually exhibits the cavity to be somewhat of an ovular shape, of which the end next the face is rather pointed. In the *owl*, the cavity of the cranium is an oval, with the axis nearly vertical. The same bones enter into the composition of the cranium in birds, as in mammalia: but the sutures are obliterated at so early an age in the former, that their cranium commonly appears as a single bone, and therefore, in order to examine the bones of the head separately, a very young subject must be chosen.

The *os frontis* is originally made of two portions: they form the principal parts of the roof of the orbits, and a portion of the septum, which divides one orbit from the other. They send down, on each side, a pointed process, almost to the base of the bill. The prominences which are seen upon the heads of the *casowary*, *hornbill*, *pintado*, and the *curassow*, &c. are attached to the os frontis, but were originally formed by distinct ossifications, in the same manner as the bones on the tarsus, which serve as the mould for the *spurs*. The casque of the *casowary's* head is filled with numerous cells: in the *pintado*, the texture is more like that of the other bones.

The *parietal* bones are also in two pieces at one period, although the distinction is but rarely seen. They resemble two semi-spheres, hollowed out on the inside, to receive the brain.

The *temporal* bones compose the posterior parts of the orbits, and exhibit a remarkable depression between two projecting processes, for lodging the muscles employed in the motions of the lower jaw. The zygoma is not joined to the temporal bone.

The *occipital* bone originally consists of four portions; one placed superiorly, another below, and two laterally. When these are united, the bone has an annular figure, incircling the foramen magnum. The surface by which it articulates with the first cervical vertebræ, is a single spherical protuberance, which is placed upon the anterior edge of the great foramen, and is received into a corresponding depression of the atlas. The mobility of the head is much encreased by this mode of articulation.

The *sphenoidal* bone forms the greater part of the base of the cranium, its processes are less evident in general, than in mammalia, although it furnishes a remarkable one which proceeds anteriorly like a silet, and receives upon its edge the ends of the inter-articular bones, and the palatine bones and vomer, which are each adapted to fit this process, and to slip along it, as the upper jaw is moved. The sphenoid bone wants the pterygoid processes, these belonging to the palatine bones in birds.

The *internal surface of the cranium* exhibits a sharp ridge, which divides the cavity into two principal fossæ. The one contains the hemispheres of the cerebrum, the other, which is situated in the posterior and inferior part of the cranium, accom-

accommodates the two thalami nervorum opticorum, the cerebellum, and medulla oblongata, &c. On the surface of the superior fossa there are two slight projections, produced by the back of the orbits, and a small spinous ridge along the top of the cranium, which marks the division of the hemispheres; the inferior fossa displays a number of depressions, corresponding to the several parts it contains. There are also two irregular projections on the side, formed by the internal organ of hearing, and anteriorly the eminence called the *fella turcica*, is to be seen, with a deep round cell for lodging the pituitary gland. The depressions on the internal part of the cranium are deepest in the *parrot* and *accipitri* birds.

The *foramina of the cranium* vary in many respects from what occurs in mammalia.

The foramina through which the olfactory nerves are transmitted are only two in number; they proceed from a little depression at the anterior part of the skull, and open upon the upper and posterior surface of the orbit, along the superior part of which they are continued, as a deep groove, or rather more than a semi-canal, to the upper and back part of the nose, where there is another foramen or slit, formed by the ethmoidal bone.

The *optic foramina* arise close together on the inside of the cranium, being only separated from each other by the thin partition of the orbits; this is frequently found deficient at the posterior part, and in that case the two optic foramina are thrown into one.

The *spheno-orbital* fissure does not exist in birds. The parts which are transmitted through it in mammalia, pass by distinct holes: some of these are arranged round the optic foramina, and one is found on the basis of the skull.

The *foramen rotundum* and *foramen ovale*, are supplied by a single hole. It is seen on the line dividing the optic and basilar fossæ.

The *canalis carotideus* appears to commence far back, on the outside of the cranium, and just as it turns up to open upon the *fella turcica*, there is a small foramen for the transmission of the communicating branch of the internal maxillary artery.

The *foramen lacerum anterius* does not exist, and the *posterior foramen lacerum* is small, and placed within and under the external meatus auditorius.

The *meatus auditorius internus* is a very palpable foramen in birds.

The *bones of the face* in birds, although they differ extremely in form from those of mammalia, still preserve in general a distant analogy, by which they can be distinguished and compared.

The *sphenum* of the orbits, notwithstanding its structure is so dissimilar, must be considered as analogous to the *ethmoid bone*. It is united to the *os frontis* superiorly, and to the sphenoidal bone below; it is at best but a lamina, or plate of bone, so thin that it is nearly transparent, and in numerous instances is in part membranous. At the back of the organ of smell there is occasionally a process, which projects a little from the septum, and then turns down forming a slit, through which the olfactory nerve passes. This process may be compared to the *os planum*, and the septum itself, although it is not continued far into the nose, may perhaps be thought analogous to the *nasal lamella* of the ethmoid bone.

There is a bone usually of a triangular shape, which is attached to the anterior, and outer angle of the *os frontis*. This bone Cuvier has called the *lacrymal*, and others the *superciliary*. It is in a certain degree moveable on the

os frontis. Its two posterior angles form the superciliary or anterior edge of the orbits. The superior of them is continued further backwards in the *diurnal birds of prey* than others, giving a considerable prominence to the upper edge of the orbit. In the *accipitri*, the superciliary arch is made of a number of small bones, which are continued from the lacrymal bone, and are distinct from the *os frontis*. The lower of the posterior angles of the lacrymal bone is prolonged considerably in the *duck*, but much more in the *parrot*, in which it goes so far back as to join the projection of the temporal bones, and thus completes the frame of the orbit.

The remaining bones of the face either enter into the composition of the mandibles, or are provided for the motion of these parts. The superior mandible is made up of the *ossæ nasi*, *ossæ maxillaria*, and *inter-maxillaria*, the *vomer*, the *malar*, and *palatine* bones; the extremity of the mandible appears to be formed originally by a distinct bone, which is added, as it were, to all the rest. The separate parts of the mandible are not to be distinguished in the adult bird, but in young subjects they come easily asunder.

The *palatine* bones are so thin at their connection with the posterior part of the mandible, that they readily bend. At the back part, they spread out into two wings or the *pterygoid process*, leaving a slit-shaped aperture for the posterior nares, in which is seen the vomer; where the palatine bones are joined above, there is a groove or gutter formed, which receives the inferior edge of the septum of the orbits, and on which the palatine bones have a degree of motion when the upper mandible is raised.

The *zygoma* is one of the most remarkable parts of the head of birds. It is a very long delicate bone, extended in a straight line from the inferior and back part of the upper mandible to the outside of the articular bone immediately above the articulation of the lower jaw. It is, as in mammalia, originally composed of two pieces, which in large birds are always visible. The anterior portion has been commonly described as a process of the palatine bones, but it is really produced from the part of the mandible that corresponds to the *os mala* or *jugale*, as it ought, in order to be consistent with analogy. The junction of the zygoma to the articular bone, is in a degree moveable; this, added to its general slenderness and flexibility, allows it to yield to all the motions of the superior mandible.

There are two bones belonging to the head of birds, to which there are none analogous in mammalia. One of these has been called by Dumeril the *square bone*, but improperly, as it is in no instance exactly square, and when its processes are eminent, it is rather of a triangular form. We have chosen, both from its office and situation, to call it the *articular bone*.

This bone is interposed between the articulation of the lower jaw, and the *os temporis*: with both of these it produces a true joint. The articular surface it presents to the temporal bone, is like the two condyles of the occiput of mammalia, and between these the end of the bone contributes to the formation of the cavity of the tympanum. The articular surface next the lower jaw is made of two irregular eminences, placed obliquely across, forming a double pulley. On the outside of this the temporal extremity of the zygoma is attached, and on the inside there is articulated another slender bone, which, from its situation, deserves to be named the *inter-articular bone*. There is a process from the anterior part of the articular bone, which passes up into the orbit, and receives the attachments of muscles.

The *inter-articular bone* is connected by a moveable joint to the articular. It is a small, straight, three-sided bone, slightly

slightly enlarged at the extremities. It is directed forwards and inwards, and at the anterior extremity touches the inter-articular bone of the opposite side: at this place the ends of both are placed against the posterior extremity of the palatine bones, and are hollowed so as to encompass the lower edge of the septum of the orbits, along which they have some degree of motion, when urged forwards by the articular bones.

The effect of this mechanism is, that whenever the inferior end of the articular bone is brought forwards, which is accomplished in a degree by the opening of the lower jaw, but still more by particular muscles, to be hereafter described, the inter-articular bones press against the extremity of the palatine bones, and they communicate the impulse to the whole superior mandible, which being very thin at its junction with the os frontis, suffers itself to be pushed up or elevated from the line it commonly holds, and in this manner the mouth of birds is dilated in part by the motion of the upper as well as the lower jaw.

The *parrot* is remarkable for having a great degree of motion in the upper mandible; in this bird the superior mandible is at all times separate from the frontal bone, they being only connected to each other by a very flexible ligament.

The *inferior mandible* appears to be formed originally of four pieces; two of these correspond with the bones of the inferior maxilla, and the others produce the mould on which the lower part of the bill grows. The formation of the inferior jaw, independent of its connection with the bill, differs very much from that of mammalia. There are no *condyles*, nor any process deserving the name of *coronoid*, and the angle of the jaw is the thickest and lowest part of it. The articulation is made by two depressed surfaces placed on the side of a cavity, into which the posterior pulley of the articular bone slips in the motions of the jaw.

The form of the bones of the mandibles is precisely the same of the horny bill, with which they are covered; except in some *water birds*, the bill assumes more or less of a conic figure; sometimes compressed, sometimes arched, in some cases elongated, in others short, and varying in the degree of sharpness, strength, and solidity. As the diversity, however, which occurs in the mandibles of birds, is an external appearance, and belongs rather to the science of natural history, than to comparative anatomy, it would be improper to discuss the subject in the present article.

The peculiarities of the *fossæ* and *foramina of the face* in birds, depend chiefly upon the form and proportions of the bones.

The *orbital fossæ* are so large, that they appear to occupy the greatest part of the profile of the head of birds. They extend in the skeleton from the roof of the skull to the palate, and communicate with the posterior part of the organ of smell. Cuvier very aptly compares them to the impression which one would conceive might be left by pinching the skull between two fingers, provided it were in a soft state.

The *nasal fossæ* are continuous with the orbital. They open upwards by the two external nares, or nostrils, and below by the posterior nares. The septum nasi proceeds so short a way in the nose, that the nasal fossæ make but one cavity. The external apertures of the nares are found in the bone, at the base of the convex surface of the bill.

The *temporal fossæ* are not crossed by the zygoma. They vary in depth according to the strength of the muscles employed in raising the lower jaw; they are therefore most plain in the rapacious birds, and those with long or heavy bills.

The *spheno-maxillary fissure* can have no existence in birds from the figure and extent of their orbits; neither have they the *internal orbital*, and *sub-orbital foramina*, or the *spheno-palatine canal*.

The *incisive foramina* are small and numerous in the *heron*, *flamingo*, *eagle*, &c. There is but one of a moderate size placed near the base of the bill in the *duck*, the *curassow*, the *cormorant*, and the *spoon-bill*, &c. In the *casowary*, the foramen incisivum is small, and near the end of the mandible, but in the *ostrich* it is of great size. The *stork* has a long slit, into which open an immense number of minute holes.

The *os hyoides* possesses a singular conformation in birds. The body of the bone is in general of a short round figure, somewhat enlarged at its posterior extremity, at which place it is articulated with the two *cornua*. These resemble horns exactly, both in their shape and direction; they are terminated by additional pieces, which form a sort of joint with the principal part of the horn, and generally consist entirely of cartilage. To the posterior end of the body or middle bone of the hyoides, there is articulated a small styloid or dagger-shaped bone, which proceeds directly backwards, and soon terminates in a point. There is also a bone articulated with the anterior extremity of the body of the hyoides, which penetrates the substance of the tongue, and partakes in a certain degree of the form of that organ: it is commonly terminated by a pointed cartilage, which is attached to it by a moveable joint, and is continued to near the tip of the tongue. This bone we should choose to call the *lingual*.

The *os hyoides* and *lingual bone* are singularly formed in those birds which have the power of protruding their tongue to take their food. In the *woodpeckers*, for instance, the cartilaginous extremities of the horns of the hyoides are immensely long, and when the tongue is not projected, are lodged in a groove or furrow, which runs over the whole head, and terminates only at the root of the bill. The *lingual bone* in these birds also is not cartilaginous at its extremity, but is covered with a hard or horny substance, which protrudes beyond the soft parts of the tongue for the distance of about the quarter of an inch, ending in a point, and furnished with a number of sharp barbs, or spiculae, which are moveable in the posterior direction only; so that, like the teeth of some fish, they suffer the insects on which the bird preys to be easily perforated by the end of this instrument, but render it impossible for them afterwards to retreat.

The vertebræ of the different regions of the spine of birds do not bear the same proportion to each other with respect to number that is usual in other animals. The cervical portion in this class is generally composed of a much greater number of vertebræ than any other division of the spine. The length of the neck is in most birds determined by the height of the legs. Those *water birds*, however, which procure their subsistence by fishing, are provided with long necks, and at the same time short limbs, as in the *cormorant*, *divers*, &c. The dorsal vertebræ are usually less numerous than in quadrupeds. The vertebræ of the loins become ankylosed with the bones of the pelvis, and with each other at an early period, and consequently it is difficult to reckon them. The caudal vertebræ are most numerous in those birds which make the greatest use of the tail, such as the *swallow*, *woodpecker*, *ostrich*, &c.

The following table, which is extracted from Cuvier's Lectures on Comparative Anatomy, exhibits the variety which exists with respect to the number of the vertebræ in many species.

B I R D.

TABLE of the Number of the Vertebra in Birds.

SPECIES.	Ver. of the neck.	Ver. of the back.	Ver. of the sacrum.	Ver. of the coccygis.
Vulture	13	7	11	7
Eagle	13	8	11	8
Bald-Buzzard	14	8	11	7
Sparrow-Hawk	11	8	11	8
Common-Buzzard	11	7	10	8
Kite	12	8	11	8
Great-Horned-Owl	13	7	12	8
Common-Owl	11	8	11	8
Fly-Catcher	10	8	10	8
Black-bird	11	8	10	7
Tanager	10	8	9	8
Crow	13	8	13	7
Magpie	13	8	13	8
Jay	12	7	11	8
Starling	10	8	10	9
Gros-beak	10	7	12	7
Bullfinch	10	6	11	6
Sparrow	9	9	10	
Gold-finch	11	8	11	8
Titmouse	11	8	11	7
Lark	11	9	10	7
Red-breast	10	8	10	8
Swallow	11	8	11	9
Goat-sucker	11	8	11	8
Humming-bird	12	9	9	8
Hoopoe	12	7	10	7
King's-fisher	12	7	8	7
Wood-pecker	12	8	10	9
Toucan	12	8	12	more than 7
Parrot	11	9	11	8
Pigeon	13	7	13	7
Peacock	14	7	12	8
Pheasant	13	7	15	5
Turkey	15	7	10	5
Curassow Bird	15	8	10	7
Ostrich	18	8	20	9
Cassowary	15	11	19	7
Flamingo	13	7	12	7
Heron	18	7	10	7
Stork	19	7	11	8
Crane	19	9	12	7
Spoonbill	17	7	14	8
Avofet	14	9	10	8
Plover	15	8	10	7
Lapwing	14	8	10	7
Woodcock	18	8	13	8
Curlew	13	8	10	8
Oyster-catcher	12	9	15	
Rail	13	8	13	8
Coot	15	9	7	8
Jacana	14	3	12?	7
Pelican	16	7	14	7
Cormorant	16	9	14	8
Sea-swallow	14	8	10	8
Gull	12	8	11	8
Petrel	14	8	??	8
Swan	23	11	14	8

SPECIES.	Ver. of the neck.	Ver. of the back.	Ver. of the sacrum.	Ver. of the coccygis.
Goose	15	10	14	7
Barnacle	18	10	14	9
Duck	14	8	15	8
Sheldrake	16	11	11	9
Scoter, or Black Diver	1	9	14	7
Merganser	15	8	13	7
Grebe	14	10	13	7

The *cervical vertebrae* are joined to each other by a mode of articulation which admits of very free motion in two directions;—laterally, and backwards or forwards. This depends upon the form of the articular surfaces of the bodies of the vertebrae, which consist of two portions of a cylinder applied crossways with respect to each other, and both a little hollowed for their mutual accommodation. The cylinder on the inferior part of the vertebrae, performs by its revolution the motion to either side; and when that of the superior part revolves, the neck is bent either backwards or forwards. The cylinders at the top of the neck admit of motion forwards; but those of the middle and inferior part of the cervical spine are incapable of performing a free motion forwards; as one contains a slight depression on its anterior part, which receives the edge of the other. The neck of birds, therefore, possesses in the contracted state, or when at rest, somewhat of the figure of an S, which is accompanied with several advantages to these animals. They are enabled by it to throw the weight of the neck and the head more over their centre of gravity, without which some species would be unable to preserve their equilibrium; and by combining the S like motion with that to each side, birds acquire a greater degree of flexibility in the neck than is possessed by other animals; they can touch every point of their own body with the bill, and thus supply the want of the prehensile faculty of the superior extremity or the tail, of which they are deprived by their peculiar mode of progression.

The surfaces of the articular processes lie nearly in the direction of the bodies of the vertebrae, but in some parts have a degree of obliquity conformable to the S like shape of the neck.

The spinous processes are only to be observed on the superior and inferior portions of the cervical spine, where they exit both on the anterior and posterior parts of the vertebrae. In birds with long necks there is a fossa on each side of the posterior spinous processes, for the attachment of the cervical ligament, or *ligamentum nuchæ*. This substance is to be observed perhaps in all birds, but is very remarkable in the *stork*, *swan*, *cassowary* and *ostrich*. In the last bird it is nearly as strong as it exists in the larger quadrupeds: the same kind of ligament is also interpolated between the spinous processes of the dorsal vertebrae.

The transverse processes of the vertebrae of the middle of the neck spread forwards, and send down a styloid process of some length. These give attachment to muscles, and form in some birds a sort of canal on the anterior part of the neck, which contains the two carotid arteries. The anterior styloid processes are little observable in the *raptacious* and *passerine* tribes, the *parrot*, &c.; but are usually very marked in the long-necked birds.

The *dorsal vertebrae* of birds have scarcely any motion, in order

order that the trunk of the body may not be affected by the motions of the wings in flight.

Their spinous processes are commonly ankylosed with each other, which sometimes occurs also with respect to the transverse processes. In the *ostrich* and *casowary*, the processes of the dorsal vertebrae are distinct, and possess a degree of motion from which, however, these birds cannot suffer any inconvenience, as they do not fly.

The *caudal vertebrae* have spinous processes on both the anterior and posterior surfaces; and the transverse processes are usually very prominent. The last bone of the tail, is, in most birds, of a plough-share shape for the attachment of the quills. It is small and conic in the *new holland ostrich*, and *casowary*; and in the *peacock*, it is thin, oval, and situated horizontally. It is wanting in a variety of the domestic cock found in America.

The *sternum* forms one of the most characteristic bones in the skeleton of birds. It is a very broad thin bone, covers the anterior part of the common cavity, like a buckler, and produces from its middle line, in every bird which is capable of flying, a thin plate of bone, which resembles very much the keel of a ship; but it is most prominent at its anterior part. The upper edge of the sternum presents two narrow depressions, which receive the ends of the two clavicles; and to the most anterior point of the keel the fork-shaped bone is commonly attached. The posterior edge is thin, and in most species, contains a space on each side, which is filled with membranes. In the *accipitres*, *parrot*, and most *aquatic* birds, this is an oval hole; but in the *gallinae* it is an oblong vacancy. The keel appears to be added to the sternum, merely for the attachment of the great pectoral muscle. Accordingly, we find its projection is proportioned to the necessity there is for using this muscle during flight; and in the *ostrich* and *casowary*, which do not employ their wings as organs of locomotion, the keel is absent, and the sternum is round and smooth on the external surface, and is very small in proportion to the magnitude of these birds.

The *ribs* of birds have been divided, like those of mammalia, into true and false, or as Vic d'azir has termed them the *sterno-vertebral* and *vertebral*. The true ribs are made of two pieces, which are each composed of bone: the posterior portion is affixed to the spine by means of two branches, of which one is articulated with the body, and the other with the transverse process of the same dorsal vertebra. The anterior piece is articulated by one end, with the lateral edge of the sternum; and by the other, to the end of the vertebral portion. The internal extremities of the ribs, being distinct bones, deserve to be called *sternal ribs*, which term we have employed in other parts of this article. Most of the true ribs are furnished about their middle, with a thin osseous process, which proceeds obliquely backwards from the posterior edge of one rib, and overlaps the one next behind it, and sometimes even goes on to cover two ribs, as in the *colymbus cristatus*. The sternal and vertebral portions of the true ribs form, at their junction, an angle which points backwards, and is very acute in the first ribs, which proves that the thorax of birds is chiefly dilated by the anterior part of the sternum, being carried forwards from the dorsal spine; at which time, the moveable angles of all the ribs become very obtuse. These angles are scarcely observable in the *struthious* birds. Their ribs assume very much the figure of those of mammalia.

The number of the sterno-vertebral ribs is liable to vary. There are, on each side, four in the *cuckoo* and the *casowary*; five in the *crow*, *african ostrich*, and *stork*; six in the *bittern*;

seven in the *eagle*, the *buzzard*, the *owl*, the *crane*, and the *duck*; eight in the *crested grebe*, and several other water-fowl; and nine in the *swan*.

The *vertebral*, or *false ribs*, are in most birds placed at the anterior part of the thorax, which is the reverse of what is observed in mammalia. When there are any of these ribs situated posteriorly, they are only one or two pair, and imperfectly formed; there are two pair in the *struthious* birds, which do not project far from the spine.

The *bones of the pelvis* become consolidated together at a very early period. Their original parts are therefore very difficult to distinguish. The portion corresponding to the *os ilium* bears some resemblance to that bone in mammalia; but the ischium and pubis cannot be recognised by their figure, and are only to be known by their relation to the different foramina. There is a very long, slender bone, originally connected to the ilium, on the fore-part of the acetabulum, which supplies the place of the *pubis*. This bone runs parallel to the anterior part of the ischium, with which it is occasionally joined towards its extremity, but never unites with the bone of the opposite side, except in the *ostrich*, in which bird the bones of the pubis are broad at their symphysis, and stand a little forwards, producing something of the appearance of the pelvis of mammalia. The pubis unites with the ischium in the *accipitres* for a considerable way, and leaves a distinct hole analogous to the *foramen ovale*; and the space between these bones possesses in all birds, at the anterior part, the traces of this foramen.

The *ischium* is commonly united to the sacrum and back of the ilium, by the part which corresponds to the ischiadic spine; consequently the ischiadic foramen is complete in the skeleton of birds. In the *ostrich* and *casowary*, however, the ischium is separate from the sacrum, and is a long, slender styloid bone, like the pubis. There is no tuberosity to the ischium, that part being thin and extended, except in the *ostrich*, where it becomes somewhat enlarged. The ischium appears to be joined to the pubis in the *new holland ostrich*, by the intervention of another short bone.

The *bones of the shoulder* are very peculiar in birds; besides the clavicles and scapulae, there is an additional single bone, called the *fork*; it usually possesses the figure of a V; the point is attached to the most anterior part of the keel of the sternum, and the ends of the branches are secured by a ligament on the inside of the dorsal extremities of the clavicles, and also to the posterior process of the scapulae, which is analogous to the acromion. The fork frequently approaches more to the figure of an U than a V. Its angle is also often at some distance from the sternum, to which it is bound by a ligament. In the *gallinae* it terminates in a thin plate, from which a ligament is extended to the keel of the sternum. As a general observation, it may be stated, that the fork is strong and elastic, and its branches wide, arched, and carried forwards upon the body, in proportion as the bird possesses strength and rapidity of flight; and accordingly, the *struthious* birds, which are incapable of this mode of progression, have the fork very imperfectly formed. The two branches are very short, and never unite in the *african ostrich*, but are ankylosed with the scapulae and clavicle. The *casowary* has merely two little processes from the side of the clavicle which are the rudiments of the branches of the fork. In the *new holland ostrich*, there are two very small thin bones, which are attached to the anterior edge of the dorsal end of the clavicles, by ligament; they are directed upwards towards the neck, where they are fastened to each

other by means of a ligament, and have no connection whatever with the sternum.

The *clavicle* is a straight bone in birds; it does not lie in a transverse direction with respect to the trunk of the body, but proceeds upwards and forwards towards the lower part of the cervical spine; and in proportion to the length and projection of the clavicle, the bird possesses strength of wing and activity of flight. The clavicle at its articulation with the sternum is thin and broad; but the rest of the bone is of a round shape; it produces a process from the posterior part of its dorsal extremity, which is united to the head of the scapula, and in conjunction with it forms a depression analogous to the glenoid cavity, although not of the same figure. The inside of the extreme part of the dorsal end of the bone, is joined by ligament with the branch of the fork, as already mentioned.

The clavicles of the *struthio* are remarkably short, and are ankylosed with the scapulae at least.

The *scapulae* are two long, plain bones, with sharp edges, resembling, in a great degree, the blade of a knife; they lie parallel to the dorsal spine, and have no processes, except the one which contributes with the clavicle to form the cavity for lodging the head of the humerus; and a little eminence opposite to this, which seems analogous to the *acromion*, and is joined to the end of the branch of the fork. The scapulae, like all the other bones of the shoulder, are very short in the *struthio*, not passing beyond the first two or three ribs; although in many other birds these bones reach as far as the pelvis.

The *humerus* is a round, smooth bone, more or less enlarged, and flattened at the extremities; the surface by which it articulates with the fossa in the scapula and clavicle, is at the very end of the bone, and is formed of a portion of a cylinder, instead of a sphere, which is most suitable to the motions of the humerus in birds, they being almost confined to the elevation and depression of the wing. The external tuberosity of the humerus is very small; but the spine which leads from it is greatly elevated in most species of birds. The internal tuberosity is, on the other hand, remarkably large, and furnishes a process at its upper part, which corresponds, in some respects, with the coracoid process of the scapula in mammalia. The humerus is long, in proportion to the other bones of the wing in the *African ostrich*, and takes the curvature of the bird's body. It is extremely short and small, and without processes, in the *Neco Holland ostrich*, and *casuvaria*.

The humerus is connected with the bones of the fore arm by an articular surface, similar to that of the human subject.

The *radius* is usually a much more slender bone than the ulna, with which it is never observed to be ankylosed.

The *ulna* exhibits no remarkable processes; it forms a pulley on its lower end. These two bones are flat in the *manchot* (*apterositta*), and are joined by an articulation which permits motion in several directions, with two tubercles, one above, and the other below the anterior edge of the humerus. The wing of this bird, both in its structure and offices, resembles a fin. The ulna and radius are nearly of an equal size in the *struthio*; they are both very small, and have but little motion on the humerus.

There are but two *carpal* bones in birds; one is applied to the end of the radius, and prevents the motion of the lower part of the wing beyond the line of the radius; the other moves a little upon the end of the ulna, to which its form is adapted. It has often a little process from its lower edge, which is analogous to the *os pisiforme*. The carpal bones are obliterated in the *struthious* bird.

The *metacarpus* consists of two bones, which are united at their superior part by ankylosis for some way. At this

place there are some eminences which appear like the remains of the second row of carpal bones folded together. The articulation of the metacarpus with the carpus is the segment of more than the half of a pulley, which is grooved in the middle, and revolves within a corresponding surface of the lower carpal bone. This motion, for the convenience of description, is called flexion and extension; but it is in strictness a lateral movement back upon the ulna, and accompanied with a degree of rotation, by which the concave figure of the wing is lost in the very action of folding it. There is a styloid process on the upper part of the radial side of the metacarpus, which gives attachment to a small pointed bone, supplying the place of the *third*. A similar bone is affixed to the extreme end of the small branch of the metacarpus, and corresponds to the *little finger*. The *principal*, or *fore finger*, which furnishes the wing, is articulated with the large or radial branch of the metacarpus. It consists of two phalanges, and the first exhibits marks of having been originally two bones. The two pieces of the metacarpus are to be seen in the *African ostrich*, as also the three fingers; each of which is furnished with a hook, which is covered with a horn, like a claw; but in the *Neco Holland ostrich* the metacarpus is a single bone, and there is but one finger, which is also terminated with a claw. All the bones of the hand are compressed into thin plates in the *manchot*.

The *thigh-bone* of birds has nothing very peculiar in its form; it wants the small trochanter; it is singularly short, in proportion to the other parts of the limb, in such birds as have long legs; it is longest in the *accipitres*, and shortest in some water-birds. The femur is strong in all the *gallinae*; and in the *struthio* it is of an immense thickness; it is bent in the *cormorant* and the *little grebe*.

There is a certain portion of the ligament of the extensor muscles of the leg converted very early into bone; and this seems in general to supply the place of the *patella*; it is usually preserved in skeletons.

The *tibia* resembles in its form the same bone in mammalia. There are several prominent edges on the fore part of its head for the attachment of muscles. The lower end of the tibia forms a pulley with a groove along the middle. The head of the tibia is prolonged in a remarkable manner upon the thigh, in the *grebes* and the *diver*.

The *fibula* is a very small bone, and is soon ankylosed to the side of the tibia.

The *tarsus* and *metatarsus* consist, in the adult bird, but of one bone; it exhibits, however, grooves corresponding to the divisions which existed between its several pieces when it was first formed. These are strongly marked in the long-legged birds, and shew that the metatarsus contained originally as many bones as there are principal toes. There is usually also a prominence on the posterior part of the head of the bone which represents the *os calcis*. The inferior extremity of the metatarsal bone produces a process shaped like a pulley for the articulation with each of the principal toes.

There are three bones in the composition of the tarsus and metatarsus of the *manchot* separate from each other in the middle; and therefore these birds are plantigrade, or walk upon the metatarsus as well as the toes.

The extraordinary length of limb which belongs to some kinds, as the *struthions* and *swallowing birds*, depends upon the extent of the tibia and metatarsal bone.

The *fork*, and some others of the *grolle*, which sleep standing on one foot, possess a curious mechanism for preserving the leg in a state of extension, without any, or at least with little muscular effort. There arises from the fore part of the head of the metatarsal bone a round eminence, which passes up between the projections of the pulley on the

anterior part of the end of the tibia. This eminence affords a sufficient degree of resistance to the flexion of the leg to counteract the effect of the oscillations of the body, and would prove an insurmountable obstruction to the motion of the joint, if there were not a socket within the upper part of the pulley of the tibia, to receive it when the leg is in the bent position. The lower edge of the socket is prominent and sharp, and presents a sort of barrier to the admission of the eminence, that requires a voluntary muscular exertion of the bird to overcome, which being accomplished, it slips in with some force like the end of a dislocated bone. Dumeril and Cuvier have described a similar apparatus to this in the knee of the *stork*; but they must have confounded, in an unaccountable manner, the one joint with the other; for the articulation of the femur with the bones of the leg in the common *stork* (*ardea alba*), certainly exhibits nothing peculiar in its structure. See Plate VIII. in the *Anatomy of Birds*. Fig. 1. represents the anterior part of the articulation of the tibia with the metatarsus in the *stork*; *a* the tibia, *b* the metatarsal bone, *cc* the prominent edges of the pulley on the end of the tibia, *d* the round eminence of the head of the metatarsus, *e* the socket in the tibia, which receives the eminence during the flexion of the joint.

The bones of the toes vary in number, increasing from the inner to the external toes. Birds with four toes have the number of the phalanges in the following order, 2, 3, 4, 5; those with three toes have them, 3, 4, 5, except the *casowary* and the *New Holland ostrich*, which have four joints to each toe. The *African ostrich* has only two toes, and four phalanges to both. Most birds have the three principal toes situated before, and the pollex attached to the inner and back part of the metatarsal bone near its extremity. The *lustard*, *casowary*, *New Holland ostrich*, the *plover*, the *oyster catcher*, and the *long legged plover*, have but three toes; and the *albatross*, *petrel*, and *penguin*, want the pollex. All the *scansores* have their toes opposed to each other, two behind and two before.

It would have rendered the description of the bones tedious and confused, to have given frequent references to the plates which represent them; the reader, therefore, will have occasion to contemplate the relation the different figures bear to each other; and to facilitate such comparison, similar letters are employed to indicate similar parts in each of the skeletons chosen to illustrate the subject.

When birds transport themselves from one place to another, it is most commonly by the act of flying; which consists in the successive elevation and depression of the wings; the latter motion being performed with so much force and velocity, as to compress a volume of air, the re-action of which is sufficient to impel forwards the whole body of the bird. The various kinds of flight depend upon the different ways of employing the wings, and the habits and œconomy of the individual, which it is the business of the naturalist to point out. Many birds are capable of using other modes of locomotion besides flying, for which their structure is equally well adapted; for instance, some tribes almost constantly inhabit the water, and swim with the greatest ease; others walk or run with the greatest rapidity; and others transport themselves chiefly by the effort of climbing. We have, therefore, selected a skeleton to exhibit the organs employed in each of these species of locomotion. See Plate VIII. in the *Anatomy of Birds*. Fig. 2. represents a skeleton of the *New Holland ostrich*, which was brought into this country by an ingenious young surgeon, Mr. Langstaff. It seems to partake of the structure of both the *casowary* and *African ostrich*, but it bears the greatest likeness to the latter; and therefore we have called the bird an ostrich, although it

has hitherto been considered by some naturalists as a *casowary*. This skeleton affords the best example of a *running* bird, which is at the same time incapable of flight. The sternum and bones of the wing are small; the centre of gravity is thrown fairly between the legs; and the inferior extremities are long, and of an immense disproportionate strength. Fig. 3. of the same plate exhibits the skeleton of the *lark*, which, as being a bird of high flight, forms a striking contrast with fig. 2.

Plate IX. of the *Anatomy of Birds*, contains the skeletons of a *climbing* and a *swimming* bird. Fig. 1. is the skeleton of the *parrot*. The body is round and contracted; the neck short, strong, and flexible in different directions; the sternum and bones of the shoulder rather small; but its chief characters are the long thigh, and very short metatarsus, furnished with the climbing toes; by which means the bird can grasp any foreign substance, and apply the feet to any part of its own body, after the manner of the prehensile members of other animals.

Fig. 2. of Plate IX. shews the skeleton of the *crested grebe* (*colymbus cristatus*). The neck is much bent; the parts of the upper extremity rather small; the ribs strong, and reaching far back; the sternum long; and the body possesses very much the form of a boat; the inferior extremity situated far behind, and the thigh bone very short, and the toes long and expanded; all which circumstances are necessary to the performance of the actions of swimming and diving with facility.

The separate parts of the skeletons, in Plates VIII. and IX. in the *Anatomy of Birds*, are indicated as follows.

Parts composing the head; *a* the occiput, *b* parietal bone, *c* os frontis, *d* temporal bone, *e* os lacrymale, or superciliary bone, *f* nasal bone, *g* superior maxilla, *h* malar bone, *i* bone of the upper mandible, *k* palatine bone, *l* septum of the orbits, *m* articular bone, *n* inter-articular bone, *o* zygoma, *p* inferior maxilla, *q* bone of the lower mandible, *r* external nares, *s* deficiency in the septum of the orbits where the optic foramina open, *t* temporal fossa, *u* spongy bone in the organ of smell.

Parts of the spine and trunk: *a* cervical vertebræ, *b* their transverse processes, *c* the styles which descend on the fore-part, *d* articular processes, *e* posterior spinous processes, *f* spines on the anterior part of the bodies of some of the vertebræ, *g* dorsal vertebræ, *h* sacral vertebræ, *i* vertebræ of the tail, *k* the last, or caudal bone, *l* os ilium, *m* ischium, *n* pubis, *o* foramen ovale, *p* ischiadic foramen, *q* vertebral or false ribs, *r* the true ribs, *s* the sternal portions, *t* intercostal processes, *u* the part of the sternum next the body, *v* the keel, or projecting part, *x* deficiency at the lower part of the sternal bone.

Parts belonging to the wing; *a* the fork, *b* the clavicle, *c* the scapula, *d* the humerus, *e* its inner tuberosity, *f* the external tuberosity, *g* the spine for the attachment of the deltoid and pectoral muscles, *h* the ulna, *i* the radius, *k* the carpal bone on the radial side, *l* the ulna carpal bone, *m* the head of the metacarpus, *n* the large branch, *o* the smaller one, *p* the style of the metacarpus, *q* the pollex or thumb, *r* the little finger, *s* the principal or fore finger.

The parts of which the lower extremity consists; *a* the femur, *b* its single trochanter, *c* the tibia, *d* the elongation of the head of the tibia which occurs in the *grebe*, &c. *e* the fibula, *f* the metatarsus, *g* the prominence at the heel, *h* the pollex, or back toe, *i* the principal or anterior toes.

Muscles.

When the writing of the present article was begun, it was intended to give a full description of the muscles of birds; but as the subject has already extended beyond the length

length that was expected, and if this were done, would exceed the bounds usually allotted to a single article, we shall only point out the most striking peculiarities in the muscular system, and correct some errors into which other writers have fallen in their accounts of this part of the anatomy of birds.

The muscles which move the lower jaw, do not differ essentially from those of mammalia. There is no marked distinction between the *masseter* and *temporal muscles*; they form one mass which arises from the temporal fossa and inferior part of the orbit, passes under the zygoma, and covers the side of the lower jaw from the joint to the commencement of the bill.

There is a tendon which lies over the muscles on the side of the jaws, usually of a triangular figure; it is attached to the inferior bony portions of the orbit, connects them to each other, and thus completes the margin of the orbit. It is affixed to the protuberance on the outside of the lower jaw near the joint, and seems to prevent the mouth opening beyond a certain distance.

Birds have none of the *muscles of the face*, as they have no soft parts for them to move.

The lower jaw is depressed by a muscle which arises by two portions, one from the hollow behind the side of the occiput, the other from the surface behind and below the external meatus auditorius; both are inserted upon the back of the lower jaw. This muscle, although so unlike the *digestivus*, supplies its place, and fulfils its office.

There are three muscles for moving the upper jaw, which are quite peculiar to birds. The *first* is of a radiated or fan shape; it arises from the septum of the orbit, and passing obliquely backwards, is inserted by tendon into the external surface of the end of the inter-articular bone, just when it becomes joined to the articular. By pulling the posterior end of the inter-articular bone upwards, the opposite end is pushed forwards, which produces the elevation of the upper jaw in the manner already described.

The *second* is a short thick muscle, arising from below the posterior part of the orbit, and before the external meatus auditorius, and inserted into the inner surface of the body of the articular bone and its anterior process, where it joins the inter-articular bone; it elevates the posterior end of the inter-articular bone, and thus raises the upper jaw.

The *third* muscle is for depressing the superior jaw; it is of a long taper shape, has one attachment to the inside of the lower jaw, and then becomes affixed to the inside of the inter-articular bone, the internal part of the pterygoid process, and sends a small tendon to the integument of the palate, just where the horny covering of the mandible commences. It is difficult to distinguish it from the pterygoid muscle, which appears to aid it in the depression of the superior mandible.

The tongue enjoys much less variety of motion in birds than in mammalia; it is only capable of being protruded, retracted, turned to each side either directly or obliquely, slightly rotated, and depressed at the point. There are a great many muscles however employed in the performance of these motions; some of these act upon the os hyoides, and others upon the lingual bone.

The *first* is analogous to the *stylo-hyoideus*; arises from the upper and back part of the lower jaw, divides into two slips; one goes to the styloid bone of the os hyoides, where it meets its fellow: the other slip passes to the inner part of the middle bone or body of the hyoides; it retracts the tongue.

The *second* corresponds to the *mylo-hyoideus*; it is a broad thin muscle, proceeds from the inside of the lower jaw, ex-

cept its posterior edge, which comes from the outer part of the jaw; it is inserted upon the concave side of the cartilaginous extremity of the horn of the os hyoides, around which it forms a muscular sheath; its use is to protrude the tongue.

The third muscle appears to answer to the *genio-hyoideus*; it comes from the superior edge of the lower jaw internally, and becomes attached to its fellow on the other side upon the styloid bone of the hyoides; protrudes the tongue a little from the obliquity of its direction, and seems to commence the actions of deglutition by elevating the parts in the bottom of the mouth. We did not observe this muscle in the *cock*.

The fourth muscle of the tongue is extended from the horn of the os hyoides at its root, to the styloid bone, where it joins the muscle of the opposite side. They approximate the horns of the hyoides, during the protrusion of the tongue.

The fifth is a very small muscle, lying along the internal surface of the horn of the os hyoides; it sends a delicate tendon to the under surface of the lingual bone, depresses the point of the tongue, and if it acts singly, turns the tongue.

The sixth is a little short muscle, which arises from the end of the middle bone of the hyoides, and is affixed to the under part of the lingual bone; depresses the tip of the tongue, and raises the base. This is a single muscle.

The seventh muscle lies along with its fellow upon the anterior surface of the superior larynx; it is attached to the root of the lingual bone. Its uses are to depress the base of the tongue, and thus elevate the point, and to retract the tongue while in the mouth.

The eighth is short; arises from the junction of all the bones of the os hyoides on the lower surface, and is inserted into the upper and outer corner of the base of the lingual bone. It brings the tongue into a straight line, after the other muscles have depressed the tip.

The ninth muscle is the last; it is very minute, and passes from the base of the lingual bone to the very tip of the cartilage; depresses the point of the tongue without elevating its root.

The muscles which protrude and retract the tongue, are remarkably large in the *woodpeckers* and *wrynecks*.

The *muscles which move the head and neck* are even more complicated in birds than in other animals. Most of them have their attachments so numerous and intermixed, that no description can convey an adequate idea of them.

The *longus colli* begins in the thorax on the anterior spines of the dorsal vertebrae; its fasciculi go from the anterior part or the cervical vertebrae to the ilyles and transverse processes; and their tendons are longest at the superior and inferior part of the neck.

The *rectus capitis major anticus* is continued from the head as low as the fifth vertebra of the cervical spine.

On the posterior part of the spine there is a small muscle which seems to represent the superior part of the *trapezius*; it is extended from the transverse processes of the four first cervical vertebrae to the back of the occiput; it brings the head backwards and to one side.

There are a great number of fasciculi interposed between the transverse and articular processes at the back of the neck. These tendons pass over several vertebrae before they are inserted on the middle of the neck, which is the part most bent backwards.

A muscle which has been considered analogous to the *cervicalis descendens*, is the chief extensor of the neck of birds. It arises from the spine of the back, opposite to the se-

cond rib by tendon, which, on coming upon the neck, receives seven slips of muscle, which descend from the spines of the seven inferior cervical vertebræ. The muscle then proceeds on the neck as a distinct slip, and at the upper part produces three tendons, which go to the back of the articular processes of the second, third, and fourth cervical vertebræ. These tendons receive muscular slips from the back of the spine as low as the seventh vertebra, or where the other slip began to descend. The ascending fasciculi furnish the tendons to the fifth and sixth vertebræ, and to the atlas. This muscle is enabled, on account of its descending and ascending fasciculi, to extend the neck even while the head is erected. Cuvier describes the muscle somewhat differently in the *heron* and *buzzard*. The above account is from the *goose*.

There is a curious shaped muscle along the inside of the preceding, which Cuvier compares to the *bivont r cervicis*. It commences by a slender tendon from the spinous process of the first dorsal vertebra, becomes fleshy at the lower part, tendinous along the middle, and again fleshy near the head, and is inserted into the occiput. Although it extends the whole length of the neck, it is so slender that its tendon is not thicker than a-piece of twine or thread. It affords in the extension of the neck and elevation of the head.

The *trachelo-mastoideus* arises in birds from the anterior part of the second, third, and fourth cervical vertebræ, and is inserted upon the side of the occiput.

The *complexus* proceeds from but a few of the articular processes of the neck; and the *splenius* does not exist in birds.

Cuvier describes three *recti capitis posteriori*; but these muscles do not deserve to be so called.

The first, which he names the *rectus maximus*, arises from the spine of the dentata, and is inserted into the side and back of the occiput. It brings the head backwards, and to one side, and resembles in figure and office the *splenius capitis*.

The second, or *rectus major posterior*, proceeds obliquely from the spine of the dentata, under the preceding, to the depression on the back of the occiput.

The third, or *rectus minor*, is only a few fibres mixed with the ligament which connects the head with the spine.

The *muscles of the back* consist of a few fleshy fibres intermixed with portion of tendon, which are mostly ossified in full grown birds; they lie on each side of the dorsal spine, which they strengthen but cannot move.

The *muscles of the tail* are distinct, and generally large; some are calculated to raise the tail, some to depress it, others to move it laterally, and others again to unfold the quills of this part.

The first is the *levator coccygis* of Vic d'Azir; it arises from the back of the sacrum and the transverse and spinous processes of the first caudal vertebra, and sends distinct tendons to each of the spinous processes of the tail and the caudal bone. There is a fleshy slip also accompanying the last tendon. This muscle, as its name implies, elevates the tail.

The second, or *depressor coccygis* of Vic d'Azir, is situated within the pelvis, and arises from the end of the sacrum and the ischium, where they join; also from the transverse processes of the bones of the tail. It is inserted by tendons into the spinous processes of the under surface of the caudal vertebræ, and distributes a number of muscular fibres in different directions on the basis of the lateral quills. This muscle depresses the tail, and appears also, from its attachment to the ligament of the quills, to be capable of converging them.

The third arises from the posterior edge of the anterior part of the pubis, and the tendon covering the lower part of the belly, and is inserted on the base of the ligament which sustains the lateral quills. When this muscle acts singly, it brings the tail downwards and to one side; if, with its fellow, it depresses the tail directly; but at all times it tends to spread the quills of the tail.

The fourth is the *motor lateralis coccygis* of Vic d'Azir, who describes its origin different from what we have observed it to be. It arises from the last transverse process of the sacrum and the first of the coccyx, and it turns round to be inserted in common with the preceding muscle upon the root of the ligamentous substance which connects the lateral quills. It moves, when acting alone, the tail to one side; but combined with its fellow and other muscles, unfolds the quills of the tail in the manner of the sticks of a fan.

The fifth muscle is in part covered by the third; it is attached to the whole of the posterior margin of the pelvis, except the extreme portion of the pelvis, and in the *goose* spreads even upon the parietes of the belly round the anus; it then proceeds to be inserted, along with the depressor coccygis, on the under part of the caudal or last bone of the tail. Its office is, with its fellow and the depressor, to lower the tail.

The sixth is the *cruro-coccygeus* of Vic d'Azir; it arises by thin tendon from the inner and back part of the thigh bone, where it is conjoined with one of the muscles of the thigh. It is inserted, along with the other muscles of the tail, into the under part of the caudal bone. This muscle draws the tail to one side; but when its action is combined with its fellow, it is the most powerful flexor or depressor of the tail.

The *muscles of the trunk* deviate more from the structure of mammalia than the muscles of birds do in general, and have been but very imperfectly described by Cuvier and others.

The *scaleni* are merely two slips of muscle, which descend from the next transverse process upon the first and second ribs.

The *triangularis sterni* takes its origin from the superior corner of the sternum and the four superior ribs, where they join this bone, and is inserted into the moveable angles of the four superior ribs after the first. It compresses the superior part of the thorax, and thus brings forwards the lower end of the sternum; it is, therefore, a muscle of expiration.

The abdominal muscles consist of three layers.

The first represents the *obliquus externus*, although its fibres are arranged transversely. It arises from the edge of the ilium and pubis by a very thin tendon, and from the lower edges of the ribs, by distinct tendinous processes, and is inserted into the side and lower edge of the sternum, and the middle line of the belly, to unite with the muscle of the opposite side. From this muscle passing over the moveable angles of the ribs, its action influences the whole cavity of the body; for at the same time that it compresses the abdomen, it raises the anterior part of the sternum, by drawing the posterior part backwards, and thus dilates the thorax, and becomes a muscle of inspiration, explaining by this means the effect we have already represented in inspiration to produce upon the abdominal air-cells.

The second is the *obliquus ascendens*; it is made of two portions, the one a little overlapping the other; the anterior is analogous to the *rectus abdominis*, and arises from the pubis and middle line of the belly; the other portion arises from the edge of the ilium and lowest rib. The fibres of each portion ascend in their proper directions to be inserted on the lower edge of the sternum, and the tendon filling the

the space between the ribs and the sternum. This muscle, like the preceding, diminishes the abdomen, and dilates the anterior part of the thorax.

The third layer answers to the *transversalis abdominis*. It proceeds from the osseous margin of the abdomen to the middle line, where it meets its fellow. They consist of separate fasciculi at the superior part; and the fibres are collected round a point in the centre, where the yolk passed into the belly of the chick.

There is a very thin slip of muscle, which crosses the lowest part of the belly; it is situated superficially, and lies over several of the muscles of the tail. In the *goose* it arises from the ischium, where that bone joins the pubis; and in the *fowl* it is only attached by cellular membrane to the surface of the muscles of the thigh. It is inserted, in both cases, on the side of the anus, which it seems designed to dilate.

We have observed in the *fowl* two very slender fasciculi of muscle to descend from the side of the rectum, one to the ligament supporting the quills of the tail, the other to the inside of the pelvis. They are both probably intended to produce the eversion of the intestine during coition.

The muscles belonging to the wing do not differ in their arrangement and structure from those of the anterior extremity of mammalia so much as might be supposed, considering how little these members resemble each other in their functions.

The *latissimus dorsi* arises only from the spines of the dorsal vertebrae; it resembles, however, the muscle of the same name in mammalia.

A muscle, analogous to the inferior portion of the *trapezius*, is observed at the shoulder. It comes from the spinous processes of the three last cervical and all the dorsal vertebrae, and is inserted into the inner and back part of the fork and posterior edge of the scapula. We have not perceived the distinction of this muscle into two parts on the shoulder, as stated by Cuvier.

The *ferratus major anticus* is only inserted into the point of the scapula. This muscle has been called by Vic d'Azir the *subscapularis*.

The *costo-scapularis* of Vic d'Azir goes from the first ribs to the neck of the scapula. It appears to be analogous to the *pectoralis minor* of the human subject.

The *rhomboides* is not divisible into *major* and *minor*. It arises, as usual, from the spine, and is inserted in the posterior edge of the scapula.

A muscle, analogous to *levator scapulae*, arises by three slips from the transverse process of the last cervical vertebra and the first and second ribs. It is inserted into the middle of the scapula, which it elevates and draws backwards. The motions of the scapula are necessarily very limited from its mode of connexion with the neighbouring bones; and its rotation is restrained by a ligament which joins the point of the scapula with the dorsal spine. It is requisite the bones of the shoulder should be kept very steady during flight.

There are three pectoral muscles.

The *pectoralis maximus* of Vic d'Azir might be called, with more propriety, the *depressor ale magnus*. It arises from the whole of the body and keel of the sternum, except a certain portion of the anterior surface occupied by the next muscle over which it lies, and from the side of the fork and the last ribs, and is inserted into the spine on the outside of the humerus, where it is connected by ligament with the deltoid muscle. The *pectoralis maximus* has commonly more strength than all the other muscles of the body united, which is required to accomplish the depression of the wing in opposition to the whole weight of the bird during flight.

The *pectoralis medius* of Vic d'Azir might be called the *levator ale*. It is affixed to the fore part of the body and keel of the sternum, the side of the clavicle, and the membrane which fills the interspace between that bone and the fork. It sends its tendon over the head of the scapula through the pulley formed by all the bones of the shoulder, to be inserted on the external tuberosity of the head of the humerus. By means of the pulley it elevates the humerus, and consequently the wing; and from occupying the lower part of the chest, the weight is kept in the situation most convenient for the bird during flight.

The *pectoralis minimus* of Vic d'Azir, or *depressor ale minor*, arises from a portion of the sternum behind the articulation of the clavicle, and from the inside of the internal extremity of the clavicle. It is inserted under the head of the humerus; depresses the wing, and brings it close to the body.

The *subclavius* is extended from the inside of the sternal extremity of the clavicle to the adjoining part of the internal surface of the sternum. It is impossible to conceive the use of this muscle, unless it be to strengthen the joint, as its attachments are incapable of motion towards each other. There are muscles analogous, as much as the form of the bones will permit, to the *subscapularis*, *teres major* and *minor*, *supra spinatus*, and *infra spinatus*.

Cuvier describes two little muscles which come from the inside of the clavicle to the head of the humerus. We have observed a muscle in the *fowl* which appears to correspond to one of these; it arises from the inner surface of the clavicle, and its joint with the sternum, passes over the first rib, and is affixed to the top of the inner tubercle of the head of the humerus. It rotates the wing inwards, when it has been spread in flight. The lower edge of this muscle, and the inside of the *teres major*, produce a most delicate tendinous cord, or fibre, which descends on the back of the upper arm, and is lost amongst the ligaments of the quills below the elbow. The effect of this, if any, is to bring the wing nearer the body, and perhaps spread the quills.

The *deltoides* is small, and of two portions. One arises from the fork at the top of the shoulder, and sends a small tendon to the aponeurotic expansion of the fold of the wing. This tendon, as it proceeds along the edge of the expansion, requires exactly the structure and the elasticity of the *ligamentum nuchae*; it then becomes like common tendon, passes over the end of the radius, and is inserted into the stylo of the metacarpal bone. It bends the fore arm, extends the hand, and, in consequence of the elasticity of the tendon, contracts the soft part of the fold of the wing. This portion of the deltoid has escaped the observation of Cuvier and other writers, although the structure of the tendon is one of the most extraordinary circumstances in the anatomy of birds. The remaining portion of the deltoid is analogous to the same muscle of the human subject, and brings the wing upwards and backwards in flight.

The muscle which represents the *biceps flexor cubiti*, takes its origin from the end of the clavicle, where it joins the fork; and from the sharp tubercle of the humerus, which is analogous to the coracoid process, the chief part of the muscle proceeds to be inserted into the inside of the neck of the radius; but as it descends, a small portion goes off, and is expanded in the fold of the wing, and attached to the outer side of the arm. This expansion of tendon corresponds to the aponeurosis of the biceps muscle of the human subject; but instead of lying close to the fore arm, it is spread out and covered with the common integuments.

The *brachialis internus* is very small, being only attached

to the fore part of the end of the humerus between the condyles.

There is a short muscle which arises from the ligament that conjoins the clavicle and the head of the humerus, and is inserted upon the flat external surface between the two tubercles. It is an *elevator* of the wing. It is peculiar to birds, and has not yet been described.

The *extensor cubiti* consists of two portions: the one, called by Vic d'Azir the *extensor longus*, comes from the junction of the fork and scapula; the other arises in a forked manner from the posterior surface of the humerus, and is the *extensor brevis*.

The *anconaeus minor* of Cuvier is the external and lower part of the *extensor brevis*. It is a distinct muscle in the *fovea*, though not in the *goose*.

Although the bones of the fore arm do not admit of *pronation* and *supination*, the muscles which perform these motions in other animals, exist in birds, and answer different purposes.

The *supinators* resemble those of the human subject. The *longus* terminates on the style of the metacarpal bone, and serves both to bend the arm on the humerus, and extend the metacarpus, or lower part of the wing. The *supinator brevis* bends the fore arm. The place of the *pronator teres* is supplied by two muscles very much like it in shape; they act as flexors of the fore arm. There is a triangular muscle which in some degree fills the situation of the *pronator quadratus*; it arises from the end of the ulna, and sends a broad tendon over the carpus to the highest scabrous surface on the metacarpal bone. It extends the hand, or lower part of the wing, giving it at the same time a degree of pronation, which the carpal joint permits, in order to render the wing concave when it is extended.

The *flexors and extensors*, situated on the fore arm of birds, resemble in shape and arrangement generally those of the human subject, but commonly have their uses changed, and often even reversed, in consequence of the difference in the figure of the bones and the plan of their articulations.

The muscle which corresponds in situation to the *extensor carpi ulnaris*, performs the motion which is called flexion of the lower part of the wing.

There is a strong muscle arising from the external condyle of the humerus, and implanted into the side of the ulna opposite the radius, for almost its whole length. It raises the fore arm on the radius, and seems to be the muscle called by Vic d'Azir *flexor profundus*.

The muscle analogous to the *extensor pollicis longus*, has its tendon inserted into the style of the metacarpus, and into the short abductor. It extends the hand on the fore arm.

The *ulnar flexor* bends the parts of the wing.

The *flexor sublimis* comes from the internal condyle, is attached to the lower carpal bone, and sends a tendon to the base of the first joint of the principal finger, bends the hand, but extends the finger.

The *flexor digitorum profundus* arises from the inner surface of the ulna; its tendon passes over a little pulley on the metacarpal bone, and terminates on the end of the last joint of the principal finger, which it extends, but bends the wing.

The *extensor communis digitorum* and *indicator* arise from the external condyle and inside of the radius. They send tendons to the first and last joints of the principal finger, which they extend.

The fingers of birds are furnished with many short muscles; and notwithstanding they are very palpable, seem to

have escaped the observation of Cuvier and other anatomists.

The *flexor brevis pollicis* comes from the inside of the head of the metacarpal bone to the flat surface of the bone of the thumb. The *extensor brevis pollicis* proceeds from the triangular surface of the metacarpus, behind the joint, to the base of the thumb. The *abductor pollicis* is extended between the style of the metacarpal bone and the outer edge of the bone of the pollex. The *adductor pollicis* is expanded between the branch of the metacarpus and the bone of the thumb. The *abductor*, or *extensor brevis indicis*, is extended all along the radial edge of the metacarpal bone, and is spread upon the root of the first joint of the principal finger. It brings the finger into a line with the metacarpus. The *adductor indicis* comes from the ulnar side of the large branch of the metacarpus to the root of the first joint of the fore finger. The *abductor minimi digiti* lies along the ulnar edge of the small branch of the metacarpus; and as the little finger is tied to the other by ligament, this muscle produces the lateral flexion or abduction of both. The last is the *interosseus*; it fills the space between the branches of the metacarpus, and its tendon passes along the back of the principal finger to the extremity; it bends the first joint laterally, and extends the rest of the finger.

The *muscles of the lower extremity* are very numerous in birds, and possess several peculiarities, notwithstanding the motions of this member are so simple. The articulation of the femur with the pelvis permits the thigh to move freely forwards and backwards, but does not allow it to be carried under the body, or far outwards. The motions of all the other joints of the inferior extremity are merely flexion and extension.

In consequence of the form of the pelvis, the *iliacus*, the *psoas magnus* and *parvus*, the *obturator externus* and *quadratus lumborum*, do not exist in birds. Cuvier also states the *pyriformis* and *gemini* to be wanting; but we have seen a little muscle which passes from the projection above the acetabulum to the trochanter, which appears to supply the place of the *pyriformis*.

The *obturator internus* is generally a large muscle, and passes over a pulley at the fore part of the foramen ovale, where it receives two little slips analogous to the *gemini*: they are inserted into the outer part of the trochanter.

There are three *gluteal muscles*, as in quadrupeds. The *gluteus maximus* is attached by a broad thin tendon to the prominence along the dorsum of the ilium, covers the outside of the thigh, and contributes to form the extensor tendon on the side of the knee. The anterior part of this muscle corresponds to the *tensor vagina femoris*. The *gluteus medius* occupies its usual situation. The *gluteus minimus* is a massy muscle, so much placed on the anterior edge of the ilium, that Vic d'Azir considered it (perhaps not improperly) as the *iliacus*. It brings the thigh directly forwards, and rotates the knee inwards.

The muscle analogous to the *quadratus femoris* is large and of a pyramidal shape. It retracts the thigh.

The *extensor muscles* of the leg resemble those of mammalia. The *vastus internus* sends its tendon to be distinctly attached to the head of the tibia. The *sartorius* also is an extensor of the leg on the thigh.

There are three *flexors* of the leg: one, which, although single, is, from its insertion into the back of the fibula, analogous to the *biceps* of the human subject; another, on the inside, is attached to the tendon of the extensors of the heel, as well as to the tibia. This muscle might be called either *gracilis* or *femimembranosus*, for it resembles both. The third flexor is in the middle. It comes from the ischium; and as

it descends, it receives a broad slip of muscle from the back of the femur. It is inserted on the back of the tibia, and the tendon covering the extensors of the heel.

There is a large muscle on the inside of the thigh, which supplies the place of the *triceps*. It performs adduction, but it is also employed in carrying the limb backwards.

A muscle, which Cuvier appears to reckon as the *second adductor*, arises from the back of the ischium, and is inserted into the middle of the femur in company with the *cruro-coxigenus* muscle. It retracts the limb.

The muscles for extending the heel, and consequently the lower part of the leg of birds, differ in many respects from the *gastrocnemii* of mammalia. The tendo achillis is produced by three portions of muscle; and, after passing over a moveable cartilaginous pulley which is placed on the heel, it spreads on the sides of the metatarsal bone. The first portion arises from the inner and fore part of the joint of the knee, and is connected for some way with another muscle, which lies on the outside of the joint. The second portion is small, and from the back of the internal condyle of the femur. The third is a very strong muscle arising by tendon from the outside of the thigh bone, just above the condyle. These three heads appear to be the *external gastrocnemius*.

The *soleus* is represented by a muscle which arises from the outer part of the knee joint, from the upper part of the tibia, and from the fore part of the fibula. It is inserted into the pulley on the heel, and sends a tendon to join that of the flexor of the first phalanx of the toes; and therefore it bends the toes; while it acts on the heel.

There is also a muscle which appears to supply the place of the *plantaris*. It comes from the back of the head of the tibia, and affixes its delicate tendon to the inside of the moveable pulley of the heel.

The *tibialis anticus* arises by two heads, and is inserted into the fore part of the upper end of the metatarsal bone. It bends the joint of the heel.

The *tibialis posticus* is not found in birds.

There is a short *peroneal* muscle which is inserted into the outside of the metatarsal bone. It merely bends the joint.

The other muscles situated along the legs, are for the flexion and extension of the toes. The *extensor longus digitorum* exhibits no peculiarity, except that its tendon goes through a hole in the end of the tibia. There is no long *extensor* for the back toe.

The *flexors* of the toes are very complicated: they may be divided into the *flexor sublimis* and *flexor profundus*. The first is composed of several portions; two of these are *peroneal* muscles, and send their tendons to the first joint of the internal toe and the second phalanx of the middle toe; the two other portions of the *flexor sublimis* arise, one from the outside of the fibula, and the other from the back of the joint and internal condyle of the femur. The one on the fibular side is joined by the tendon of the *accessorius femoralis flexorum*: a muscle, which arises from the spine of the pabis, runs along the thigh, and sends its tendon through a sheath that runs over the ligament of the patella, to arrive on the fibular side of the leg. The two portions of the *flexor*, after this, unite, separate, and unite again, and at last produce three tendons, of which two go to the first phalanges of the internal and middle toes, and the third to all the joints of the outer toe except the last. Those tendons which pass beyond the first joint, are *perforating* as well as *perforated*.

The *flexor profundus* arises as two distinct muscles; the one from the back of the femur, and the other from the

back of the bones of the leg. The two tendons unite on the back of the metatarsal bone, and send off tendons to the last phalanges of the toes, which perforate those of the *flexor sublimis*.

All the flexor tendons are inclosed in a tendinous sheath, as they pass along the back of the metatarsus; and some of them go through the moveable cartilaginous pulley of the heel, and others run in sheaths formed in the cartilage which covers the top of the metatarsal bone.

The circumstance of the flexion of the toes accompanying that of the other joints of the lower extremity of birds, was long ago observed by Borelli, and attributed by him to the connexion the flexors of the toes have with the upper parts of the limb, by which they are mechanically directed when the knee is bent. This explanation has been controverted by Vic d'Azir and others, who have referred the effect to the irritability of the muscles. The opinion of Borelli appears, notwithstanding, to be well founded; for not only the tendon of the accessory flexor passing round the knee, but the course of the flexor tendons over the heel and along the metatarsus, must necessarily cause the contraction of the toes, when either of these joints are bent; and if the phenomenon was not produced on mechanic principles, it would be impossible for birds to exhibit it during sleep, which they do, or to prove the effect on the limb of a dead bird, than which nothing is more easy. The utility of this contrivance is great in all birds, but particularly so to the rapacious tribe, which by this means grasp their prey in the very act of pouncing on it; and it is still more necessary to those birds which perch or roost during their sleep, as they could not otherwise preserve their position when all their voluntary powers are suspended.

There are six long small muscles lying on the metatarsal bone; they are largest and best marked in those birds which walk most. Two of these are on the posterior surface; one goes to the base of the external toe, which it *abducts*; the other is inserted into the root of the back toe, which it *bends*. On the anterior part of the metatarsus there are four muscles: the first *extends* the back toe; the second goes to the base of the first toe, and *abducts* it; the third is spread on the root of the middle toe, which it *extends*; the fourth lies along the outside of the metatarsus, perforates the end of the bone, and is implanted into the inside of the external toe, and *adducts* it.

Brain.

This organ exhibits several deviations from the structure of the brain of mammalia, which afterwards appear in a more marked manner in the inferior classes of animals. Accordingly, in the scale of existence, or with respect to sensitive or mental faculties, the rank of birds is clearly fixed below that of mammalia, and above that of other animals. The rules which have been established to determine the degree of intelligence possessed by species or individuals, according to the proportion the brain bears to the whole body, or other parts of the nervous system, do not appear so applicable in birds as in mammalia. It is, however, very difficult to appreciate the capacity of birds, as they are so much the slaves of instinct, that it is often impossible to discover whether their actions arise from the impulse of this principle, or depend upon the recollection and association of external sensations. The largest birds generally have the smallest proportion of brain to the whole body; and some of the small birds have the proportion of brain so great, that they would, agreeable to the rules laid down, excel in mental endowments man himself: for instance, the brain of the *canary bird* is equal to the one-fourth of the whole body; and in the human subject it is only the one-twenty-fifth part. The diameter of the

the brain, in relation to the medulla oblongata, has been ascertained only in a few species of birds, in which it has been observed as follows :

	Medulla oblongata.	Brain.
Falcon	13	34
Owl	14	35
Duck	10	27
Turkey	12	38
Sparrow	7	18

The brain of birds is invested with the same coverings which are described in mammalia.

The form of the cerebral mass is very different from that of the human brain, which chiefly arises from the optic thalami being visible externally. The hemispheres are therefore proportionately diminished. They assume the shape of a heart with the point turned forwards. On the lower part of the side of the hemisphere there is a depression which corresponds to the *fossa* of *Sylvius*, and is the only appearance of a division into lobes. Underneath the hemispheres the *thalami nervorum opticorum* are found, as two distinct tubercles, each equalling in magnitude a lobe or division of the brain. They unite before the infundibulum, and send off the optic nerves; there are, therefore, six parts, or principal eminences, of the brain of birds, visible externally; the two hemispheres, the two thalami, the cerebellum, and the medulla oblongata. There are no convolutions, or winding impressions, on the surface of any of these parts, except the cerebellum, which is transversely furrowed, but not divided into two lobes. The medulla oblongata is round, and smooth on the under surface, being unfurnished with the eminences called *pons Varolii*, *corpora pyramidalia*, and *corpora olivaria*.

On separating the hemispheres a little, it is perceived that they are united at their lower part, or over the third ventricle. The junction is effected by white medullary substance, which afterwards spreads in a radiated manner, on the surfaces of the hemispheres that are opposed or applied to each other, almost as high as the top of the cerebrum. In reality, this medullary union of the hemispheres corresponds to the *fornix*, and can, like it, be traced to the anterior commissure in the third ventricle; but instead of being connected to the *septum lucidum* and *corpus callosum*, as these parts do not exist in birds, it spreads on the inner surfaces of the hemispheres, and thus contributes to form the internal parietes of the lateral ventricles.

Behind the radiated partition of the hemispheres, and without the third ventricle, the *posterior commissure* presents itself, and consists usually of more than one white line connected together by a white fibre, like a nerve passing obliquely across. The vault of the *canalis medius* is also visible, and is composed in part of a white medullary band; and behind this, another white cord runs across, which is the fourth pair of nerves at their origin.

The lateral ventricles are not prolonged posteriorly, nor possess what is called the *retroëd horn*; the *great* and *lesser hippocampus* have therefore no existence.

The *corpus striatum* fills the ventricle almost entirely, projecting from the external side of it in the shape of a kidney. It does not exhibit on a section regular or strong marked striæ.

There are no *tubercula quadrigemina*.

The *pineal gland* rests upon a flat surface; it is very small, and enveloped in pia mater, and covered by a large vein. The plexus choroides also at this place divides into two tufts, or bunches, which pass into the lateral ventricles by two foramina in the back of the internal parietes.

The *third ventricle* possesses its usual situation between the thalami and its fl t-like shape, and communicates with the *canalis medius* under the posterior commissure, and with the infundibulum behind the anterior commissure.

The *infundibulum* and *pituitary gland* are both large in proportion to the other parts.

The *thalami nervorum opticorum* contain each a ventricle, which opens into the *canalis medius*; therefore, there may be six ventricles reckoned in the brain of birds.

The *fourth ventricle* exhibits no peculiarity.

There are no eminences corresponding to the *corpora candicantia*; Cuvier has described four round eminences between the thalami and corpora striata, which are particularly plain in the *ostrich*. These are analogous to the tubercles of the brain of fishes.

The olfactory nerves arise, in birds, from the very points of the hemispheres, and often have a degree of enlargement at their origin, which resembles the olfactory tubercles of fishes. There are eight other pair of cerebral nerves, which have nothing very peculiar in their origin.

See *Plate X. of the Anatomy of Birds*. *Fig. 1* presents a lateral view of the brain of the *goose* abstracted from the head; *a* the hemisphere, *b* the depression analogous to the *fissura Sylvii*, *c* the optic thalamus, *d* the cerebellum, *e* the medulla oblongata, *f* the beginning of the medulla spinalis, *g* the infundibulum, *h* the pituitary gland. The different nerves are indicated by numbers, as they arise, from 1 to 9. N^o 1. the olfactory nerve, N^o 2. the optic, N^o 3. the oculo-muscular nerve, N^o 4. the patheticus, N^o 5. the trifacial nerves, N^o 6. the nervus abducens. N^o 7. the seventh pair, or auditory, N^o 8. the eighth pair, N^o 9. the hypoglossal nerve.

Fig. 2. of the same plate, shews the internal parts of the brain, as they are exposed without dissection, simply by pushing the hemispheres to each side, and drawing the cerebellum a little back: *aa* the two hemispheres, *b* the cerebellum, *c* the medulla oblongata, *ee* the radiated white lines seen arising from the junction of the hemispheres, and forming part of the parietes of the lateral ventricles, *f* the transverse medullary cords corresponding to the posterior commissure, *g* the white band of the roof of the *canalis medius*, *h* the fourth pair of nerves crossing behind it, *i* the pineal gland obscured by the *vena galeni* and the plexus choroides, *k* the latter passing into the ventricle.

The third figure of the tenth plate of the *Anatomy of Birds*, gives a view of the interior of the ventricles of the thalami nervorum opticorum, and the third ventricle; *aa* the hemispheres laid down very much to each side, by which the white partition is ruptured, and the third ventricle brought into view, they are also pulled forwards to expose the thalami; *b* the cerebellum; *c* the medulla oblongata; *dd* the two optic thalami, that on the right side is cut open to shew the ventricle and its communication with the *canalis medius*; *e* the tract of the third ventricle and *canalis medius*, along which a bristle is passed into the fourth ventricle; *f* the anterior commissure, which seems to produce the medullary radii that unite the hemispheres.

Nerves.

The *olfactory nerve* has been already mentioned to pass along a canal, or groove, in the upper and inner part of the orbit, to reach the nasal cavity; in which its distribution will be pointed out in describing the organ of smell.

The *optic nerves* pursue their ordinary course, as in other animals.

The distribution of the *third, fourth, and sixth* pair of nerves, is almost the same as in mammalia.

The branches of the *fifth* pair bear great resemblance to the

the same nerves in quadrupeds. They are distributed to the bill, and are therefore the nerves of the organ of touch in birds, under which head they will be farther noticed.

The *portio dura* of the seventh pair, or the *facial* nerve, is so small in birds, that it can hardly be discovered. Its offices are not required, in consequence of the structure of the parts of the face in these animals.

The *portio mollis* is remarkably soft; when it arises from the brain, it is a tender pulp, of a reddish colour.

The *par vagum*, or *pneumo-gastric* nerve of the eighth pair, sometimes passes out of the cranium in two or three filaments, which afterwards rejoin. On leaving the skull, this nerve communicates with the lingual and glosso-pharyngeal nerves. The *par vagum*, after this, passes as a distinct strong cord along the neck, in company with the jugular vein, and descending into the chest, forms the *cardiac* and *pulmonary plexuses*, as in mammalia. The two nerves unite behind the heart, and proceed along the œsophagus, to terminate in anastomoses with the great sympathetic nerve. We have not observed the *recurrent* branch of the eighth pair.

The *glosso-pharyngeal* nerve of the eighth pair makes its exit from the cranium through the posterior foramen lacerum in two filaments, which immediately unite to form a quadrangular ganglion, which sends off a small nerve to the anterior muscles of the neck, and another branch to anastomose with the *par vagum*; the nerve then descends along the œsophagus, and divides into two branches, of which one passes upwards to the muscles of the os hyoides, which include it between them, and the other furnishes a branch to the lingual nerve, and afterwards is expanded upon the œsophagus.

The *hypoglossal nerve* is small where it passes through the condyloid foramen of the cranium; it crosses and partly unites with the *par vagum*, at which place it detaches a filament towards the thorax, which seems analogous to the *descendens noni*. The trunk of the hypoglossus goes forwards under the horn of the os hyoides, and divides into two principal branches, which are distributed to the tongue.

The *cervical, dorsal, lumbar, and sacral* nerves, arise from the medulla spinalis exactly as they do in quadrupeds, and only vary in their number, which is determined by the number of vertebræ belonging to each region of the spine.

The *phrenic nerve* is not found in birds, in consequence of the absence of the diaphragm.

The *intercostal, or great sympathetic nerve*, is described as entering the cranium by the foramen lacerum posterius. It unites with the fifth and sixth pairs, and produces a lenticular ganglion below the skull, which communicates with the eighth and ninth pair of nerves. The appearance of the sympathetic nerve is, however, soon lost on the neck; for the cervical nerves form their anastomoses with each other in the vertebral canal, from which a nerve is sent out between each vertebra to supply the muscles and integuments of the neck. These nerves are remarkably large. On coming into the thorax the great sympathetic sends a branch to the pulmonary plexus of the *par vagum*; it anastomoses also with the brachial plexus; and below the second rib, the sympathetic commences a series of ganglia, which are very conspicuous between each of the succeeding ribs, but become less visible along the remaining part of the spine. These ganglia are central points for the union of a number of nerves. They receive filaments from each other, which pass over the heads of the ribs; they communicate backwards with the spinal nerves; they detach on the outside the intercostal nerves, which are large, and besides supplying the intercostal spaces, give branches to the muscles and

integuments upon the sides of the body; they lastly send off filaments anteriorly, which anastomose with each other on the side of the dorsal spine, and form cords, which become the splanchnic nerves. In this manner there is produced on each side of the dorsal spine a reticulation of nerves which incloses in its meshes the heads of the ribs, and has a striking effect. The first dorsal ganglion unites with the brachial plexus and the cardiac plexus of the *par vagum*.

The *splanchnic* nerves, after being formed by the anterior branches of the sympathetic, pass to the roots of the principal arteries of the viscera. Those of the cœliac artery produce a plexus round the trunk of this vessel, and where the artery is divided, there are one, two, or three enlargements, which are analogous to the *scillunar ganglia*; and the nerves which depart from these, inclose the arteries in a reticulated manner, and represent the *solar plexus*.

There are similar plexuses on the other chief arteries of the trunk, which correspond to the *superior and inferior mesenteric* and *renal* plexuses, &c.

The nerves of the solar plexus accompany the branches of the cœliac artery to the stomach, spleen, liver, and pancreas, around which they continue to form numerous anastomoses, that may be compared to the *stomachic, splenic, hepatic, and pancreatic plexuses*.

The *nerves of the wing* more nearly resemble those of the superior extremity in mammalia, than Cuvier has represented. The *brachial plexus* is produced by the two last cervical and first dorsal, and not, as he has stated, by the last cervical and two first dorsal nerves. The union of these three branches gives rise to three others, which are distributed in the following manner:—The first is a very fine filament, which runs down on the inside of the arm, and is lost about the internal part of the elbow. This is analogous to the *internal cutaneous* nerve. The second is a large cord; it gives off a very large branch, which divides into many others, for the supply of the pectoral muscles; it sends several smaller branches to the muscles under the clavicle, and about the joint, and then proceeds to the inner edge of the biceps muscle, along which it descends to the fold of the arm, after giving some large muscular branches. Before it reaches the joint, it divides into two branches; one of which is analogous to the *ulnar* nerve, and the other soon divides again into nerves which are similar to the *median* and *musculo-cutaneous*. The *median* dips down amongst the muscles on the middle of the fore arm, to which it gives branches, and afterwards runs along the interosseous space, passes under the annular ligament of the carpus, and is distributed to the short muscles of the digiti. The branch analogous to the *musculo-cutaneous* nerve, is expanded upon the muscles on the upper edge of the radius.

The *ulnar* nerve, although it appears to be incorporated with the *median* on the upper arm, can be easily separated from it and traced to its proper origin in the brachial plexus. After this nerve leaves the median, it turns over the end of the foramen to get upon the edge of the ulna. It gives filaments to the muscles in this situation; but its chief branch runs down superficially upon the ligaments of the quills in company with the vein, and goes ultimately to be lost upon the ulnar edge of the hand.

The third cord furnished by the brachial plexus, supplies the place of the *radial* nerve. It detaches several filaments to the muscles on the inside and back of the scapula. It gives off also the *articular nerve*, and then winds round the humerus between the extensor muscles, to which it furnishes some large filaments. On coming to the outside of the humerus, it sends a branch between the integuments of the

fold of the wing. The nerve now turns round the neck of the radius, beneath the muscles, and forms two branches; of which one passes under the muscles to the outer side of the ulna, along which it runs superficially to the hand; the other branch passes on the radial side, but more deeply amongst the muscles, goes under the annular ligament of the carpus, proceeds between the branches of the metacarpus, and is finally lost on the back of the digiti.

Although Cuvier has given a more accurate description of the nerves of the lower extremity, than of those of the wing, it nevertheless needs correction in several particulars, which we have supplied.

The *obturator* and *femoral* nerves arise from the same plexus which is formed by the two last lumbar nerves, by a communicating branch from the first sacral pair. The obturator nerve passes through the upper part of the foramen ovale, and is distributed to the muscles around the hip joint, especially the adductor. The femoral nerve passes out of the pelvis in company with the artery, over the upper edge of the ilium. It divides into three branches, which are dispersed amongst the muscles and integuments on the anterior and inner part of the thigh. Some of these filaments are long, and descend superficially for a considerable way upon the limb.

The *ischiodic* nerve is composed of the five superior sacral nerves; and as soon as it departs from the plexus, even within the pelvis, is easily separable into its primary branches. Immediately after it passes through the ischiadic foramen, it sends filaments to the muscles on the outer part of the thigh; it then proceeds under the biceps muscle, along the back of the thigh, about the middle of which it becomes divided into the *tibial* and the *peroneal* nerves.

The *tibial* nerve, even before it arrives in the ham, separates into several branches, which pass on each side of the blood-vessels, and are chiefly distributed to the muscles on the back of the leg. Two of these branches, however, are differently disposed of: the one accompanies the posterior tibial artery down the leg, passes over the internal part of the pulley, and is lost in small filaments, and anastomoses with a branch of the peroneal nerve, on the inner side of the metatarsus; the other branch runs down on the peroneal side of the leg, along the deep seated flexors of the toes, passes in a sheath formed for it on the outer edge of the moveable pulley of the heel, and proceeds under the flexor tendons along the metatarsal bone, to be distributed to the internal part of the two external toes.

The *peroneal* nerve is directed to the outer part of the leg; it dips in above the gastrocnemii muscles, and runs through the same ligamentous pulley that transmits the tendon of the biceps muscle; it then detaches some large filaments to the muscles on the anterior part of the leg, under which it divides into two branches, which proceed close together, in company with the anterior tibial artery, to the fore part of the ankle joint, at which place they separate; one passes superficially over the outer part of the joint; the other goes first under the transverse ligament which binds down the tendon of the tibialis anticus muscle on the tibia, and then over the inner part of the joint, below which it divides into two branches, the one is distributed to the inner side of the metatarsus and the tibial side of the pollex and to the next toe; the other turns towards the centre of the metatarsal bone, and penetrates the tendon of the tibialis anticus just at its insertion, and then rejoins the branch of the peroneal nerve it accompanied down the leg. They continue their course together again in the anterior furrow of the metatarsal bone; and at the root of the toes, separate once more, and proceed to the interspaces of the three anterior

toes, and each divides into two filaments, which run along the sides of the toes to the nail.

Organs of Touch.

As the sense of touch is bestowed upon animals to enable them to discern the forms and states of aggregation of external matter, it resides more especially in the extreme parts of their bodies, and when most perfect, exists in some member which is constructed for including or taking hold of extraneous substances. There is no part of the body of birds capable of conveying an accurate impression of touch, but the feet and the bills; their upper extremities and tail being simply instruments of motion. Different species enjoy this in different degrees, and possess it more or less in the bill or feet, in proportion as they employ these parts in the pursuit or examination of their food; these being the only occasions on which birds exercise their functions of touch. The *scansores*, *accipitres*, and *passerine* tribe have most sensation in their feet, while the *gralle* and *anseræ*, especially those that have long or broad bills for feeling out their food, like the *snipe*, or *duck*, possess a very great susceptibility of impression in their bills.

The organization of the feet of birds, as far as concerns their offices as instruments of touch, is similar to that of the digitated mammalia and reptiles. The skin on their lower surfaces is endowed with more than common vascularity, is largely supplied with nerves, and is elevated into those little regular eminences called *papilla*, in which the sense of touch more immediately resides.

The structure, on which the sensibility of the bill depends, is different from the preceding. It consists in the magnitude and distribution of the fifth pair of nerves. These are divided, as in mammalia, into three branches, the *ophthalmic*, the *superior maxillary*, and the *inferior maxillary*.

The *ophthalmic* enters the orbit by a hole beside the optic foramen, passes for some way in an osseous canal before it arrives in the nasal cavity, where it distributes some branches to the septum and turbinata, and to the external nares, and then goes on as two branches; one runs in the substance of the upper jaw, which it perforates at the end in many filaments, to terminate under the horny integument of the bill; the other passes between the membrane of the palate and the bill, and is lost in a number of fibrils at the apex of the bill.

The *superior* and *inferior maxillary* nerves come out of the cranium by the same hole. The *superior*, after dispensing branches to the muscles in its course, is finally distributed to the lateral parts of the bill, which, if notched along the edge, as in some water birds, each denticulation receives several filaments. The *inferior maxillary* descends to the lower jaw, which it penetrates, after sending a branch to the integuments of the side of the bill; and running in the maxillary canal, sends filaments to the edge of the bill, and terminates, like the ophthalmic, on the apex of the lower mandible.

These nerves are of great size in the *goose*, *duck*, &c. in which they render the bill a very delicate organ of touch. See Plate X. in the *Anatomy of Birds*. Fig. 4. is the section of the head of a *duck*, made by dividing the organ of smell longitudinally, and by removing the bill and bone of the mandible, in order to bring into view the distribution of the fifth pair of nerves: *a a* the ophthalmic nerve coming from the upper part of the orbit, and proceeding along the septum nasi; *b* the branch which passes in the substance of the mandible, to be lost on the point of the bill, *c* the branch that runs on the membrane of the palate to the end of the bill; *d* the superior maxillary nerve dividing on the membrane of the palate, and sending its filaments to the denticuli on the side of the bill; *e* the inferior maxillary run-
ning

ning in the canal of the lower jaw, and sending filaments to the denticuli on the edge of the mouth, and ending on the point of the bill; *f* the nasal branch of the ophthalmic distributed to the septum.

External Parts, or Integuments.

The *feathers* with which the bodies of birds are clothed, render them less capable of receiving the more simple impressions of touch, than most other animals. They also serve to defend them against the excesses of temperature. The structure and mode of growth of these substances are considered in another part of the dictionary. See FEATHERS.

The *cuticle* of birds is remarkably thin, but resembles in structure the epidermis of mammalia. It is fixed generally along with the feathers.

The *rete mucosum* is not observable, except in those parts which are uncovered by feathers, and possess peculiar colours, as the ceres and caruncles of the head, the feet, and bills; where it is of course found to vary in colour as those parts do.

The *cutis* is in most birds extremely thin and delicate in its texture, appearing often like a fine single lamina, instead of an intermixture of fibres as in mammalia. It is, however, of some strength in the *swain birds* and the *accipitres*; it is thinnest in the *passeres*. The external part of the cutis is never *papillated*, but when it covers the under surfaces of the toes which are designed to receive the impressions of external bodies.

The *muscles of the skin*, in consequence of the size of the external coverings, are in general very evident, and particularly in those birds which move the feathers of the crest, neck, or tail, as the *braptes*, *cockatoo*, *herons*, &c.

The following cutaneous muscles are common to all birds. Two fleshy slips, which arise from behind each side of the head behind the meatus auditorius, and go backwards to be lost in the integuments. A thin expansion of muscle along the anterior and lateral parts of the neck; it takes a longitudinal course, but is connected with some transverse fibres between the jaws; this muscle corresponds with the *platysma myoides*. There is a muscle, arising in a serrated manner from two or three of the lower ribs, and extending upwards to the axilla and outside of the shoulder. We have perceived, in the *goose*, a very thin slip of muscle proceeding from the posterior part of the branch of the pubis to the skin on the inside of the knee; and Cuvier considers the red granular appearance under the skin on the back of the pelvis as muscular substance.

The functions of the skin of birds, as an organ of absorption and excretion, appear to be very imperfect. The clothing of feathers alone disqualifies it in a great degree for the performance of these processes. The thinness and simple organization of the skin itself render it probable that its secretory powers are but inconsiderable. It does not also possess those various glands which are so abundantly bestowed upon the skin of other animals for its preservation and defence against the operation of external substances. Birds are, however, provided with two peculiar glands for the purpose of furnishing an oily fluid, to keep the feathers in order and defend them against the effects of moisture.

The *oil glands* are two oblong or oval-shaped bodies, with one end more pointed than the other, and situated under the skin on each side of the spinous processes of the caudal vertebrae. They approach each other, and touch at their points, which are directed backwards, and thus produce very commonly between them the figure of a heart. They are covered by a strong dense white tunic, and their interior structure consists of a number of small tubes arranged in a radi-

ated manner around a vacancy, or canal, which runs nearly in the middle of the gland, into which they all open and discharge their contents, in the same way as the tubuli uriniferi do into the pelvis of the kidney. The middle canal leads to a papilla on the skin of the rump, and terminates in a simple foramen. It deserves remark, that the tubes towards the circumference of the glands are soft and indistinct, and their contents are liquid and pale coloured; but before their termination, the tubes acquire more firmness, are a little separated into packets, their secretion becomes an opaque yellow, and of more consistence; thus affording an obvious and interesting view of the change which may be wrought upon secreted fluids after their formation, while they are passing through their glands. The fluid produced by the glands on the rump of birds, although of an unctuous nature, is still not pure animal oil. It has more consistence, and is less affected by heat; which properties it principally acquires in the ends of the tubes, before they open into the common duct, as already mentioned. It is, however, sufficiently oleaginous to prevent the adhesion of moisture to the surface of the feathers. When birds make use of it, they turn their head round to the rump, and compress the glands with the bill, when a quantity of oily matter exudes, with which they beset their feathers, arranging the barbs upon their shafts at the same time by means of the bill. These glands, as might be presumed from their use, are particularly large in the *swimming birds*. See Plate X. in the *Anatomy of Birds*. Fig. 5. shews the oil glands of the *duck* of their natural size: *a a* the two glands; *bb* their foramina on the papilla, into each of which a bristle is introduced; *cc* the integuments reflected on each side to bring the glands into view. Fig. 6. of the same plate is a section of one of the oil glands somewhat magnified; *a* the canal in the centre into which the radiated tubes open; *bb* the external portion of the tubes; *cc* the interior extremities more distinct, and of a deeper colour.

Organ of Smell.

The shape and situation of the *nostrils* are used by naturalists as classic characters of birds; and therefore do not require particular consideration here. They consist of two slits, varying in the length and width, commonly placed on each side behind the base of the bill. There are no muscles provided for dilating and contracting their aperture, as in mammalia.

The interior of the organ of smell is formed by a septum and three turbinated bodies, over which the pituitary membrane is spread.

The *superior turbinatum* assumes in general the shape of a bell; it is formed of cartilage, and is attached to the os frontis and lacrymale; it is hollow within, and divided by a slight prominence into two apartments, which are continued for a little way in a tubular form; the external ends by a blind extremity behind the middle turbinatum; the internal opens into the cavity of the nose. The superior turbinatum is small in the *passeres* and *gallina*, somewhat larger in the *scenobates*, increases in bulk in the *accipitres*, and still more in the *anser*, and in the *gralle* it is greatest of all. According to the observations of Scarpa, the acuteness of smell is exactly proportioned to the magnitude of this part of the organ, as it is upon it only and the septum that the olfactory nerve is spread.

The *middle turbinatum* has been likened by Scarpa to a cucurbit. It is connected on the external part to the cartilaginous pinna of the nares and the bony process of the upper jaw, and inferiorly it is attached to the cartilaginous septum of the nose. It is composed of a cartilaginous lamina, which in the *goose* makes two folds and an half; but in the *gralle* it is compressed, and forms only one turn and an

half. Harwood has stated these turbinata to be membranous in the *casuary* and *albatross*; and Cuvier has observed them to be composed of bone in the *toucan* and *hornbill*.

The *inferior turbinatum* is an osseous fold, continued from the pinna of the nares, and united on the other side to the septum. See Plate X. in the *Anatomy of Birds*. Fig. 7. exhibits the interior of the nasal cavity of the *goose*, the septum being removed; *a* the canal through which the olfactory nerve passes to the nose; *b* the cavity of the superior turbinatum; *c* its internal tube; *d* the external tube; *e* the middle turbinatum; *f* its deep or first winding; *g* the second; *b b* two pins passed from the windings into the nasal cavity; *i* the inferior turbinated bone; *k* its junction with the septum; *l* the cartilaginous appendix of the middle turbinatum; *m* a pin introduced through the external naris; *n* the posterior naris.

The *pituitary membrane* is fine where it invests the superior turbinatum, and thicker and more villous over the middle one; it is covered with pores, which discharge mucus on its surface. The blood vessels on the interior of the nose are beautifully reticulated.

The *olfactory nerve*, as already described, arises from the point of the hemisphere of the cerebrum, and passes through an osseous canal to the superior part of the nasal cavity. On arriving there it breaks into a great number of filaments, some of which are spread upon the superior turbinatum, and others run about as far on the septum nasi. See Plate X. in the *Anatomy of Birds*, fig. 4. *g* the nerve proceeding along the canal above the orbit; *b* the appearance of the nerve on the septum of the *duck*; and fig. 8. of the same plate exhibits a section of the head of the *beron*, a bird with an acute sense of smell; *a* the trunk of the olfactory nerve; *b* its distribution on the superior turbinatum, which is very large; *c c* the middle turbinatum proportionably reduced in size; *d* inferior turbinatum; *e* its connection with the septum; *f* the aperture of the external naris.

Scarpa made a number of experiments with different species of birds, in order to determine their capacity for discerning odours. He mixed various strong smelling substances with their ordinary food, which in some were taken with indifference, but in others the repugnance to the scented food was so great, that the birds perished rather than eat it. He was thus enabled to form a scale of the different degrees of perfection in which birds enjoy the sense of smell, which accorded exactly with the extent of the surface allowed for the distribution of the olfactory nerves. The scale he has laid is as follows: *gallinæ, passeræ, picæ, anseres, accipitres, and grallæ*.

Organ of Taste.

The sense of taste is so imperfect in most birds, that it might be doubted whether it existed at all or not. The form and motions of the tongue unfit it for being applied to the superficies of substances; the glairy tenacious fluid, with which the surfaces of their mouths are besmeared, is not calculated for the solution of sapid bodies; and the shape and structure of the papillæ of the tongue seem to render them nearly incapable of impression; and further it may be observed, that birds commonly swallow their food without examination, or a minute division of its parts.

The motions and internal formation of the tongue have been already discussed; it only remains, therefore, to notice the figure and integuments; but as these have been described by natural historians in almost every genus, it is only necessary to speak of them in a very general way at present.

The *form* of the tongue may be commonly guessed at from the shape of the bill, with which it corresponds in a certain degree. In the *gallinæ* and *passeræ* it is an elongated trian-

gle, the point being turned forwards; in the *grallæ* it is generally of the same figure, the triangle being however lengthened in proportion to the bill; the broad-billed birds, as the *swan, goose, &c.* have the tongue broad and round at the end.

The *parrot* has a thick round fleshy tongue, not unlike that of mammalia.

Several birds have the tongue bifid at the point.

The *African ostrich* has a broad tongue, but so short, that its existence has been often doubted. The *New Holland ostrich* has a very thin small tongue, and nearly an equilateral triangle.

The *papillæ*, or projecting points of the integument of the tongue are very various in their shape and arrangement. In most instances the tongue is smooth, except at its base, where it is furnished with sharp reflex papillæ, which are commonly cartilaginous, and often covered with bone. In many birds there are processes along the upper surface or the edge of the tongue, which are invested with a horny or osseous substance. The *vulture* has cartilaginous ferræ along the edges of the tongue. The *toucans* have fine horny bristles along the sides, which give their tongue a resemblance to a feather.

On the lateral parts of the back of the tongue of the *flamingo*, there are two rows of bony processes, shaped like hooks, with their points turned backwards.

The *duck, goose, swan, &c.* have, besides sharp bristles and denticulations, some rows of little osseous plates with their thin edges turned toward the fauces.

Birds have frequently the edges of the posterior nares, and other prominent parts of the fauces furnished with reflected spiculæ, similar to those on the tongue; from which it is probable, that both are intended to assist in the action of swallowing the food, rather than to receive the impressions of sapid substances.

The *parrot* is the only bird which appears to taste its food, and hence it possesses soft papillæ, of which some are really *fungiform*.

It is probable, that the *humming* birds possess the sensation of taste, as their tongue is flexible and tubulated, through which they suck, like insects, their fluid aliment.

Organ of Hearing.

Birds are unprovided with the *concha*, or that external projection of the ear which is observed in man and quadrupeds, for collecting the rays of sound; but to compensate for the want of it, some of the internal parts of the organ are formed upon a larger scale. The feathers are arranged in some species, however, around the meatus auditorius in such a way as to produce, in a degree, the effect of the *concha*. This is most observable in the *owls*, in which also the *membrana tympani* lies at the bottom of a cavity, which is lined by a reflection of the common integuments that forms folds something analogous to the projections of the human *concha*; and in the *white owl*, there is a square membrane, which serves as an operculum to the anterior part of the cavity.

The *frame* of the *membrana tympani*, or the bone which surrounds it, is more prominent in some birds than in others; but generally it does not project sufficiently to deserve the name of a canal. It is imperfect anteriorly, where the articular bone is situated, to which the *membrana tympani* is in part attached. In the *white owl*, however, the osseous frame of the meatus is completed by the bones of the head alone.

The *membrana tympani* is always more or less of an oval figure. It possesses the same structure as in mammalia, but is very thin; the convex, or conic surface, is external,

external, instead of pointing inwards, as in man and quadrupeds.

The *cavity of the tympanum* is irregular on the internal surface, and is widest at its outer part. Besides the usual foramina leading to the labyrinth and Eustachian tube, it contains three others which communicate with the cells of the bones of the cranium. These are widened into something like canals, where the holes open into them. The largest of the foramina is in the back of the tympanum, and leads to the posterior cells, and communicates above the foramen magnum with the cellular canal of the other side. The second opening is placed at the anterior part of the tympanum, and conducts to the cells on the lower and anterior part of the cranium. The third foramen is continued amongst the cells which surround the labyrinth. Thus the cavities of each tympanum have a communication with the interior of all parts of the cranium, and with each other, from which they might be reckoned as making only one cavity. The end of the articular bone also, where it contributes to form the parietes of the tympanum, has a foramen, by which it derives its supply of air. The *auditory cells of the cranium of birds* are analogous to the mastoid of the human subject; but from their extent, multiply found much more. They are of the greatest magnitude in the *nocturnal birds of prey*, and especially in the *white owl*; the *goat sucker (caprimulgus)* has them also very large. They diminish in the other birds, in which the posterior canals have no direct communication with each other. They are little observable in the *struthio*; and the *parrot* appears to want them altogether, but in their place the cavity of the tympanum is enlarged posteriorly.

The *Eustachian tube* is very large in birds; it is an osseous canal, and terminates by a small aperture close to the one of the other side, within the fissure of the posterior nares.

The foramina, which lead into the labyrinth, are situated within a fossa. They do not merit the distinctions of *foramen ovale* and *foramen rotundum*, being both oval, and only separated by a small bony process.

The *officula auditus* are supplied by a single bone and some cartilaginous processes. The ossiculum consists of a stalk or pedicle, crowned by an oval plate, which is applied to the foramen that leads into the vestibule of the labyrinth. At the other extremity it becomes extended and united to two or three cartilaginous processes, which form a triangle that is attached to the membrana tympani.

The pediculated bone of the tympanum is moved by *one muscle*, which comes from the occiput behind the ear, and penetrating the cavity, is affixed to the triangle that is connected to the membrana tympani. This muscle is a *tensor*, and draws the membrana tympani outwards. It is counteracted by two small tendinous cords that are extended to the internal parietes of the tympanum.

The *labyrinth of the ear of birds* consists only of the *vestibule* and *three semicircular canals*, and the rudiment of the *cochlea*.

The *vestibule* is small in proportion to the other parts.

The *canals* have been termed by Scarpa, from their gradation in bulk, *canales major, minor* and *minimus*. The largest is most superior, and has a vertical position. The smallest is situated horizontally. The canalis minor ascends upon the major, and opens into its side. They contain corresponding tubes of vascular membrane; and they also possess the *ampulla*, on which the nerves are distributed in the same manner as in mammalia.

The place of the *cochlea* is supplied by a short osseous tube, very slightly bent, and either blunt or enlarged at the extremity. Its interior is occupied by two small cylinders

of fine cartilage, each a little twisted, and united at their origin and termination. They proceed from the osseous bar, which separates the two foramina that correspond to the foramen ovale and rotundum. The sulcus, which is left between the cartilages, is dilated near the point, and accommodates the same branch of the auditory nerve which is sent to the cochlea in mammalia. This nerve spreads in fine filaments upon the united extremity of the cartilaginous cylinders. The tube is divided by the presence of the cartilages into two *scalæ*, which communicate with the vestibule and the foramen rotundum.

The *struthious birds* have the tube corresponding to the cochlea, very small in proportion to the other parts.

The *auditory nerve* is received into a fossa, and there breaks into five branches; one is the *facial*, or *portio dura*, and the others are sent to the semicircular canals and the tube. The facial nerve receives a filament from the par vagum, which traverses the ear, and is afterwards distributed to the palate.

Comparetti has described two canals leading from the labyrinth of birds, which correspond with the *aqueducts* of the ear of mammalia.

For the illustration of the organ of hearing, see *Plate X.* in the *Anatomy of Birds.* *Fig. 9.* represents a dissection of the posterior portion of the skull of the *white owl (Strix flammea)*, which exposes both the parts of the tympanum and the labyrinth: *a* the membrana tympani, which is inclosed in a perfect frame of bone in this bird; *b* the cavity of the tympanum laid open on the other side of the head; *c* the pediculated bone, or ossiculum, in situ; *d d d* the semicircular canals; *e* the tube analogous to the cochlea; *f f* the air-cells exposed by the division of the cranium. *Fig. 10.* shews the ossiculum and the membrana tympani abstracted from their situation and magnified; *a a* the membrane; *b* the flat head or disk of the ossiculum; *c* the pedicle; *d* the extremity which unites with the cartilages, and forms the triangle that is connected to the membrana tympani. *Fig. 11.* exhibits a magnified view of a dissection of the labyrinth of the *goose*, in which the membranous parts and the distribution of the nerves are displayed; *a* the trunk of the auditory nerve; *b* the portio dura; *c c c* the three branches of the portio mollis going to the semicircular canals; *d* the nerve of the cochlea running in the sulcus, and ramifying on the apex of the cartilages; *e* the osseous part of the tube analogous to the cochlea; *f* the inferior cartilaginous cylinder; *g* the sulcus between it and the superior, which is concealed from view by the nerve; *h h h* the three ampullæ of the membranous semicircular canals; *i* the canalis major; *k* the canalis minor; *l* its communication with the major; *m* the canalis minimus; *n* the hole which corresponds to the foramen ovale. *Fig. 12.* is the cartilaginous body removed from the osseous tube; *a* the superior cylinder; *b* the inferior; *c* their junction where they commence; *d* the cavity at the apex of the cylinders laid open; *e* the nerve of the cochlea; *f* its expansion in the cavity of the apex of the cartilaginous body.

Organ of Sight.

The peculiarities in the structure of the eyes of birds are chiefly intended to facilitate the perception of objects through a rare medium, and accommodate vision to different distances.

The *form of the eye* is admirably adapted in most species to promote both these effects. The anterior circle of the globe of the eye always projects more than in other animals; and in many species it is prolonged in a tubular form, and in those cases the cornea also is remarkably gibbous. The *owl* furnishes the most striking example of the disproportion between the anterior and posterior spheres of the eye. The

axis of the anterior portion being twice as great as that of the other. The obvious consequence of this figure of the globe of the eye is to allow room for a greater proportion of the aqueous fluid, and for the removal of the crystalline lens from the seat of the sensation, and thus produce a greater convergence of the rays of light, by which the animal is enabled to discern the objects placed near it, and to see with a weaker light; and hence *owls*, which require this sort of vision so much, possess the structure fitted to effect it in so remarkable a degree.

The *sclerotic coat* of the eye in birds is thin and flexible on the posterior part, but anteriorly its form is maintained by the interposition of a number of bony plates between its layers. These vary from thirteen to twenty, and are arranged in a circle immediately behind the cornea, with their edges overlapping each other. They are commonly flat thin scales, and nearly of a square figure, but become elongated from before backwards in proportion as the bird possesses the power of changing the convexity of the cornea. In the *owls* the scales compose not only all the projection of the eye (the cornea excepted), but contribute to form the posterior sphere. The scales are capable of a degree of motion upon each other, which is, however, restrained within certain limits by the attachments of their anterior and posterior edges to the sclerotic coat; and by their being bound together with a tough ligamentous substance, which seems to be the continuation of the sclerotic between the edges that overlap each other.

The *cornea* possesses the same structure as in mammalia, but differs with respect to form. When the posterior part of the eye is compressed by the muscles, the humours are urged forwards and distend the cornea; which, at that time, becomes much more prominent in most birds than it is ever observed in mammalia; and under such circumstances, the eye is in a state for perceiving near objects. When the muscles are quite relaxed, the contents of the eye-ball retire to the posterior part, and the cornea becomes flat, or even depressed; this is the condition in which we always find the eye of a dead bird, but we can have no opportunity of perceiving it during life. It is only practised for the purpose of rendering objects visible that are placed at an extreme distance. From the well known effects of form upon refracting media, it must be presumed, that the cornea possesses very little, if any, convexity, when a bird, which is soaring in the higher regions of the air, and invisible to us, discerns its prey upon the earth, and descends with unerring flight to the spot, as is customary with many of the rapacious tribe.

There are other circumstances in the anatomy of the eye of birds, which have been supposed to concur with the extraordinary variation in the figure of the cornea, in producing its capacity for the perception of remote objects: these will be mentioned in their proper place.

The *choroid coat* differs in no material point from that of the human subject. The *ciliary processes* of the choroides are very small and short; being merely serrated striæ. There appears to be no *tapetum*.

The *iris* is sometimes of brilliant colours, which are employed by naturalists as distinguishing specific characters of birds. *Parrots* have the power of voluntarily producing a great degree of motion in the iris. It does not appear, however, that other birds are capable of commanding the motions of this part.

The *pecten*, or *plicated membrane*, is the most singular part of the structure of the eye of birds. It appears to grow from the choroides where the optic nerve penetrates that coat; but on closer inspection it is found to have no inti-

mate connexion with it. In structure, however, it is perfectly similar to the choroides. The form of this part varies in different species; in general, it consists of a membrane folded backwards and forwards on itself, like the plaits of a garment, and presenting, when viewed on the side, something of the appearance of the teeth of a comb; on which account the name of *pecten* has been applied to it. In the *struthious birds*, the folds of the pecten are larger, and collected towards the point, giving it a resemblance to a purse. The Parisian academicians therefore, in taking their description of this part from the *ostrich*, called it the *marjubarium nigrum*, by which name it is still very commonly known. The plicated membrane proceeds into the substance of the vitreous humour, and usually becomes attached to the posterior part of the capsule of the crystalline lens a little to one side. In some instances it does not come into immediate contact with the capsule of the lens, but ends a very short way behind it amongst the cells of the vitreous humour: such is the case in the *turkey*, *jackdaw*, and several other birds. The number of the folds of the pecten vary. There are sixteen in the *stork*, fifteen in the *ostrich*, and seven in the great *horned owl*.

The functions of the plicated membrane have been often discussed, but still remain involved in some degree of doubt. Haller, and others, consider it as the medium through which the vessels are conducted to the crystalline lens; but there appears no reason for such a provision to exist in birds. Petit was of opinion that it absorbed the lateral rays of light, in order that objects placed immediately before the eye might be more distinctly seen; which is highly improbable, as the scope of vision is full as extensive in birds as in other animals. The best supported theory on this subject is Mr. Home's. The plicated membrane, according to his experiments, possesses a contractile power, and affords the means of withdrawing the lens from the anterior part of the eye, when the organ is adapted to the perception of remote objects; thus acting in concert with the change of figure in the cornea. Experiments, however, upon the operations of the eye are so delicate in their nature, that they are seldom to be relied upon, and accordingly in different hands they have afforded very different results; but the doctrine of the muscularity of the plicated membrane is almost proved by its seeming necessity for the explanation of the powers of adaptation of the eyes to different distances, which birds possess in a degree far superior to all other animals; and it seems fair to infer that if the accommodation of vision depends upon the motion of the cornea, and the recession of the lens in those animals which are so eminently endowed with it, similar means are employed for the same purpose in the other classes which possess the faculty in a less degree. For the more ample discussion of this subject, see Mr. Home's lectures on muscular motion, published in the Philosophical Transactions for the years 1794, 1795, and 1796; Dr. Olbers' "De oculi mutationibus internis," Gotting. 1780; "The Essays of Petit, Mem. de l'Acad." 1735, p. 163. 1736, p. 166; "Observations on the Eyes of Birds," by Mr. Pierce Smith, Phil. Trans. for 1795; and "Dr. Young's Lecture on the Mechanism of the Eye," Phil. Trans. 1801.

The *optic nerve* passes through an oblique sheath in the back of the sclerotic coat, during which it changes from a round to a flattened shape, and as such, enters the eye, presenting on the inside an elongated white line, instead of a round disk, from which the retina is produced. The origin of the plicated membrane covers the entrance of the optic nerve.

The *humours* as well as the shape of the eye and the structure

ture of its coats, indicate the peculiar vision of birds and the kind of medium they inhabit. The *aqueous humour*, as already observed, is extremely abundant. It possesses considerable refractive powers especially in the higher regions of the atmosphere. The *crystalline* is remarkably flat and soft, as its offices can be so well supplied by the aqueous fluid in a rare medium. Both the form and the proportions of the humours in the eyes of all birds derive great illustration from being compared with those of *fishes*, which, in consequence of their continual residence in so dense a medium as water, have these parts formed upon a plan the very reverse.—Their eye is flat anteriorly; the aqueous fluid small in quantity, and of considerable consistence; and the lens spherical and hard, more especially in the centre. The *cormorant* has the crystalline more spherical than other birds, from being obliged to seek its food under the water.

The *muscles* for the motion of the eye-ball are six in birds, as in the human subject; the four straight and two oblique. The tendons of the recti cannot be traced farther than the circle of imbricated bones. The operation of the straight muscles, when acting together upon the figure of the eye (which, as already observed, is so striking in birds), depends upon the bony scales of the anterior part of the sclerotic, and the thinness and pliability of that tunic posteriorly. The superior-oblique muscle does not pass through a pulley.

The *external eye-lids* are chiefly closed in birds by the elevation of the lower one, although there is an orbicular muscle which surrounds both. The inferior eye-lid is larger and thicker than the other, and contains internally an oval cartilaginous plate, under which the fibres of the orbicularis palpebrarum pass. There is also a peculiar muscle, which comes from the floor of the orbit, and acts as a *depressor* of the inferior eye-lid.

The *internal eye-lid*, or *membrana nictitans*, is a thin semi-transparent membrane, which lies close to the globe of the eye. It has a vertical position, and, when not employed, is folded back by virtue of its own elasticity, and remains concealed from view in the corner of the eye next the nose. It is, however, capable of being spread over the whole of the anterior part of the organ, by means of the combined action of two curiously contrived muscles. One of them is of a square figure, and thence called *quadratus*; it arises from the upper and back part of the eye-ball, and approaching the optic nerve, terminates abruptly in a circular edge, which contains a pulley for the passage of the tendon of the *pyramidalis*. This muscle arises from the side of the sclerotic next the nose a little inferiorly, and produces a fine tendon, which runs through the pulley formed in the free edge of the quadratus, and afterwards returns in a cellular sheath on the lower surface of the sclerotic, and becomes attached to the margin of the membrana nictitans, along which it is continued for some way, and gradually lost.

The *lacrimal gland* is small in most birds. The *glandula lacrimalis* exists, and is larger than the lacrimal. Cuvier describes it as being generally situated between the adductor and levator muscles, and as having a single excretory duct, which perforates the membrana nictitans, and discharges upon its inner surface a yellow tenacious fluid. Many *water-birds* have a hard granular body placed at the superior part of the orbit, which seems to perform the office of a lacrimal gland; and although its excretory ducts have not been yet seen, it probably furnishes a fluid of a peculiar nature, for the defence of the eye against the effects of the water and other accidents to which aquatic birds are exposed.

The figures, which serve to explain the organization of the eye, are found in *Plate XI. of the Anatomy of Birds. Fig. 1.*

shews the cornea and imbricated bony scales of the *goose*, as an example of the figure these parts commonly assume in birds. *Fig. 2.* represents the same parts in the *horned owl*, in which the cornea will be seen very prominent, and the scales greatly elongated, forming the fore part of the eye into a tube. *Fig. 3.* exhibits a lateral view of the crystalline lens and the plicated membrane in the *goose's* eye; *a* the pecten attached to the posterior part of the lens a little to one side; *b* the edge of the lens marked by the ciliary processes; *c* the anterior part, which is particularly flat in birds. *Fig. 4.* shews the pecten and the lens in the relative situation they hold in the eye of the *turkey*; *a* the plicated membrane; *b* the lens; *c* the outline of the eye; *d* the optic nerve. *Fig. 5.* is a section of the eye of the *emou*; *a a* the cut edges of the sclerotic coat; *b b* the edges of the choroides; *c* the retina; *d* the plicated membrane formed like a purse. *Fig. 6.* presents the anterior part of the eye of the *casowary*, with the membrana nictitans partially drawn over it, which is so fine a film that the parts of the eye are seen through it. *Fig. 7.* is the posterior view of the *casowary's* eye, all the muscles, &c. being removed, but those for moving the membrana nictitans: *a* the musculus quadratus; *b* the pyramidalis at its origin; *c* its tendon passing through the pulley in the edge of the quadratus; *d* the tendon proceeding on the sclerotic coat.

Organ of Voice.

Until within these late years this part of the anatomy of birds has been involved in obscurity. Although several of the older anatomists described the structure by which birds produce sound, they were ignorant of its uses, from being misled by analogy, and supposing that this organ occupied the same situation in all animals. Even some of the descriptions of the ablest of the modern anatomists have been erroneous or imperfect. The subject has been most laboriously and ingeniously investigated by Cuvier. He dissected the organs of voice of more than one hundred and sixty species of birds, and published the result of his inquiries in two memoirs; the principal one will be found in the *Magazin Encyclopedique*, tom. 2, to which we would refer the reader for numerous and minute details, that would be burdensome to introduce into the present work.

The true seat of the organ of voice in birds is at the bifurcation of the trachea, and not, as general analogy would dictate, at the superior larynx, which is in birds little more than a simple rima, or slit, formed, however, with somewhat differently shaped cartilages than belong to the rest of the trachea, and furnished with muscles for opening and closing the aperture. The mechanism of the inferior larynx, which fits it for the production of sound, depends upon the figure of its cartilages, and the expansion of its membranous parts.

The two branches of the bronchiæ are composed of semi-rings of cartilage; the internal surfaces, or those opposed to each other, being membranous. The semi-rings next the trachea are often large, and always less curved than those near the lungs. The consequence of which is, that the membranous part of the bronchiæ becomes expanded in proportion to its distance from the lungs, and towards the bifurcation usually assumes an oval figure, to which Cuvier has given the name of the *tympaniform membrane*.

Where the bronchiæ open into the trachea, there is the appearance internally of the reed of a musical instrument. This is produced by a thin and elastic fold of the inner membrane, which projects upwards from each side. The aperture is divided into two, sometimes by an osseous bar extended across from before backwards, and sometimes merely by the angle produced by the union of the two bronchiæ.

When the air is expelled from the lungs and air-cells with
force

force through the bronchiæ, a lively vibration is excited in the tympaniform membrane and the reed shaped aperture, or glottis, upon which the production of the voice essentially depends.

The magnitude, figure, and proportions of the inferior larynx vary more or less in almost every species, which Cuvier has taken great pains to point out.

The trachea is commonly enlarged, at its bifurcation, by the expansion and union of its last cartilaginous rings, which is designed to afford strength to the voice.

In the *stare* and the *singing birds* the last rings of the trachea are united into a single piece, of which the base is wide, and furnished with two points that are joined by a transverse osseous bar in such a way, that the trachea communicates by two openings with each of the bronchiæ.

In the *parrot*, the last rings of the trachea are united, and form a tube a little compressed on the sides. The very last ring is almost square; it is also flattened before and behind, and furnished posteriorly with two points. There is no partition within. The sides of the bronchiæ, opposite to each other, are membranous. The first semi-ring is large, flat, and shaped like a crescent; the second, third, and fourth semi-rings unite in one piece; and the fifth, sixth, and seventh are consolidated into a similar plate. The edges of both, however, present the marks of their original parts.

In the *nocturnal birds of prey*, the last ring of the trachea is divided by a bone.

In the *scolopax rusticola*, the four last cartilaginous rings of the trachea are incomplete posteriorly, and the tympaniform membrane is continued up between them.

The male birds of the *duck* kind, and the genus *mergus*, have the last rings of the trachea united, and forming a cartilaginous or bony sack, called by authors the *ampulla*, or the *labyrinth*. This part, in the *mallard*, forms two dilatations; the one on the right is small, and resembles a truncated cone, with a prominence from the base behind. The left is a large vesicle irregularly rounded, and produces at the lower part a pyramidal projection. Its right surface is a little flattened below, and its inferior border is indented. The cavity is interrupted by projections, or septa, in such a manner, that the air cannot pass from the left bronchia into the trachea, but through the capsule, although on the right side it may. The entrance to the bronchiæ is provided with a thick membrane, under which there are some glands resembling the *synovial*, that secrete a mucous fluid.

The form and internal partitions of the ampullæ of the *drakes* of other species and the *mergansers*, are different in every instance. Their deviations are described at length by Cuvier. See *Memoire sur le larynx inferieur des oiseaux*, *Magazin Encycopdique*, tom. 2d.

Two species of *vulture* (*V. papa* and *V. aura*) were observed by Cuvier to be deprived of the organ of voice, there being neither the tympaniform membrane, nor any contraction, or projecting elastic parts at the entrance of the bronchiæ into the trachea.

The voice of birds is modified, and the tones rendered more acute or grave, by means of two descriptions of muscles. The first are common to all species, and have been long known and described. They were called by Vic d'Azir the *inferior* or *external laryngeal*. They are two fleshy cords, and arise from the triangular processes of the sternum, to which the superior ribs are joined within the chest, and proceed to the side of the trachea, above the bifurcation, along which they ascend for its greatest length. Their effect is to depress the inferior larynx, and contract the bronchia, and thereby relax the tympaniform membrane, and deepen the tone of voice, and in some circumstances they

may also bring the trachea forwards. These were the only muscles observed by Cuvier in the *gallina*, and most of the *anferes*. It is probable, that no others are to be found also in the *struthious* birds.

The second kind of muscles are confined to the inferior larynx; they are short, and situated upon each side of the bifurcation of the trachea; and, except in the *parrot* tribe, are all constrictors, or intended to render the tympaniform membrane tense, and thus exalt the tones of voice.

In most birds, which do not sing, there is but a single pair of constrictors, one on each side, which arises from some of the last rings of the trachea, and is inserted into some of the first semi-rings of the bronchia. These muscles are longest in the *nocturnal birds of prey*, extending from the base of the trachea to the seventh semi-ring. The constrictor is attached to the fifth semi-ring in the *cuckoo*, the *heron*, and *bittern*. The latter birds owe their strength of voice to the elasticity of the semi-rings, and the extent of the tympaniform membrane. The *goat-sucker*, *king-fisher*, and *pelican*, have the constrictor muscle affixed to the second semi-ring of the bronchia; and the *woodcock*, *phalarope*, *coots*, and the *plowers*, and *recurvirostra*, and probably all the weak billed *gralla*, have it inserted into the first semi-ring.

The larynx of *singing birds*, and some others, is provided with five constrictors on each side, which Cuvier has named, according to their situation and direction.

1. The *anterior longitudinal constrictor*.
2. The *posterior longitudinal constrictor*.
3. The *small longitudinal constrictor*.
4. The *oblique constrictor*.
5. The *transverse constrictor*.

These almost surround the bifurcation of the trachea, to which they have all the same attachments, as near as may be. The two first are inserted into the third semi-ring; the two next into the second semi-ring; and the last is affixed to the first semi-ring, and particularly to a little cartilage that is joined to it.

Cuvier has observed the five pair of constrictors in all the *singing birds*, in the *stare*, in all the *passeres*, except the *swallow* and *goat-sucker*, and in the *crow*, *raven*, *jay* and many of the *pie* kind.

The most complicated instrument of voice amongst birds, is that of the *parrot* tribe. It possesses three pair of muscles; but one pair is intended to relax the opening of the glottis.

The *principal constrictor* arises from the last ring but one of the trachea, descends almost perpendicularly upon the laxator, and then goes on to be inserted into the union of the fifth, sixth, and seventh semi-rings of the bronchia. Its attachment being joined to the semicircular plate, it urges the upper part of the plate inwards, and thus contracts the glottis.

The *auxiliary constrictor* occupies, for a certain distance, the anterior part of the trachea, and sends off a tendon, which is lost in the preceding muscle; its operation therefore, is exactly the same.

The *laxator* is placed under the two other muscles; it arises along the side of the trachea, and expands upon the inferior concave edge of the last ring; in drawing which outwards, the muscle enlarges the glottis.

See *Plate XI. in the Anatomy of Birds. Fig. 8.* shews the external appearance of the inferior larynx in the *owl*; *a* the lower part of the trachea; *b* the two bronchiæ; *c* the external laryngeal muscles, which are common to all birds; *d* the constrictor. *Fig. 9.* of the same plate exhibits the organ of voice in the *thrush*; *a* the anterior longitudinal constrictor; *b* the transverse constrictor partially exposed under

under it; *c* the posterior longitudinal constrictor, detached at one extremity, and turned outward: and *Fig. 10.* affords another view of the same subject: the posterior longitudinal constrictor is turned down to expose those that lie behind it; *a* the little longitudinal constrictor; *b* the oblique constrictor. *Fig. 11.* of *Plate X.* represents the anterior part of the organ of voice in the *parrot*; *a* the principal constrictor; *b* the auxiliary one; *c* the laxator: and *Fig. 12.* gives a lateral view of the same parts, which are indicated by corresponding letters.

The *trachea*, in several birds, is found to assume singular forms, and to suffer enlargements at particular places. These have long attracted the attention of naturalists. Some of the best observations on the subject have been made by Dr. Bloch of Berlin, and by Pallas, Silberfeld, Beckmann, and Otto, who have each published in the Berlin Transactions, *See Besch. des Berl. Nat. F. i. ii. iii. & iv.* But by far the most copious account of the peculiarities of the trachea of birds, has been given by Dr. Latham in the Linnæan Transactions, vol. iv. p. 90.

The deviations from the common structure of the trachea, have been divided by Dr. Latham into two kinds. In one the windpipe does not alter its capacity, but possesses an unusual length, which is disposed of either in convolutions on the outer part of the body underneath the integuments, or in a cavity formed within the sternum for the purpose. The other kind of deviation consists in dilatations occurring either at the bifurcation of the trachea, or both there and in the middle of the tube.

The trachea of the *wood grouse*, when arrived at the crop, takes a bend upwards for a little way, and again turns down, and pursues its course to the lungs. There has been no peculiarity observed in the other birds of this genus which visit this kingdom.

In the *marail turkey* (*penelope marail.*) the trachea makes a round turn on the outside of the top of the sternum, and then enters the chest.

In the *male parrake pheasant*, the wind-pipe descends under the skin more than half the length of the body, before it returns to enter the thorax.

The *guan* (*penelope cristata*) has the trachea still longer than the preceding. It passes to the very bottom of the belly, and then turns up again, before it makes the double. See *Plate XI.* in the *Anatomy of Birds*, *fig. 13.*

The *Indian cock* was observed by the academicians to have a degree of convolution in the trachea, which varies somewhat in different individuals.

The *cassero curaffow* has the most remarkable convolutions of the trachea. It first descends upon the right pectoral muscle to the end of the sternum, where it makes a convolution to the left, something in the shape of a ring, after which it returns to the right pectoral muscle, and goes over the clavicle into the thorax.

The *semi-palmated goose* of *New Holland* has an extensive convolution of the trachea under the skin. Its note is said to be very musical.

The *ardea virgo*, the *wild* or *whistling swan*, and the *crane*, have the winding of the trachea accommodated in the keel of the sternum. It is singular that this structure does not exist in the *tame swan*, which in other respects so much resembles the wild bird. See *Plate XI.* in the *Anatomy of Birds*. *Fig. 14.* shews those parts in the *wild swan*; *aaa* the sternum cut open to expose the cavity which lodges the trachea; *bbb* the trachea; *cc* the fork; *dd* the clavicles. The above structure belongs to both sexes.

The dilatations of the trachea are confined to two genera,

anas and *mergus*; and, as already observed, are only to be met with in the male birds.

The bony enlargements at the bifurcation into the bronchia, which are called *ampulle*, or *labyrinths*, exist in every species of duck and merganser. They consist of two cells, one in general much larger than the other. In some instances the parietes of the cells are in a great measure formed by a membrane spread across it, like the head of a drum. There is also a bony arch turned across to give it length. This is the case in the *scamp duck*, the *poehard*, *tufted duck*, the *smew*, &c. See *Plate XI.* *Fig. 15.* is the end of the wind-pipe of the *poehard* (*anas ferina*).

The trachea of the *golden eye duck* is very curious. The labyrinth is more complicated than usual; and there is a singular enlargement in the middle, which is formed by cartilaginous joints, or plaits, placed obliquely, and folding over each other, so that the part admits of being contracted and lengthened, as the motions of the neck may require.

The *velvet duck* is distinguished by two very remarkable osseous enlargements, one is situated immediately below the superior larynx, and another in the middle of the wind-pipe. The lower part does not form the usual ampulla, but the bronchiæ become for a little way bony canals. See *Plate XI.* in the *Anatomy of Birds*. *Fig. 16.* represents the trachea of the *velvet duck*; *a* the superior, or laryngeal osseous cell; *b* the bony cavity of the middle; *cc* the osseous parts of the bronchiæ.

The *red-breasted merganser* has the middle of the trachea formed like that of the *golden eye duck*, only the plaits are made of bone, and curiously furrowed; indeed all the trachea of the mergansers, as Dr. Latham observes, consists of little else than bone.

A very little comparison of the mechanism of wind musical instruments with the organs of voice in birds, will shew how nearly they are allied to each other; and it may be observed, that the sound produced by some of the larger birds is exactly similar to the notes that proceed from a *clarionet* or *hautboy* in the hands of an untutored musician. The inferior glottis exactly corresponds to the reed, and produces the tone or simple sound. The superior larynx gives it utterance as the holes of the instrument; but the strength and body of the note depend upon the extent and capacity of the trachea, and the hardness and elasticity of its parts. The convolution and bony cells of the wind-pipe, therefore, may be compared to the turns of a *French horn*, and the divisions of a *basoon*; and they produce the proper effects of these parts in the voices of those birds in which they are found.

BIRD, in *Astronomy*, *Avis Indica*. See *AVUS*.

BIRD of *Phœbus*, the *Raven*, one of the southern constellations. See *CORVUS*.

BIRDS, in *Ancient Augury*. Prescience, or knowledge of futurity, was supposed, among the ancients, a natural faculty of birds, owing, perhaps, to their nearer intercourse with heaven, or their breathing a purer and more celestial air than other animals. Hence it was, that divination by birds obtained among the ancient Greeks and Romans, being performed by observing, and interpreting the flight, chirping and feeding of divers birds. (See *AUGURY*.) Birds, with regard to augury and divination, were of divers kinds, viz. *Aves auspicate*, or *felices*, those which naturally portended good: such were the dove, swan, &c. *Aves inauspicate*, or *diræ*, *ominose*, those which boded some evil or mischief: such were the kite, raven, crow, and owl, every where, except at Athens. *Admissiva*, that which excites and encourages the consulter to execute what he has in view. *Arcina* or *arcula*, that which forbid a thing to be done; otherwise called

called *clivia*, *clamatoria*, and *prohibitoria*, *inebra*, and *inhiba*. *Incendiaria*, that which gave omen of a fire, or other calamity; or which is seen carrying a firebrand from the funeral pile to a house. *Remora*, that which stays or delays an action. *Sinistra*, that on the left hand, denoted a happy or prosperous omen; and was also called *secunda*, *prospera*. *Alites*, those which gave omens by their wings and flight. *Ofcines*, those by their singing or chirping. *Pulli*, by their pecking. *Præpætes*, those which by their flight, or perching, gave happy omens. *Inferæ*, or *inebræ*, those which in like manner gave ill omens.

BIRD, WILLIAM, in *Musical Biography*. This worthy and admirable scholar of the profound Tallis, is supposed to have been the son of Thomas Bird, one of the gentlemen of Edward the sixth's chapel, in which he was himself a singing-boy. By the great number of his ecclesiastical compositions to Latin words, and the several portions of the Romish ritual which he so frequently set to music, and published late in life, he seems to have been long a zealous adherent to that religion. He must, however, have conformed to the church establishments of queen Elizabeth's reign; for, in 1563, he was chosen organist of Lincoln cathedral, where he continued till 1569, when, upon the accidental death of Robert Parsons, who was drowned at Newark-upon-Trent, he was appointed gentleman of the chapel royal. Notwithstanding which office, he seems to have composed the chief part of his Choral Music to Latin words, and to have published it in that language, as late as the middle of the reign of king James I.

In 1575, it appears by the title-page of the "Cantiones Sacræ," and the patent annexed to that work, that he and Tallis were not only gentlemen of the royal chapel, but organists to her majesty queen Elizabeth. Indeed both must have been great performers on the organ, to have been able to play such of their pieces for that instrument as are still preserved; in which the passages, though awkward to performers who are only accustomed to modern music, must have been suggested by persons that were habituated to the complicated, and now, almost, invincible difficulties of the sixteenth century. And though the compositions for keyed-instruments by these great masters of harmony, are totally unimpassioned, and without grace, it is impossible not to regard their ingenuity and contrivance in the texture of the parts, with respect and wonder!

If we consider the elaborate style of composition which prevailed, particularly in the church, during the time of Bird, and that he, like his master Tallis, was not only ambitious of vanquishing its usual difficulties in the construction of fugues and canons, but sought new complications, perplexities, and involutions in the motion and arrangement of the parts, the following list of his works will not only manifest diligence, but fecundity.

Besides the great share he had in the "Cantiones Sacræ," published in conjunction with his master Tallis, in 1575, when his name first appears as an author; and without enumerating many admirable compositions for the church and chamber, still subsisting, but which were never printed, or, at least, not till after his decease, he published "Psalms, Sonnets, and Songs of Sadness and Piety," of five parts, 1588; "Liber primus sacrarum Cantionum, quinque vocum," 1589; "Songs of sundrie Natures, some of Gravitie, and others of Myrth, fit for all Companies and Voyces," 1589; "Gradualia ac Cantiones Sacræ, Lib. primus et secundus," 1607 and 1610. The last work published by himself, was entitled, "Psalms, Songs, and Sonnets: some solemn, others joyful, framed to the Life of the Words, fit for Voyces or Viol, of three, four, five, and six partes,"

1611. Dr. Tudway's collection, in the British Museum, contains a whole service in D minor, by Bird, with responses, and the anthems, "Sing joyful unto God,"—"O Lord, turn thy Wrath,"—(all published in the second and third volumes of Dr. Boyce's Cathedral Music.)—"O Lord, make thy Servant;" "Save me, O God;" "Prevent us, O Lord;" "Civitas sancti tuo." one of his Sacrarum Cantionum, or Sacred Songs, published 1589, has been long sung in our cathedrals to the English words, "Bow thine ear, O Lord," and is one of the admirable pieces of harmony in the second volume of Boyce's printed collection.

Dr. Aldrich, who was a great admirer and collector of the works of Bird, and who adapted English words to most of his compositions which have been used in our cathedrals, and that were originally set to parts of the Romish service, in Latin, has bequeathed to Christ Church, Oxon, beautiful and correct copies of most of his productions, in a set of books, small 4to. In this library near forty of his compositions are preserved; and in another set, many more, with those of Tallis, Taverner, Tye, White, Redford, both the Mundys, Shepherd, Bull, and other contemporary English masters.

Bird's pieces for the organ and virginals are almost innumerable. In a magnificent folio manuscript, curiously bound in red morocco, formerly in Dr. Pepusch's collection, which is generally known by the name of "Queen Elizabeth's Virginal Book," there are near 70 of his compositions.

The first piece by Bird, in this book, and the eighth in the collection, is a Fantasia, which generally implies a Fugue, in which the subject is as frequently changed as in ancient Choral Music, where new words require new accents and intervals; for as yet, it was not the custom in composing fugues to confine a whole movement to one theme: and here Bird introduces five or six, wholly different and unconnected with each other.

The subject of the second composition, by Bird, in the Royal Virginal Book, is the tune of an old ballad, "John come kiss me now;" of which, with great labour and ingenuity, he has varied the accompaniments sixteen different ways; for while the treble, base, or some inward part, is always playing the original air, three other parts are moving in fugue, or running rapid and difficult divisions. No. 52, is another Fancie; and 56, a Pavan, by Bird; which implied a grave majestic dance, in common time, similar to the movement of the peacock. This strain was usually followed by the Galliard; which, on the contrary, was a gay and lively dance, in triple time, but on the same strain as the preceding Pavan. No. 58, is entitled, "The Peacock's Whistle." From No. 58 to 69, the compositions are all by Bird; consisting chiefly of old tunes, with variations; among which is "Fortune," a plaintive and expressive melody, to which the ballad, called "Titus Andronicus's Complaint," inserted in Reliques of ancient English Poetry, vol. i. p. 204, was originally written. It has been imagined that the rage for variations, that is, multiplying notes, and disguising the melody of an easy, and, generally, well-known air, by every means that a *spacca nota*, or note splitter, sees possible, was the contagion of the last century; but it appears from the Virginal Book, that this species of influenza, or corruption of air, was more excessive in the sixteenth century, than at any other period of musical history.

Crowded and elaborate as is the harmony, and uncouth and antiquated the melody, of all the pieces in this collection by various composers, there is a manifest superiority in those of Bird over all the rest, both in texture and design. In a later age his genius would have expanded in works of invention, taste, and elegance; but, at the period in which

he flourished, nothing seems to have been thought necessary for keyed-instruments, except variations to old tunes, in which all the harmony was crowded, which the fingers could grasp, and all the rapid divisions of the times, which they could execute. Even nominal fancies were without fancy, and confined to the repetition of a few dry and unmeaning notes in fugue, or imitation. Invention was so young and feeble, as to be unable to go alone; and old chants of the church, or tunes of the street, were its leading-strings and guides.

Though the reformation had banished superstition from the land, fragments of *canto fermo*, like rags of popery, still remained in our old secular tunes, and continued to have admission in the new. Indeed the melodies of all the rest of Europe had no other model than the chants of the church, till the cultivation of the musical drama; whence all the rhythm, accent, and grace of modern music, have manifestly been derived.

Besides the great number of Bird's compositions for keyed-instruments, which are preserved in the Virginal Book of queen Elizabeth, another manuscript collection of his pieces still subsists, under the title of "Lady Nevil's Music Book." It is a thick quarto, very splendidly bound and gilt, with the family arms beautifully emblazoned and illuminated on the first page, and the initials HN at the lowest left hand corner. The music is all written in large, bold characters, with great neatness, on four staved paper, of six lines, by Jo. Baldwin, a singing-man at Windsor, and a celebrated copyist of queen Elizabeth's time. The pieces contained in this collection, sixteen of which are entered in that queen's virginal book, amount to forty-two, with variations to many of them, of the most laboured and difficult kind. The notes, both white and black, are of the lozenge form, like those of the printed music of the same period.



Lady Nevil seems to have been the scholar of Bird, who professedly composed several of the pieces for her ladyship's use.

None of Bird's pieces for keyed-instruments seem to have been printed, except eight movements in a thin folio book of lessons that was engraved on copper, and published in the reign of king James I. under the following title: "Parthenia, or the Maidenhead of the Musicke that ever was printed for the Virginals. Composed by three famous masters: William Bird, Dr. John Bull, and Orlando Gibbons, gentlemen of his majesty's most illustrious chappel." These lessons, though not equally difficult with some of those in the Virginal Books of queen Elizabeth and lady Nevil, are rather more dry and ungraceful.

The canon, *Non nobis Domine*, appears in none of his works published by himself, or collected by others, before the year 1652; when Hilton inserted, and prefixed the name of Bird to it, in a collection of catches, rounds, and canons. But as no claim was laid to it by, or in favour of, any other composer, before or since that time, till about the middle of the last century, when it was given to Palestrina by Carlo Ricciotti, who published, in Holland, among his concertos, a fugue in eight parts, on the same subject, there seems no doubt remaining of our countryman Bird having been the author of that pleasing and popular composition.

Bird died in 1623, surviving his master Tallis thirty-eight years; and if we suppose him to have been twenty in the year 1563, when he was chosen organist of Lincoln, he must have been eighty at his decease. Peacham, in his *Complete Gentleman*, speaks of him with great reverence; "For

Motets and Musicke of piety and devotion, as well for the honour of our nation, as the merit of the man, I preferre above all others our Phœnix, Master William Byrd, whom in that kind I know not whether any may equal. I am sure none excell, even by the judgement of France and Italy, who are very sparing in their commendation of strangers, in regard of that conceipt they hold of themselves. His Cantiones Sacræ, as also his Gradualia, are meere angelicall and divine; and being of himselfe naturally disposed to gravity and piety, his veine is not so much for light madrigals or canzonets; yet his Virginella, and some others in his first set, cannot be mended by the first Italian of them all." *Second Impression*, p. 100. His pupil, Morley, in his *Introduction*, every professor and musical writer of his own and later times, never mention him but with the highest respect. At this remote period but little, however, can be known of his private life, which was too studious and sedentary to have furnished history, at any time, with events of general interest. With respect to what Ant. Wood asserts in his *Fasti*, that "Bird was excellent in mathematics," it is, in his usual way, supported by no proof: and indeed mathematics have so little to do with practical music, either in composition or performance, that those musicians, who are most ignorant of the ratio or philosophy of sounds, seem constantly to have arrived at the highest degree of excellence in the selection, combination, and refinement of them in practice, by the mere assistance of experience, and the gift of good ears and powerful voices. That he was a diligent cultivator of his art appears from his numerous works, which are more the productions of meditation and study than of haste and enthusiasm. That he was pious, the words he selected, and the solemnity and gravity of style with which he set them, sufficiently evince. Of his moral character, and natural disposition, there can, perhaps, be no testimonies more favourable, or less subject to suspicion, than those of rival professors, with whom he appears to have lived during a long life with cordiality and friendship. And, of the goodness of his heart, it is, to us, no trivial proof, that he loved, and was beloved, by his master, Tallis, and scholar, Morley; who, from their intimate connexion with him, must have seen him *en robe de chambre*, and been spectators of all the operations of temper, in the opposite situations of subjection and dominion.

Indeed, the best memorials of a professional man's existence are his surviving works; which, from their having been thought worthy of preservation by posterity, entitle him to a niche in the Temple of Fame, among the benefactors of mankind. The physician who heals the diseases, and alleviates the anguish of the body, certainly merits a more conspicuous and honourable place there; but the musician, who eminently fooths our sorrows, and innocently diverts the mind from its cares during health, renders his memory dear to the grateful and refined part of mankind, in every civilized nation.

BIRD cherry, in Botany. See PRUNUS Padus.

BIRD'S eye. See ADONIS.

BIRD'S foot. See ORNITHOPUS.

BIRD'S foot trefoil. See LOTUS.

BIRD'S nest, a name used by some for the daucus, or carrot; and by others for ophrys.

BIRD'S nest purple. See ORCHIS.

BIRD pepper. See CAPSICUM.

BIRD'S tongue. See SENECIO.

BIRDS, Canary. See CANARY birds.

BIRD of the wise, among Alchemists, is the philosophical mercury; and, in general, sublimate or substances spiritualized by the separation of their terrestrial part.

BIRD, golden, the hermetic matter partly matured.

BIRD, green, the philosopher's stone, at the time when its green colour appears.

BIRDS, Cyprian, aves Cypricae, or aviculae Cypricae, is a denomination given to a kind of odorous candles, made of the matter of troches, and burnt for the sake of their fumes, called also, from their figure, *laculi*, or *flicks*.

BIRD of Hermes, avis, or avicula Hermetica. Alchemists speak much of that which flies in the night without wings. Some will have the *avicula Hermetica* to be an universal salt prepared from dew.—It also denotes red-lead.

BIRDS, decoy, are those which are trained up to call and allure others into the fowler's nets, snares, lime-twigs, or the like. See **DECOY**.

BIRDS, Humming. See **HUMMING-bird**.

BIRDS, in Domestic Economy, and in reference to their use as aliments. See **FOWL**.

BIRD, in Falconry, denotes a hawk, or falcon. See **FALCON**. *Nides birds, aves nidularia*, denote those taken while in the nest. *Ramage birds, arborariae aves*, are those only arrived at strength sufficient to fly from branch to branch. *Hazard bird*, is that which has lived at liberty, and is thence more wild and untractable. *Bird of the fist*, is that which having been reclaimed, returns to, and perches on the hand, without the help of a lure. *Bird of lure*, signifies that which comes to the lure, and by that means to the hand. *Bastard bird*, a hawk, for instance, bred of a hawk and a lanier; or a faker, bred of a faker and a lanier. *Coward birds*, those which only pursue their game for their own belly, and which are not to be reduced to just sport; as ravens, kites, &c.

BIRD, in Geography, the name of a small island in Dunmannus bay, in the county of Cork, Ireland.—Also, another small island in Strangford lough, and county of Down.—Also, one of the Bermudas islands.—Also, a small island in the gulf of St. Lawrence, 21 leagues W. of cape Anguilla on the island of Newfoundland. N. lat. 47° 55'. W. long. 60° 45'.—Also, an island in the southern Pacific Ocean, discovered by capt. Cook, in 1769, in his voyage from Cape Horn to Otaheite, covered with verdure, and inhabited. S. lat. 17° 48'. E. long. 216° 24'.—Also, an island in the southern Pacific Ocean, near the north-west coast of the island of New Georgia, discovered by capt. Cook in 1775. S. lat. 54°. W. long. 38° 22'.—Also, an island of the same ocean, discovered, in 1788, by the commander of the Prince of Wales, and so called from its being the resort of many birds. This solitary island, or rather single rock, rising out of the immense ocean, was particularly examined by Vancouver in 1794. Its greatest extent, in a direction S. 74 W. and N. 74 E. did not exceed one mile; and its northern, eastern, and western extremities, against which the sea broke with great violence, presented a very awful appearance, rising perpendicularly from the ocean in lofty rugged cliffs, inaccessible except to its winged inhabitants; on its southern side the ascent is not so steep and abrupt; and near its western extremity is a small sandy beach, where, in fine weather, and with a smooth sea, a landing might probably be effected. At this place was the appearance of a little verdure, though it was destitute of tree or shrub; every other part was apparently without soil, and consisted only of the naked rock. The whole circumference does not exceed a league, and it is situated in N. lat. 23° 6'. E. long. 198° 8'. It lies from Onehow, one of the Sandwich islands, N. 51 W. at the distance of 39 leagues; it is recognized by the natives of those islands under the appellation of "Modoo Mannoo," that is, bird island; and from its great distance from all other islands, and its proximity to their islands, it seems to claim some pretensions to be ranked in the group of the Sandwich islands;

which see.—Also, a small island near the north-east coast of New Holland, lying low and almost covered with birds; 4 leagues N. W. from cape Grenville. For other islands under this denomination; see **AVES**.

BIRD fort, an American fort on Monongahela river; 40 miles south of Fort Pitt.

BIRDS-Key, or Round island, a small island, or rock, among the Virgin islands, in the West Indies; 2 leagues S. of St. John's island; and 3 N. E. from St. Croix, or Santa Cruz. N. lat. 17° 55'. W. long. 64° 36'.

BIRDS, Message, aves internunciae, denote those that are employed to convey letters or other dispatches, either for the sake of expedition or safety. See **CARRIER PIGEON** and **ALEPPO**.

BIRD, mocking, the *turdus polyglottus*; which see. See also **MOCK bird**.

BIRD bolt, in *Heraldry*, is a small arrow with a blunt head, and often represented in armory, with two and sometimes three heads rounded, but in that case the number of heads must be noticed.

BIRD call, a small stick cleft at one end, in which is put a leaf of some plant, that serves to counterfeit the call of several birds, and to bring them to the net, snare, &c. by which they are taken. A laurel leaf fitted on the bird-call counterfeits the voice of lapwings, a leek that of the nightingale, &c. See **CALL** and **BIRD-catching**.

BIRD Catching, in its most comprehensive sense, denotes the art of taking birds or wild-fowl, either for food, or for enjoying the pleasure of their song in cages, or for preventing the destruction which some species of them occasion to the husbandman. Some recur to it as an amusing pastime, and others practise it as a profitable employment; and with a view to one or other of these objects, various modes of taking birds have been adopted, and the practice is in some places reduced to a kind of system. One of these methods is denominated **BAT-FOWLING**, or, as some term it, *Bat-folding*. For this purpose, five or six persons commonly provide themselves with a large net, expanding, when open, to the extent of a man's arms, and about three yards high, and formed of meshes so small as not to allow the escape of the smallest bird. The extremities of the net are attached to two poles, held one in each hand of the person who has the management of it. With this, and a large lantern affixed to a pole, the party proceeds to corn-fields, out-houses, yew-hedges, thatched buildings, &c. The cords of the net being separated to their utmost extent, it is placed before any spot where birds are supposed to roost, and the light being held before the centre of the net, the assistants in this operation beat the hedges, ricks, eaves, &c. with poles; and the birds, thus alarmed, fly towards the light, upon which the person who holds the net claps its poles together, and encloses the birds. From the latter circumstance, the net is called a *clap net*. Sparrows, larks, thrushes, and the other small birds, are thus caught in great numbers in dark nights. Another method of bat-fowling, is performed by means of a long net drawn over the ground, followed by a person bearing a light; and this net, in its passage, encloses and confines any birds that happen to be under it. But one of the most ingenious and systematic methods of bird-catching, is practised principally in the vicinity of London, by persons who find a ready market for birds used as food, or who deal in song-birds, which, at certain seasons of the year, change their situation, and are hence denominated birds of flight, in the language of this art. The birds usually taken on such occasions, are wood-larks, titlarks, linnets, aberdavines, gold-finches, and green-finches. They are principally

pally taken during what is called their flight, or while they congregate for the purpose of propagating their species. The wild birds begin to fly in the month of October, and part of the preceding and following months; and the flight in March is much less considerable than that of Michaelmas. It is to be noted also, that the several species of birds of flight do not appear exactly at the same time, but follow one another in succession. The pipit, which is a small species of lark, inferior in its song to other birds of that genus, begins his flight, every year, about Michaelmas; and then the wood-lark, linnet, gold-finch, chaffinch, green-finch, and other birds of flight succeed; all of which are not easily to be caught, or in any numbers, at any other time, particularly the pipit and the wood-lark. These birds, during the Michaelmas and March flights, are chiefly on the wing from day-break to noon, though there is afterwards a small flight from two till night; but this is so inconsiderable, that the bird-catchers always take up their nets at noon. Another circumstance worthy of notice is, that, during their sitting, they always fly against the wind; hence the bird-catchers eagerly contend for that point; so that if it be westerly, the bird-catcher, who lays his nets most to the east, is sure almost of catching every thing, provided that his call-birds are good: a gentle wind to the south-west generally produces the best sport. The nets used by the bird-catchers are about 12 yards long, and 2½ wide; which are known in most parts of England by the name of "day-nets," or "clap-nets," but the best are those that are used in the neighbourhood of London. These nets are spread upon the ground parallel to one another, and at such a distance, that when turned over, they shall coincide. The remaining apparatus consists of lines so fastened to the nets that the bird-catcher is able, by a sudden pull, to draw the net over the birds that may have alighted in the space between their parallel sides. These birds are enticed to alight by others usually denominated "call-birds," of which there are generally five or six linnets, two gold-finches, two green-finches, one woodlark, one red-pole, a yellow hammer, a titlark, and an aberdavine, and perhaps a bull-finch. These are placed at small distances from the nets in little cages. Besides these, the bird-catcher has others called "flur-birds," which are placed within the nets, raised upon the flur, and gently let down at the time the wild birds approach them. This "flur" is a moveable perch to which the bird is tied, and which the bird-catcher can raise or depress at pleasure, by means of a long string fastened to it. These flur-birds generally consist of the linnet, the gold-finch, and the green-finch, which are attached to the flur by what is called a "brace," which secures the birds without injuring their plumage. This brace is a sort of bandage, formed of a slender silken string, that is fastened round the body of the bird, and under the wings in such a manner as to prevent the bird's being hurt, however it may flutter when it is raised. The call-birds are particularly trained for the service to which they are appropriated. Accordingly, the bird-catchers contrive to improve the song of these birds, by causing them to moult before the usual time. For this purpose, they put them, in June and July, into a close box, under two or three folds of blankets, and leave their dung in the cage to increase their heat; and in this state they continue, being, perhaps, examined once a week to have fresh water. The air of the cage is so putrid, that they want little or no food, as they eat scarcely any thing during the whole period of their confinement, which is about a month. The birds frequently die under this operation; and on this account the "stopped bird," as it is called, is the more valuable. When the bird hath thus prematurely moulted, he is "in song," while the wild

birds are "out of song;" and his note is louder and more piercing than that of a wild one; and his plumage is by this process equally improved. The black and yellow in the wings of the gold-finch, for example, become deeper and more vivid, and acquire a very beautiful gloss, which is not to be seen in the wild bird. The bill, which in the latter is likewise black at the end, becomes in the "stopped bird" white and more taper, as are also its legs; and, in short, there is as much difference between a wild and a stopped bird, as there is between a horse, which is kept in bodycloths, and one at grass. When the bird-catcher hath laid his nets, he disposes of his "call-birds" at proper intervals; and Pennant observes, that a malicious joy appears in these call-birds, to bring the wild ones into the same state of captivity; and this is also the case with regard to the decoy ducks. After they have seen or heard the approach of the wild birds, which they observe long before it is perceived by the bird-catchers, the intelligence is announced from cage to cage, with the utmost ecstacy and joy. The note, by which they invite them down, is not a continued song, like what the bird uses in a chamber; but "short jerks," as they are called by the bird-catchers, which are heard at a great distance. So powerful is the ascendancy of this call over the wild birds, that the moment they hear it, they alight on a spot, within twenty yards of three or four bird-catchers, which otherwise would never have attracted their notice. It also frequently happens, that if, by pulling the string, half a flock only should be caught, the others who have escaped, will immediately return to the nets, and share the fate of their companions; and if only one bird should escape, that bird will still venture into the scene of danger, till it be caught; such is the fascinating power which the call-birds possess with regard to the others. A bird, acquainted with the nets, is by the bird-catchers termed a "sharper;" and this bird they endeavour to drive away, as they can have no sport, while it continues with them. These sportsmen frequently lay considerable wagers, whose call-bird can "jerk" the longest, as this circumstance determines their superiority. With this view, they place them opposite to each other, near an inch of candle, and the bird that jerks the oftent, before the candle is burnt out, wins the wager. Some birds have given 175 jerks in a quarter of an hour, and a finch has been known, in such a trial, to persevere in its emulation, till it swooned from the perch; thus, as Piny (l. x. c. 29.) says of the nightingale, "*victra morte finit sepe vitam, spiritu prius decedente quam cantu.*"

It is observable, that bird catchers immediately kill the hms of every species of birds they take, as they are incapable of singing, and inferior in plumage. The pipits, likewise, are indiscriminately destroyed, as the cock does not sing well. The dead birds are commonly sold for three-pence or four pence a dozen. The flesh of these is regarded as a delicate acquisition at the tables of the luxurious; and yet the taste for small birds is far from being so prevalent in England as it is in Italy, where they are eaten under the name of "beccaficos." However, the luxury of the modern Italians will appear to be parsimonious, when compared with the extravagance of their predecessors the Romans. (See *Clodius Aesop.*) The highest price given for singing birds in London, Mr. Pennant informs us, is about five guineas; this sum having been paid for a chaffinch, that had a particular and uncommon note, under which it was intended to train others, and five pounds ten shillings have been given for a call-bird linnet.

Mr. Pennant informs us, that when the titlarks are caught in the beginning of the season, it frequently happens, that 40 are taken without one female; the case is the same with the wheatear, and probably with respect to other birds: and this

this circumstance confirms the observation of Linnæus, that the male chaffinches fly by themselves, and the flight precedes the females; and the fact extends to other birds. Such birds as breed twice a year have generally in their first brood a majority of males, and in their second of females.

As the bull-finch, though it is not properly either a singing bird, or a bird of flight, its range being merely from hedge to hedge, fetches a good price on account of its learning to whistle tunes, and as it sometimes flies over the fields where the bird-catchers lay their nets, they have often a call-bird to ensnare it, though most of them can imitate the call with their mouths. It is a peculiarity with regard to this bird, that the female answers the purpose of a call-bird, as well as the male, which is not to be experienced in any other bird taken by the London bird-catcher. The nightingale, though distinguished as a singing-bird, moves only from hedge to hedge, and does not take the periodical flights of other birds in October and March; and therefore it is not classed by the bird-catchers among the birds of flight. The persons who catch these birds, make use of small trap-nets, without call-birds, and are considered inferior in dignity to other bird-catchers, who will not rank with them. The arrival of the nightingale is expected by the trappers in the neighbourhood of London the first week in April; at first, none but cocks are taken, but in a few days the hens make their appearance, generally by themselves, though sometimes a few males come along with them. They are caught in a net-trap, the bottom of which is surrounded with an ironing; and the net itself is somewhat larger than a cabbage-net. When the trappers hear or see them, they strew some fresh mould under the place, and bait the trap with a meal-worm from the baker's shop. In this way ten or twelve nightingales have been caught in a day. Pennant's Zool. vol. ii. Append.

Birds are caught in traps of various kinds; and frequently by nooses of hairs. In this way, great numbers of wheat-eaters are annually taken on the various downs of England. Small holes are dug by the shepherds in the ground, in each of which is placed a noose. Whenever a cloud obscures the sun, these timid birds seek for shelter under a stone, or creep into any holes that present themselves; and they are thus ensnared by the nooses which fasten around their necks. Woodcocks and snipes are taken likewise by nooses of horse-hair placed along their paths, in marshes and moist grounds. Wild ducks in all their varieties are taken in vast numbers every winter on our coasts by means of decoys. (See DECOY.) Grouse and partridges are taken by means of nets, either at night when resting on the ground, by observing where they alight, and when settled, drawing a net over that part of the field; or, in the day, a very steady dog is used to point at them. The attention of the birds being thus fixed, two persons, drawing the two extremities of a large net, pass it over them, and thus secure a whole pack of grouse, or covey of partridges at once. Pheasants are sometimes taken by night, by holding flaming sulphur under the trees on which they are observed to perch, the suffocating effluvia of which make them fall senseless. Mons. Pratty informs us, that, during his travels in North America, he took great numbers of the passenger-pigeon in a similar manner. For various methods of taking larks; see ALAUDA. For the use of bird-lime among bird-catchers; see BIRD-LIME.

In various parts of the world, peculiar modes are adopted for ensnaring and taking birds, some of which, whilst they are hazardous to those who practise them, excite no inconsiderable degree of surprise, and even of anxiety, in the spectators. Thus, in the Orkney islands, where the birds that

inhabit the rocks, and the eggs which they deposit among the cliffs, supply the principal food of many among the poorer inhabitants, the intrepid and adventurous fowlers climb rocky precipices more than fifty fathoms above the sea, and pass from one shelf or ledge to another, whose breadth is barely sufficient for resting places to the birds, which deposit their eggs upon them. In this hazardous employment, the adventurers are commonly lowered from above by means of a rope, formed often of brittle materials, and held by a single assistant. Fastened to this rope, the intrepid peasant descends, and searches all the cavities for eggs, springing from one projecting ledge to another, by the help of a pole, whilst the assistant, upon receiving the necessary signals, shifts the rope from one part of the rocky precipice to another. If the weight of the fowler and of his booty should, in these perilous circumstances, overpower his associate above, or the craggy rock cut the rope, inevitable destruction must await the adventurer; for he will either be dashed against the projecting rock, or drowned in the subjacent sea. But the most singular species of bird-catching is in the holm of Nofs, which is a huge rock severed from the isle of Nofs by some unknown convulsion, and distant from it about 16 fathoms. The opposite cliffs are separated by the raging sea. The adventurer, having reached the rock in a boat, and ascended to the top of it, fastens several stakes in the shallow soil that is found on the surface of the rock; and similar stakes are also attached to the edge of the corresponding and opposite cliff. A rope is then fixed to the stakes on both sides, upon which a machine, called a cradle, is contrived to slide; and by the help of a small parallel cord fastened in like manner, the daring adventurer wafts himself over, and returns with his booty.

In the Feroe islands the method of bird-catching is more extraordinary and hazardous than any which has already been recited. The cliffs, to which the fowlers recur, are in many cases 200 fathoms high; and they are traversed both from above and below. In the first case, the fowlers provide themselves with a rope 80 or 100 fathoms long; and the adventurer fastens one end about his waist and between his legs, and having recommended himself to the protection of the Almighty, he is lowered down by six associates, who place a piece of wood in the margin of the rock, that the rope may be preserved from being fretted and broken by its sharp edge. To his body is fastened a small line, which serves for enabling him to give the necessary signals, when he wishes to be raised or lowered, or shifted from one place to another. In changing his situation, he is exposed to the hazard of injury from loosened and falling stones, which, falling on the head, must inevitably destroy him, if he were not in some degree protected by a strong thick cap. The fowlers, by their astonishing dexterity, contrive to place their feet against the front of the precipice, and to dart themselves some fathoms from it, for the purpose of surveying the roosting places of the birds, and projecting themselves into the deep recesses, where they lodge. There the fowler alights; and disengaging himself from the rope, which he fixes to a stone, collects the booty at his leisure, attaches it to his girdle, and when this is done, resumes his suspended posture. He will also, when occasions require it, spring from the rock, and in this attitude, by means of a fowling net, fixed to the end of a staff, catch the old birds which are flying to and from their retreats. When this hazardous operation is finished, he gives a signal to his companions above, who pull him up, and divide the booty. The feathers are preserved for exportation; the flesh is partly eaten fresh, and the greater

greater part is dried for winter's provision. In fowling from below, the party have recourse to a boat, and when they have arrived at the base of the precipice, one of the most intrepid of them fastens a rope about his waist, and being furnished with a long pole, with an iron hook at one end, either climbs, or is thrust up by his companions, who place a pole under him, to the next footing spot within his reach. By means of the rope he hoists up one of the boat's crew; and the rest are drawn up in the same manner, each of them being furnished with his rope and fowling-staff. They then pursue their journey upwards till they arrive at the region of birds; and they wander about the cliff in search of them. They next act in pairs; one fastens himself to the end of his associate's rope, and, in places where birds have nested beneath his footing, he suffers himself to be lowered down, depending for safety on the strength of his companion, by whom he is again hauled up; but it sometimes happens, that the person above is overpowered by the weight, and in this case, both inevitably perish. The fowl is slung into the boat, which attends their operations, for the purpose of receiving the booty. The fowlers often pass seven or eight days in this perilous occupation, and lodge in the crannies which they find in various parts of the precipice.

In some remote parts of Russia there is practised a singular invention for taking great quantities of gelinottes or grouse. They choose the most open places in the birch woods; and there they plant long forks in the earth opposite the larger trees. On these forks is laid a horizontal stick, galloway-wise, to which are tied small bundles of ears of corn. At a small distance from this part of the contrivance, is a kind of large funnel, or inverted cone, made with long birch twigs, thin and flexible, the lower extremities of which are stuck in the earth, very near to one another; but by spreading towards the top, form there an opening of above a yard in diameter. In this opening is placed a wheel made of two circles that intersect each other, and are surrounded with straw and ears of corn. This wheel turns on an axis fastened to the sides of the funnel in such a manner, that there is room enough between the sticks of the cone, and the circles, to admit of the wheel's turning freely about. The birds first perch upon the transverse stick near the tree; and when they have a mind to fall upon the corn tied to the wheel, they must necessarily stand upon one of the projecting parts of the circles of which it is composed. At that instant the wheel turns, and the gelinotte falls, head foremost, to the bottom of the trap, which is there so contracted that he cannot get out. They sometimes find the machine half full of gelinottes.

The following method of netting or catching of wild pigeons is eagerly pursued as a diversion in different parts of Italy, particularly by the inhabitants of Cava, in the Hither Principato, and is thus described by Mr. Swinburne. The people "assemble in parties; and if any stranger chances to stray to their rendezvous, give him a most cordial welcome. I am not in the least surpris'd (says Mr. Swinburne), at their passionate fondness for this sport, as I found it extremely bewitching, keeping the attention constantly alive, and the springs of the mind pleasingly agitated by expectation; the situations where the toils are spread are incomparably beautiful, the air is pure and balsamic, and every thing around breathes health and satisfaction. When the periodical flights of stock-doves return from the northern and western parts of Europe, to gain warmer regions for their winter abode, the fowler repairs to the mountain, and spreads his nets across the intermediate hollows, the passes through which the birds direct their course, to avoid

unnecessary elevation in their flight. These nets are hung upon a row of large trees planted for the purpose. The branches being very thick and close at top, and the bore lofty and bare, a great opening is left below for the toils, which reach to the ground; and, by means of pulleys, fall in a heap with the least effort. Sometimes they are extended upon poles that exceed the height of the trees. At a small distance is a lofty circular turret, like a column with a little capital or cap, upon which a man is stationed to watch the approach of the game. As he commands a free view over all the country, and practice has made his sight as acute as that of the lynx, he descends the bird, at a wonderful distance. The doves advance with great velocity; but the alert watchman is prepared for them; and just as they approach his post, hurls a stone above them with a sling; upon this the whole flock, whose fears have birds of prey for their great object, supposing the stone to be an enemy of that kind ready to pounce them, dart down like lightning to avoid the blow by passing under the trees; but there they rush into the jaws of death, by dashing against the net, which instantly drops, and so entangles them that not one of them can escape the active hands of the fowler. These birds are sometimes taken by dozens at one fall, and are accounted fine eating. The dexterity with which the slingers manage their weapon is very remarkable; they throw the stone to a great height without any violent effort, and even without whirling the sling round before they discharge the pellet. In the Pyrenean mountains, where the same diversion is followed, the watchmen use a bow and arrow, trimmed with the feathers of a hawk."

The following simple but ingenious method of catching aquatic birds is used in Mexico by the natives. The lakes of the Mexican vale, as well as others of the kingdom, are frequented by a prodigious multitude of ducks, geese, and other water-birds. The Mexicans leave some empty gourds to float upon the water, where those birds resort, that they may be accustomed to see and approach them without fear. The bird catcher goes into the water so deep as to hide his body, and covers his head with a gourd; the ducks come to peck at it; and then he pulls them by the feet under water, and in this manner secures as many as he pleases.

Sir George Staunton, in his "Embassy to China," (vol. ii. p. 400.) informs us, that water-fowl are taken upon the Wei-Chaung hoo lake in that country by a similar device. Empty jars or gourds are suffered to float about upon the water, that such objects may become familiar to the birds. The fisherman then wades into the lake with one of those empty vessels upon his head, and walks gently towards a bird; and sitting up his arm, draws it down below the surface of the water, without any disturbance or giving alarm to the rest, several of which he treats in the same manner, until he fills the bag which he had brought to hold his prey. This contrivance is not so singular as it is that the same device should have occurred in the New Continent, as Ulloa asserts, to the natives of Carthage, upon the lake Cicnega de T-las.

Birds *feeding with*, is a singular mode of fishing practised in some of the lakes of China, and particularly described in the account of the late embassy. Upon a lake near the imperial canal were observed thousands of small boats and rafts, constructed for this singular kind of fishing. On each boat or raft were ten or twelve birds, which, at a signal from the owner, plunged into the water; and it was astonishing to observe the enormous size of the fish with which they returned, grasped within their bills. These birds appeared to be so well trained, that it did not require clanking or cord about their throats, to prevent their swallowing

any portion of their prey, except what the master was pleased to return to them for encouragement and food. The boat used by these fishermen is of a remarkable light make: and is often carried to the lake, together with the fishing birds, by the men who are there to be supported by it. The bird trained for this purpose is a species of pelican, described by Dr. Shaw, from a specimen submitted to his inspection, as "the brown pelican or corvorant, with white throat, the body whitish beneath and spotted with brown, the tail rounded, the irides blue, the bill yellow." Staunton's embassy to China, vol. ii. p. 388.

BIRD lime, a viscid substance, prepared various ways, and from various materials, for the catching of birds, mice, and other vermin.

The bird lime ordinarily used among us is made from holly-bark, boiled ten or twelve hours. When the green coat is separated from the other, it is covered up a fortnight in a moist place, then pounded into a rough paste, so that no fibres of the wood be left, and washed in a running stream till no notes appear, put up to ferment four or five days, skimmed as often as any thing arises, and laid up for use. To use it, a third part of nut oil, or any thin grease, is incorporated with it over the fire.

The mistletoe affords a juice even superior to that of the holly; and if a young shoot of the common elder be cut through, a stringy juice will draw out in threads, and follow the knife like bird-lime, or the juice of holly. It seems in this tree to be lodged, not in the bark, but in certain veins just within the circle of the wood. The roots of all the hyacinths also afford a tough and stringy juice of the same kind, and so do the asphodel, the narcissus, and the black bryony root, in a surprising quantity.

The bird lime brought from Damascus is supposed to be made of sebastins, their kernels being frequently found in it: but this does not endure either frost or wet. That brought from Spain is of an ill smell: that of the Italians is made of the berries of mistletoe, heated, mixed with oil, as before; to make it bear the water, they add turpentine. It is said, the bark of our *viburnum* or wayfaring shrub makes bird-lime as good as the best.

Bird-lime is a substance very apt to be congealed, and rendered unserviceable by frosts; to prevent which it is proper, at the cold seasons, to incorporate some petroleum with it, before it is used. The method of using it is to make it hot, and dip the ends of a bundle of rods in it; then to turn them about and play them together, till a sufficient quantity is extended over them all. If strings or cords are to be limed, they are to be dipped into the bird-lime, while very hot. The cords may be put in cold, but the rods should be warmed a little. Straws are to be limed while the matter is very hot: a large bundle of them should be put in at once, and worked about in it, till they are well befouled. When thus prepared, they should be preserved in a leather bag till they are used. When the twigs or cords are to be put in places subject to wet, the common bird-lime is apt to have its force soon taken away: it is necessary, therefore, to have recourse to a particular sort, which, from its property of bearing water unhurt, is called *water-bird lime*; and is prepared thus: Take a pound of strong and good bird-lime, wash it thoroughly in spring-water, till the hardness is entirely removed; and then beat it well, that the water may be separated from it; then dry it well, and put it into an earthen pot; add to it as much capon's grease as will make it run. Then add two spoonfuls of strong vinegar, one spoonful of oil, and a small quantity of Venice turpentine. Let the whole boil for some minutes over a moderate fire, stirring it all the time. Then

take it off; and when there is occasion to use it, warm it, and cover the sticks well with it. This is the best sort of bird-lime for snipes, and other birds that love wet places.

In order to use the common bird-lime, cut down the main branch or bough of any bushy tree, whose twigs are thick, straight, long, and smooth, and have neither knots nor prickles. The willow and the birch trees will best answer the purpose. Trim off all the superfluous shoots; and when the twigs are made neat and clean, let them be well covered with the bird-lime, within four inches of the bottom, but without touching the main bough from which they proceed. Some art is necessary to lay on the bird-lime properly; so that it be neither too thick, which would give the birds a distaste, and prevent their approaching it; nor too thin, so that it would not hold them when they touch it. Having prepared the bush, let it be placed in some dead hedge, or among growing bushes, near the outskirts of a town, a farmer's yard, or such situation, if it be in the spring, when the birds resort to such places. If it be used in summer, let the bush be fixed in the midst of a quick-set hedge, or in groves, bushes, or white-thorn trees, near fields of corn, hemp, flax, and the like; and in the winter, near stacks of corn, hovels, barns, and such places. When the lime-bush is thus planted, the sportsman must stand as near it as he can, without being discovered, and contrive to make such sorts of notes as the birds do when they call to one another. Bird-calls may be used for this purpose; but the most expert method is to imitate with the voice the notes of call of the several birds. When a single bird is thus enticed to the bush, and fastened to it, the sportsman is to wait till, by struggling to release itself, it becomes more securely attached, and by its fluttering it has brought other birds to the bush; so that in this way several may be caught at once. The time of the day for this sport is from sun-rise to 10 o'clock, and from one till sun-set. Another mode of bringing the birds together is by a snare; such as, a bat fastened in sight at a distance, or an owl, which is followed by several small birds, which, alighting on the lime-bush, will be entangled. The skin of an owl stuffed, or even the image of an owl carved on wood and painted in its natural colours, has been successfully used for the same purpose.

M. Barrera, physician at Perpignan, discovered an animal bird lime, prepared of the boils of a sort of caterpillars, by putrifying them in the earth, steeping them in water, and then pounding and mixing them with olive oil. Fontenel. Hist. Acad. Scienc. 1720, p. 12.

BIRDS, migration of. See MIGRATION.

BIRDS' nests, in Cookery. the nests of a small Indian swallow, very delicately tasted, and frequently mixed among soups. Mr. Marsden, in his account of Sumatra, sir George Staunton in his embassy to China, and many other travellers of more ancient and modern date, have recited several particulars concerning these edible nests. But we have a more minute and ample description of them, as well as of the birds by which they are formed, in the *third* volume of the "Transactions of the Batavian Society in the Island of Java, for promoting the arts and sciences." The birds that construct them are of a blackish grey colour, somewhat inclining to green, but gradually changing on the back to the tail, and on the belly into a mouse colour. The length of the bird, from the bill to the tail, is about $4\frac{1}{2}$ inches; and its height, from the bill to the extremity of the middle toe, $3\frac{1}{4}$ inches. The distance from the tip of one wing to that of the other, when extended, is $10\frac{1}{4}$ inches; the largest feathers of the wings are about 4 inches in length. The head is flat; but, on account of the thickness of the feathers, appears round, and large in proportion to the size of the rest

rest of the body. The bill is broad, terminating in a sharp extremity, and incurved like an awl. Its width is increased by a naked piece of skin, resembling parchment, which, when the bill is shut, is folded together; but when open, is considerably extended, and enables the bird, while on wing, to catch with greater ease the insects that serve it for food. The eyes are black and large; the tongue is shaped like an arrow, and not forked; the ears are flat, round, naked spots, with small oblong openings, and are wholly concealed under the feathers of the head; the neck is very short, as well as the legs and bones of the wings; the thighs are wholly covered with feathers; and the very tender lower parts of the legs, and the feet, are covered with a skin like black parchment. Each foot has four toes; three before, and one turned backwards. The toes are separate to their roots; and the middle one, together with the claw, is as long as the lower part of the leg. Each toe is furnished with a black, sharp, crooked claw, considerably long, by which the bird can easily attach itself to crags of rocks. The tail is as long as the body, together with the neck and head: when extended it has the form of a wedge, and consists of ten large feathers; the four first of which on each side are long, and, when the tail is closed, extend almost an inch beyond the rest. The other feathers decrease towards the middle of the tail, and are equal to about the length of the body. The whole bird is very light and tender; ten of them together weighed little more than $2\frac{1}{2}$ ounces. The Javanese call it "lawit;" but those who live in the mountains, "berongdage," or "waled;" *ucrong*, in the Malay language, signifying in general a bird.

There are two places in particular, near Batavia, where these birds are found in great numbers. The first, Calappa Nengal, lies about 10 miles south of the city; and the other, Sampia, is somewhat more distant to the south-west; but both are in that range of high land extending towards the sea, and apparently different from the large ridge that extends over the whole island. Besides these there are also other places in the same district, or at a greater distance from the coast, which either produce a few, or are carefully concealed by the Javanese, to whom they are known. The two bird mountains above-mentioned, called by the Javanese (goa) caverns, are insulated rocks, hollow within, and pierced with numerous openings of different sizes; but some so small, that they seem to be peculiarly adapted to the security of these little animals. On the outside, these rocks are covered with various kinds of tall trees; and within, they consist of grey calcareous stone and white marble. To the sides of these caverns the birds affix their small nests in horizontal rows, and so close as almost to adhere together. They are constructed at different heights, from 50 to 300 feet; and no cavity that is dry and clean is left unoccupied; but if the sides of the caverns be in the least wet or moist, the birds desert them. At day-break these birds fly abroad from their holes, with a loud fluttering noise; and in dry weather rise instantaneously to such a height in the atmosphere, for the purpose of seeking their food in distant parts, that they are soon out of sight. In the rainy season they never wander far from their holes, particularly in Java, where some rocks are situated near the shore. About 4 in the afternoon they return, and confine themselves so closely to their retired habitations, that none of them are seen to fly either out or in, except those that are hatching. They feed upon all sorts of insects that hover over the stagnated water; and these, by the easy extension of their bills, they readily catch. Their most destructive enemy is a kind of hawk, which seizes many of them as they issue from their holes, and which the people frighten away by shooting at them. Their nests are prepared, says this

writer, from the strongest remains of the food which they use, and not of the foam of the sea, or of sea-plants, as some have asserted. On this subject, however, there have been different opinions. Kæmpfer says, that the substance with which they form their nests is the mullusca or sea-worm; according to Le Peivre, fish-spawn; according to Dalrymple, sea-weeds; and according to Linnæus, the animal substance often found on the sea-beach, and called by fishermen blubbers or jellies. In proof of his opinion, this author suggests, that it is known from experience, that those birds, which build their nests in the two rocks before-mentioned, have never been found on the sea coast, and could not possibly fly thither and return again in so few hours, on account of the high intervening mountains, and the stormy winds that often prevail among them. The great difference in the colour and value of these nests proves, that their goodness depends merely on the superabundance and quality of the insects on which they feed, and perhaps on the greater or less solitude of the place where they seek nourishment. Those found in the territory of Calappa Nengal and Goa-gadja are exceedingly grey, and worth one third less than those produced in the territory of Sampia; and these latter are not to be compared with an excellent sort which is every year imported from Terate and Passier, or which is to be found on the surrounding islands, particularly to the east of Borneo. These birds occupy two months in preparing their nests: they then lay their eggs (two in number), on which they sit for 15 or 16 days. As soon as the young are fledged, people begin to collect the nests, which is regularly done every four months; and this forms the harvest of those who are the proprietors of the rocks. The business of taking down the nests is performed by persons accustomed from their youth to climb these rocks. For this purpose they construct ladders of reeds and bamboos, by which they ascend to the holes; or, if the caverns are too deep, they employ ship-ropes. When they have descended to the bottom of the caverns, they place bamboos with notches in them against the sides, if these be sufficient, in order to get up to the nests; but if they cannot thus reach them, they ascend the ladders, and pull down the nests with poles of bamboo made for that purpose. There are also certain holes to which people can ascend by means of steps made of bamboos; but these are very few. This employment is very dangerous: many lose their lives in pursuing it, and more particularly those who attempt to rob these caverns at improper seasons; for guarding against whose depredations, there are small watch-houses constructed in their vicinity. The mountaineers who engage in this occupation, never undertake their labour till they have slaughtered or sacrificed a buffalo; which custom is continually observed by the Javanese, at the commencement of any extraordinary enterprise. On such occasions they mutter over a few prayers, anoint themselves with aromatic oil, and fumigate the holes with odoriferous substances. At the chief of these caverns, in the island of Java, a particular protecting female deity is worshipped, under the name of "Raton Lawi Ridul," or Princess of the South Sea. She is provided with a small hut, and a covered sleeping place, together with various elegant articles of dress, which no one but a princess must approach. On every Friday, when the nests are taken down, incense is continually burnt; and the body and clothes of every one who intends to ascend the rocks must be exposed to it. In order to have light in the caverns, they use torches made of the resinous gum of a large tree called "caret," and the inner bark of the arek tree.

The gathering of the nests continues no longer than a month, and may be repeated three times a year. Some say it may be done a fourth time; but the most experienced say

that a nest, as long as it remains entire, is continually enlarged or made thicker, until it is entirely deserted by the bird, when it has become dry or hairy in the inside. When the nests have been collected, they require only to be dried and cleansed, and then they are packed in baskets and sold to the Chinese. Their price varies, and depends on their whiteness and fineness. Some of them have a grey, and others a reddish appearance: those of the best sort are exceedingly scarce. They are sold at the rate of from 800 to 1400 rix-dollars per 125 pounds. This high price, and the insatiable avarice of the Chinese, give rise to much dishonesty and thieving, especially as the Chinese make no scruple of bribing the watchmen with money, opium, and clothes; nor can any vigilance prevent this fraud. Calappa Nongal and Sampia formerly belonged to the Dutch East-India company; but, in 1778, the government resolved to sell them by auction to the highest bidder, and received for them almost 100,000 rix dollars. Besides these, there are several other places of a like kind, though less important, in the same range of mountains; and there are also two or three in the high land, in the interior parts of the country, and several small ones, which are carefully concealed. Three considerable bird-mountains, Goa Daher, Gede, and Nangafari, are situated in the government of Samarang, in Java; and these are washed by the sea, which forms its way so deep into the latter that fish may be caught in it. In these places the nests are of an excellent quality; but the steepness of the rocks, and the violence of the surf, render it very dangerous to collect them; and, therefore, a suspended apparatus of bamboos is employed for this purpose. The quantity of these nests, collected annually in the island of Java, amounts to 2500 pounds in weight. There are also bird caverns in Bantam, and the island of Sumatra, in the Andaman and Nicobar islands, in the island of Borneo, and also in Cochin-China. The young birds are eaten both by the Javanese and the Europeans in India; but it is difficult to procure them. They are considered as very heating: but the nests, on the other hand, when they have been boiled to a slimy kind of soup, exposed in the night-time to the dew, and mixed with sugar, are very cooling. The Javanese, therefore, use them in violent fevers; and they are said to be prescribed with good success for sore throats and hoarseness. This latter use of them has probably been derived from the Chinese, who carry on a great trade by these nests, and eat many of them in the winter, because sore throats are then very common in the northern part of the kingdom, in consequence of the people accustoming themselves to sit very much over the fire. But the author of the paper, from which these particulars are extracted, was not able to discover this nourishing and strengthening quality that has been so much extolled, though he used a considerable number of these nests, prepared in various ways, in order to convince himself of the fact. He caused them to be examined by able chemists; but nothing more could be observed than that the solution presented a weak gum with a disagreeable taste, which perhaps might be of some use in slight indispositions of the breast.

These nests are, therefore, a mere article of luxury to adorn the tables of the rich. The Chinese are remarkably fond of them. After being soaked and well cleansed, they put them, along with a fat capon or a duck, into an earthen pot closely covered, and suffer them to boil for 24 hours over a slow fire, which they call "tinmen;" and, on account of this addition, the whole dish acquires a more delicious taste. The trade in these nests has of late much increased. The high and advancing price of them in China makes Batavia the principal mart of this commodity, which is employed, since the company have surrendered it, very

advantageously by the inhabitants, to lessen the prejudicial exportation of specie.

The species of swallow that forms these nests is not to be found in China. Linnæus gives, as a distinguishing mark of the *hirundo fuculenta*, that it has white spots only on the feathers of the tail. But the small birds in Java that construct the nests, have spots neither on the tail nor on any other place. The tail feathers are entirely of one colour, blackish grey above, and a little brighter below. Rumphius says of his *capodes marina*, that the feathers of the tail were spotted, and that the breast also was speckled black and white. Valentin, in his description of the small swallow which constructs edible nests, mentions neither spots nor speckles; and only says, that the belly was undulated black and white. If these are to be considered as essential differences, it will follow that there are two kinds of these swallows: one with a speckled breast, and white spots on the tail feathers; and the other, without spots or speckles. A third kind of these swallows would be those called "momos," or "boerongitams." These also prepare their nests of eatable substances; but on account of the number of small feathers, and other impurities mixed with them, they are not fit to be used; and people, therefore, endeavour, as much as possible, to exterminate them, as they spoil the habitations of the better kinds. They are distinguished from the others merely by being larger, and having their legs down to the feet covered with small feathers.

BIRDS, *pictures of, prepared by means of their own feathers.* For this purpose, procure a thin board of deal or waincoat, well seasoned, that it may not warp. On this paste white paper, and let it dry: then get any bird which you would wish to represent, and draw its outline on the paper, in the desired attitude, and in its natural size, with the addition of any landscape or back-ground, &c. which you may think best. This outline so drawn is afterwards to be filled up with the feathers from the bird, placing each feather in that part of the drawing corresponding to the part of the bird from which it was taken. To do this, cover the outline representation with several coats of strong gum-water, allowing it to dry between each coat, till it is of about the thickness of a shilling. When the ground is thus prepared, take the feathers off from the bird, beginning at the tail or points of the wings, and work upwards towards the head. These feathers must be prepared by clipping off all the downy part; and the large feathers must have the insides of their shafts pared off, so that they may lie flat. In laying them on, hold them by a pair of small pliers, and, moistening the gummed ground with water, place each feather in its natural and proper situation. Keep each feather down, by placing upon it a small leaden weight, till you have another ready to be laid on. Care must be taken not to let the gum pass through the feathers, so as to linear them or to adhere to the bottom of the weight, and thus pull off or disorder the position of the feathers. When all the feathers are put on, cut a piece of round paper, and colour it to resemble the eye of the bird, and then stick it in its proper place; but the best substitutions for this purpose are small eyes made of glass. The bill, legs, and feet, must be drawn and coloured from nature. When it is finished and adjusted to your mind, lay a sheet of paper upon it, and upon that a heavy weight to press it down; and after it has remained in that position till it is quite dry, it may be preserved in a glass-frame.

BIRDS, *preservation of.* Many methods have been used by naturalists for preserving dead birds from corruption, in their natural form and colour. Some have taken off the skin, with all the feathers upon it, from the body and thighs, leaving the tail, legs and wings, with the whole neck and the bill, and filled it with some soft stuff, such as hay,
wool,

wool, or flax. Mr. Kuckahn (ubi infra), and Dr. Lettson (*Naturalist's Companion*, p. 12, &c.), who approve of this method as one of the most compleat and least troublesome, direct, that after opening the bird by a longitudinal incision from the breast to the vent, separating the fleshy parts from the bones, and removing the entrails, eyes, brain, and tongue, the cavities and the inside of the skin should be sprinkled with the powders (as below); the eyes to be inserted, for which purpose wax may be used, or glass-eyes of any size or colour may be cheaply procured; and the head to be stuffed with cotton or tow. When this is done, a wire should be made to pass down the throat, through one of the nostrils, and fixed into the breast-bone. Wires should also be introduced through the feet up the legs and thighs, and inserted into the same bone; and then the body should be filled with cotton to its natural size, and the skin sewed over it. The attitude should also be regarded; for in whatever position the subject is placed to dry, the same position will be afterwards retained. The powder which he recommends is composed of $\frac{1}{2}$ lb. of corrosive sublimate, $\frac{1}{2}$ lb. of prepared or burnt sulphur, $\frac{1}{4}$ lb. of burnt alum, $\frac{1}{2}$ lb. of flowers of sulphur, $\frac{1}{4}$ lb. of camphor or musk, 1 lb. of black pepper, and 1 lb. of tobacco ground coarse. The whole should be mixed together, and kept in a glass vessel stopp'd close.

This method is particularly described by Mr. Kuckahn, *Phil. Trans.* vol. ix. p. 311, &c. When the above-mentioned process is finished in the manner which he has minutely detailed, he advises to bake the birds intended for preservation in an oven of a due degree of heat; and he observes, that baking is not only useful in such preservations, but will also be of very great service to old ones, as it destroys the eggs of insects. And it should be, he says, a constant practice once in two or three years to bake them over again, and to fresh wash the cases with a liquid made by dissolving one pound of camphor in half a gallon of spirit of turpentine.

Others have put them into vessels full of spirit of wine, or strong brandy; against which it has been objected that spirituous liquors change the colours of the feathers; but M. Reaumur concludes from many experiments, that this objection is groundless; and he has given several minute directions for preserving and conveying them in this way. Others again, especially in countries where spices are cheap, have embalmed dead birds. Reaumur observes, that powdered alum or lime will serve the same purpose. Another method which has been sometimes practised, is that of drying birds for preservation in a heated oven. It is of importance, however, that dried birds should be secured in boxes or barrels sufficiently closed, that insects may not slip in during the voyage or journey; and all the empty spaces left in the barrel should be filled up with hemp, flax, cotton, &c. The same ingenious naturalist informs us, that quadrupeds, fishes, reptiles, and insects, may be preserved in the same manner with birds. For Reaumur's directions to this purpose, see *Phil. Trans. Abr.* vol. xi. page 891, &c.

Mr. Chaptal recommends the following method of preparing all kinds of animals for cabinets as exceedingly simple, and so certain in its effect that he never found it to fail in a single instance. The matter contained in the bowels of the animal must be evacuated, either by gradually pressing the body towards the rectum, or by injecting some liquid which may remove every thing that stands in its way. After this operation, the end of the rectum should be tied with a thread, and ether should be injected with a proper instrument into the body, through the mouth or bill; and when the bowels have been filled with it, the animal is to be hung

up by the head. One of the eyes must then be scooped out, and the brain extracted; after which the head is also filled with ether, which must be prevented from escaping by plugging up the eye hole. On the second or third day the injection of ether is to be repeated; and this process is to be continued till the animal is completely dried. While it is gradually drying, care must be taken to give the body its proper position; and as soon as it is completely desiccated, it may be put up without further care or any other preparation. Ether is preferable to spirits of wine, because, by its evaporation, it carries with it not only its own aqueous particles, but those also which it absorbs from the body. Besides, this method neither destroys the form of the animal, nor tarries the splendour of the feathers or hair, and is very cheap: one ounce of ether being in general sufficient for a small bird. The process of drying, says Mr. Chaptal, might perhaps be a little shortened by the application of artificial heat. The theory of this process, as this ingenious chemist thinks, is, that the ether, while it evaporates, volatilises the moisture in the animal body, and by these means effects a gradual desiccation, and thus removes the only cause of corruption.

The method of preserving birds in Guiana, described by Bancroft (p. 184.), is as follows: The birds intended for preservation, and for being conveyed to the cabinets of Europe, are deposited in a proper vessel, and covered with high wines, or the first running of the distillation of rum. In this spirit they remain for 24 or 48 hours, or longer, according to their size, till it has penetrated every part of their bodies. When this is done, the birds are taken out, and the feathers, which are not at all changed by this immersion, are placed smooth and regular. They are then put into a machine, made for the purpose; and the head, feet, wings, tail, &c. are placed exactly agreeable to life. In this position they are put into an oven, very moderately heated, where they are slowly dried; and they will ever after retain their natural position, without danger of putrefaction.

BIRDS, *singing*, are the nightingale, blackbird, starling, thrush, linnet, lark, throstle, canary bird, bullfinch, goldfinch, &c. See *SONG of birds*.

BIRDAMA, in *Ancient Geography*, a town of India, on this side the Ganges, which, according to Ptolemy, was the capital of a people called Porvari.

BIREMIS, from *bis*, double, and *remus*, oar, in *Antiquity*, a vessel with one or more rows of oars, ranged, as some think, in two stages over each other; or a vessel, having two ranks or rows of oars placed over, and aside of each other. But the particular fabric of these vessels seems far from being a settled point among the learned. The Roman *biremis* is the same with what the Greeks call *διεξαρά*, and stands contradistinguished from *triremis*, *quadriremis*, &c.

BIRINGOCCIO, or BIRINGUCCI, VANNUCCIO, in *Biography*, a mathematician of Siena, was descended of a noble family, and flourished about the 16th century. After having been employed by the dukes of Parma and Ferrara, he entered into the service of the Venetians. He is said to have been the first Italian author who wrote on the art of fusing and casting metals; particularly for the purpose of making cannon. His work, entitled, "*Pirotechnia*, &c.?" was printed at Venice in 1540, 4to; at Bologna, in 1678, 8vo; and at the same place in 1550, 1558, and 1559, 4to. A Latin translation of it appeared at Paris in 1572, 4to; and at Cologne, 1658, 4to. A French translation by Jacob Vincent, was published at Paris in 1556, and 1559, 4to; and at Rouen in 1627. As a metallurgic writer, who detailed his own observations and experiments, and gave a clear and connected account of the chief processes in metallurgy, Biringoccio is highly commended by professor Beckman. *Gen. Biog.*

BIRKAN, in *Geography*, a town of Arabia, 24 miles south of Saade.

BIRKENFELD, a town of Germany, in the circle of the Upper Rhine, and county of Sponheim, the seat of a bailiwick, including 32 villages and two iron foundries. It was taken by the French in 1794; and in their new arrangement, it is the principal place of a district of the same name, in the department of Sarre. The town contains 1061, and the canton 5892 persons. This district comprehends 38 communes, and its whole territorial extent includes 1615 kilometres. It is situated 30 miles E. N. E. of Treves, and 30 N. N. W. of Deux Ponts.

BIRKENHEAD, or **BERKENHEAD**, **SIR JOHN**, in *Biography*, a political writer of some celebrity, was meanly descended, and born at Northwich, in the county of Chester, about the year 1615. In 1632 he was entered as a servitor in Oriel college, Oxford, and afterwards became amanuensis to archbishop Laud, who recommended him in 1640 to be chosen probationer fellow of All-Souls' College. When Oxford became the head-quarters of king Charles I. in the time of the civil war, Birkenhead was selected as a proper person to write a kind of journal in support of the royal cause; which office he discharged to the satisfaction of his employers, and with reputation and advantage to himself. The king appointed him reader in moral philoosophy; and this post, more honourable than lucrative, he retained till the year 1648, when he was expelled by the parliament visitors. From hence he removed to London, where he wrote several poetical pieces, chiefly of a satirical kind, levelled against the republicans in power; and on account of his steady attachment to the royal cause, he was called the "loyal poet," and suffered several imprisonments. Upon the restoration of Charles II. he was rewarded for his loyalty. In 1661, he was created doctor of the civil law, by the university of Oxford; and about the same time, was returned to serve in parliament for the borough of Wilton. He was knighted in 1662, and succeeded sir Richard Fanshawe as master of requests. The favours which he received from the court exposed him to many severe attacks from those who opposed it; but he was esteemed by the learned persons of his time, and elected a fellow of the Royal Society; and his memory has been transmitted with honour to posterity by Dryden, Langbaine, and Winstanley, notwithstanding the reproaches of Anthony Wood. He died in Westminster, in 1679. *Biog. Brit.*

BIRKESTORFF, in *Geography*, a town of Germany, in the circle of Westphalia and duchy of Juliers, one mile north of Dueren.

BIRKET EL HADJIS, or *Lake of Pilgrims*, a lake of Egypt, communicating with the Nile, and situate 10 miles E. N. E. of Cairo, near which the companies which form the caravan to Mecca assemble.

BIRKET EL KERUN, or **CAROUN**, a lake of Egypt, 30 miles long and 6 broad in the middle, but of an irregular form, and narrowing towards each end; 40 miles S. W. of Cairo. See **MOERIS**.

BIRKHEHER, **BLAUER RAKER**, in *Ornithology*, the name of the garrulous roller, *coracias garrula* in Frisch. *Av.*

BIRKIN, in *Geography*, a river of England, which runs into the Bollin, one mile south of Altringham in the county of Chester.

BIRKOZOWKA, a town of Poland, in the palatinate of Kiow, 40 miles S. E. of Bialacerkiew.

BIRLAB, a town of Egypt, in the route from Catich to El Arish, 17 miles E. N. E. of Catich, and at a small distance east of the lake of Sebaket Bardoil, or king Baldwin's lake.

BIRLAT, a town of European Turkey, seated on a river of the same name, in the province of Moldavia, 60 miles N. W. of Galate, and 116 S. W. of Bender.—**Alio**, a river which runs into the Siret at Dubravitzza, in Moldavia.

BIRMAN, or **BURMAN Empire**, comprizes the kingdoms of Ava and Pegu, and derives its name from the Birmanis or Burmahs, who have been long known as a warlike nation, in the country formerly called "India beyond the Ganges;" its capital being Ava or Aungwa. The boundaries of this empire are not easily ascertained. Burmah, considered as distinct from Pegu, and sometimes erroneously denominated Ava from its capital, borders on Pegu to the north, and occupies both banks of the river Ava, as far as the frontiers of China. On the north-west is Meckley, and on the West Aracan and Roshaan. On the east it has the kingdom or country of Upper Siam, which begins at a small distance eastward from the city of Ava; a ridge of mountains separating it from Burmah and Pegu. But the king of Burmah is now said to possess not only the country of Meckley, in addition to those of Pegu and Burmah, but also the whole tract which lies on the north of it, between China, Thibet, and Afam. According to colonel Symes, to whom we are much indebted for our knowledge of the Birman empire, it appears to include the space between the 9th and 26th degrees of north latitude, and between the 92d and 107th degrees of east longitude, about 1050 geographical miles in length, and 600 in breadth. Such are the ascertainable limits from the Birman accounts; but it is probable that their dominions stretch still farther to the north. The breadth, however, often varies, and is in many places very inconsiderable, on what is called the eastern peninsula. To the north this empire is separated by mountains from Afam, and further to the east it borders on Thibet and China. On the west it is divided from the British dominions in Bengal by a range of mountains, and the little river Naaf; and the limit is continued by the sea. But the southern and eastern boundaries are somewhat obscure. If it be extended to the ninth degree of latitude, it must include a considerable portion of the Malayan peninsula, or the province of Tenasserim, and city of Mergui, formerly regarded as part of Siam; and if, on the east, it be extended to the 107th degree of longitude, it might be said to comprehend almost the whole of the country called India beyond the Ganges, as far as the mouths of the Japanese river in Cambodia. But it does not appear that Siam is regarded as a portion of the Birman empire, and even in this case it would only extend to 103 degrees. In this state of uncertainty, however, we must satisfy ourselves with observing, that this empire constitutes the fifth grand native power in India, since Hindoostan and Persia have been divided, and may probably extend its authority over Laos and Cambodia, while it remains separated by deserts and ranges of lofty mountains from the united kingdoms of Cochiachina and Tonquin.

Of the ancient state of the countries which now constitute this empire, our knowledge is very imperfect. (See **CHERSONESUS**.) With regard to their modern history, Col. Symes observes, that we are indebted for our first information, principally to the Portuguese, who made themselves masters of Malacca early in the 16th century. Accordingly the Portuguese historians inform us, that in the middle of this century four powerful states divided among them the regions that lie between the south-east province of British India, Yunan in China, and the eastern sea; and that their territories, besides some intervening lands belonging to petty independent princes, extended from Cassay and Afam on the N. W. as far to the S. E. as the island of Junkfeylon. These nations

rations were known to Europeans by the names of Aracan, Ava, Pegu, and Siam; which see respectively. The empire of Ava, as it was called, is situated eastward of Aracan, and separated from it by a ridge of lofty mountains. (See ARACAN.) On the N.W. it is divided from the kingdom of Caffay by the river Keen-duem; on the north it is bounded by mountains, and petty independent principalities, that lie contiguous to Afam; on the north-east and east it touches on China and North Siam; and on the south its limits have been so variable, that it is not easy to define them. The city of Prome, or Pee, seems to be the original and natural boundary of the Birman empire, though by conquests it has been extended much farther to the south. Pegu is the country southward of Ava, which occupies the sea-coast as far as Martaban. (See PEGU.) The kingdom of Siam extended to the south as far as Junkseylon, east to Cambodia and Laos, and north to Ozemee, probably the Chiamce of Loubere, and Yunan in China. (See SIAM.) These boundaries, however, may be considered more as the claim than the actual possession of each state; whilst alternate victory and defeat have occasionally extended and contracted their dominions. From the Portuguese we learn, that the Birmans, though formerly subject to the king of Pegu, became afterwards masters of Ava, and caused a revolution in Pegu about the middle of the 16th century; extending their kingdom from Muravi, probably Mergui, near Tenasserem, to the province of Yunan in China, about 800 miles from north to south, and 250 from east to west. The influence of the Portuguese, which was for some time very considerable in the Birman and Pegu countries, was supplanted by the Dutch; and it appears that, in the beginning of the 17th century, both the English and Dutch had obtained settlements in various parts of the Birman dominions, which were forfeited by the misconduct of the latter; so that Europeans of all nations were banished from Ava. The English, however, several years after this expulsion, were reinstated in their factories at Syrian and Ava, where they traded more as private merchants than on the part of the India company, in whose service they were not regularly enrolled. The supremacy of the Birmans over the Peguers continued till about the year 1740, when the latter, inhabiting the provinces of Dalla, Martaban, Tongo, and Prome, revolted, and a civil war ensued. In 1744, the British factory at Syrian was destroyed by the contending parties. At length the Peguers, by the assistance of some Europeans, who traded to their ports, gained several victories over the Birmans, particularly in the years 1750 and 1751; and in 1752 the capital of Ava was invested, and the Birmans, after a short siege, compelled to surrender at discretion. The last of a long line of Birman kings was taken prisoner; but two of his sons were fortunate enough to make their escape to the Siamese, where they were kindly received, and assured of security and success. Upon this conquest the principal inhabitants of the country about Ava acknowledged themselves vassals to the victorious king of Pegu, and accepted the prescribed oath. After some time, Alompra, a Birman of low extraction, who had been continued by the conqueror in the possession of a small village called Moachaboo, determined to emancipate himself from the yoke of oppression. Accordingly, having assembled 100 followers, on whose fidelity and courage he could rely, he attacked a band of 50 Pegu soldiers, who had been stationed in Moachaboo, and put every one of them to the sword; and after several previous encounters with the Pegu force dispatched against him, he gained possession of Ava in 1753. The contest was obstinate and bloody; but Alompra, pursuing his conquests, founded the town of Rangoon, or Dzangoon, signifying "victory achieved;" and soon after chastised the people of Caffay, who had revolted

from the Birman authority. In 1756 he blockaded the town of Syrian, which yielded to his arms; and having deprived the capital of any foreign aid by water, he advanced against the city of Pegu, invested it in January 1757, and in about three months took possession of it. He then proceeded to subdue the countries to the east of the city, as far as the Three Pagodas, which were the ancient boundary between Pegu and Siam. Tavoy, which was once an independent principality, and recognized as such by the English in 1753, has been since added to the Birman possessions in this quarter. Alompra, triumphing in his success, determined to chastise the Siamese, who had afforded an asylum to his rebellious subjects; and for this purpose he ordered a fleet to sail to Mergui, a sea-port belonging to the Siamese, which soon surrendered; and the capture of Mergui was followed by the conquest of Tenasserem. The next object of Alompra was the reduction of the capital of Siam; but whilst he was prosecuting the siege, he was seized with a disorder which proved fatal, and saved the Siamese from destruction. Alompra, apprised of his approaching end, gave orders for a retreat; when he had arrived within two days' march of Martaban, on the 15th of May 1760, he expired, very much to the regret and sorrow of his subjects, who regarded him as their deliverer, and as a wife, powerful, and victorious sovereign. By the prudence of his counsels he secured what his valour had acquired; he was not more eager for conquest than attentive to the improvement of his territories, and the prosperity of his people; he issued a severe edict against gambling, and prohibited the use of spirituous liquors throughout his dominions; he reformed the courts of justice; he abridged the power of magistrates, and forbade them to decide at their private houses on criminal causes, or on property where the amount exceeded a specified sum; every process of importance was decided in public, and every decree registered. His reign was short but vigorous; and if his life had been prolonged, it is probable that his country would at this day have been farther advanced in national refinement and the liberal arts. He did not live to complete his 50th year; his person, strong and well proportioned, exceeded the middle size; and though his features were coarse, his complexion dark, and his countenance saturnine, there was a dignity in his deportment that became his high station. Alompra, the founder of the Birman empire, was succeeded by his son Namdogee Praw, who, after suppressing several insurrections, died in 1764, and left an infant son, Momiem; whose uncle Shembuan, second son of Alompra, assumed first the regency, and afterwards the diadem. Shembuan, having usurped the royal power, diverted the national attention from his conduct, by declaring war against Siam; and two armies entered the country from the north and south, which, being united, defeated the Siamese about seven or eight days' journey from their capital. The consequence of this defeat was the immediate investiture of Siam by the Birmans; and after a siege of two months, the capitulation of the city. The king having withdrawn during the progress of the siege, a Siamese governor was appointed, who took an oath of allegiance to the Birman monarchy, and engaged to pay an annual tribute. The Chinese, having planned the subjugation of the Birman empire, and concerted measures for adding the dominion of the Jerawaddy and the fertile plains of Ava to their empire, advanced in the beginning of the year 1767, from the western frontiers of Yunan, with an army of 50,000 men, to accomplish their object; but they were met by the Birmans, and after a conflict which lasted three days, totally routed with very dreadful carnage. The lives of the captives were spared for the benefit of the country; various employments were assigned them; and they were encouraged to marry Birman wives, and to consider them-

selves as natives of the country. The Siamese, however, though vanquished, remained unsubdued; and the inherent enmity that subsists between these two nations will probably prevent either servitude or alliance on the part of the one to the other, unless they are broken by such repeated defeats as must nearly amount to extirpation. As soon as it was known that the Birman had withdrawn into their own territories, a Siamese prince assumed the monarchy, and in 1771 defeated the Birman. The king, who had pusillanimously abandoned his throne and people, is said to have perished in the woods, probably by the dagger of the usurper. Shembuan, the Birman sovereign, who had rebuilt ancient Ava, the metropolis of the empire, which had fallen to ruin during the late commotions, pursued his favourite scheme of extending his conquests towards the west, and having advanced within two days' march of Cospore, the capital of Cachar, forced the raja of the province to submit to his power, by the most unequivocal proofs of vassalage, according to the custom of the country. Shembuan died at Ava in 1776, and was succeeded by his son Chenguza, whose tyrannical conduct occasioned a conspiracy, at the head of which was Shembuan Minderagee Praw, the younger brother of the deceased Shembuan, and the present monarch. Chenguza was slain in 1781, and fell unlamented, as he had lived despised. Among other acts of savage cruelty, with which he is charged, one is his conduct towards his second wife, the daughter of one of the Attawoons, or privy-counsellors, of his court, a young woman endowed with virtue, beauty, and various accomplishments. Under the impulse of sudden rage, he accused her of infidelity, and without allowing time for cool judgment, pronounced sentence of immediate death. Accordingly the trembling and innocent victim was dragged from the palace, and inclosed in a sack of scarlet cloth, richly ornamented; thus confined, she was put on board a boat, when the sack being suspended between the narrow necks of two earthen jars, the whole was sunk in the deepest part of the river Jerawaddy. Her afflicted father, overwhelmed with anguish and deprived of all his offices, retired in despair to the city of Chagaing; and waited the opportunity that soon after occurred, of being avenged. When Chenguza was forcing his way towards the royal palace, the Attawoon snatched a sabre from an attendant officer, and at one stroke cut him through the bowels, and laid him breathless at his feet; nor did any person offer to prevent or avenge the cruel tyrant's death. Shembuan Minderagee withdrew the seat of government from Ava, and founded a new city called Ummerapoora; which see. The Birman conquests having already been extended as far as Mergui to the south, and several of the northern provinces which formerly belonged to Siam, having been reduced to subjection, and tribute, Shembuan Minderagee, observing the supineness of the rajah of Arracan, and the unwarlike disposition of his subjects, and allured by the fertility of its soil, and its aptitude for commerce, determined to invade the country, and to annex it as an appendage to the Birman crown. Accordingly, in 1783, this conquest was effected. (See ARRACAN.) The Birman arms were next directed towards Siam. Although the Birman could not retain possession of its inland parts, they maintained their dominion over the sea-coast; so that all the ports on the western shore of the peninsula, as far as Mergui, in N. lat. 12° 20', continued subject to them. But they still wished to obtain the island of Junkfeylon, which would give them the entire dominion of the western coast, as far as the territories of the Malay prince of Queedah, and not only enable them to monopolize the commerce of the peninsula, but prevent the Siamese from a communication with India by any other channel than that of the gulf of Siam. A fleet was fitted out in 1785 for subduing this island; but the enterprise

failed. The Birman monarch, mortified by the disappointment of his views, resolved as speedily as possible to repair the disgrace; and for this purpose he marched in the spring of 1786, from his capital at the head of 30,000 men, with a train of 20 field-pieces, which army was supported by a fleet of 16 ships, that blocked up the harbour of Junkfeylon. The sovereign, sanguine in his expectations, had scarcely entered the Siamese territories, before he was opposed by the king of Siam, and, after a furious engagement, completely routed. In the commencement of the ensuing year, the Siamese invaded the vicereignty of Martaban, which comprehends within its jurisdiction Tavoy, Mergui, and all the Birman possessions towards the south; but having laid unsuccessful siege to Tavoy, they were obliged to retreat and abandon the enterprise. In 1793 overtures for peace were made on the part of the Siamese; and they were followed by a negotiation, which speedily terminated in the ratification of a treaty highly favourable to the Birman interests. By this compact, the Siamese ceded to the Birman the western maritime towns as far as Mergui; thus yielding to them entire possession of the coast of Tenasserim, and the two important ports of Mergui and Tavoy; which were acquisitions of great moment, considered either in a political or commercial light. From this statement it appears, that the Birman empire can scarcely be computed to extend beyond the 102d degree of longitude, and that only in the part to the north of Siam. The Birman are indisputably pre-eminent among the nations which inhabit the vast peninsula that separates the gulf of Bengal from the Chinese sea; they possess a territory equal in extent to the German empire; and they are blessed with a salubrious climate, and a soil capable of producing almost every article of luxury, convenience, and commerce, which the east can supply. After their treaty with the Siamese, they enjoyed the pleasing prospect of a long exemption from the miseries of war; but their pride and resentment embroiled them in fresh troubles before they had time to profit by the advantages of peace, and threatened to excite against them a foe more formidable than the Chinese, Arracaners, Peguers, Siamese, and Cassayers. The Birman monarch, conceiving that the piratical banditti who infest the Broken islands, and commit various depredations to the injury of trade, were protected by the British flag, and that they sought refuge in the British districts, ordered a body of 5000 men to enter the territories of the company, in order to seize the delinquent fugitives, and he stationed an army of 20,000 men at Arracan for the purpose of supporting this detachment. As the Birman had made no previous application for redress in a pacific way, a strong detachment was formed at the presidency, and entrusted to the conduct of major-general Erskine, for resisting this aggression. On the approach of the British general, the Birman chief proposed terms of accommodation, stipulating for the surrender of the fugitives as the basis of the agreement. The general declined all treaty whilst the Birman continued on English ground; but after a representation of the case made in person by the Birman chief, he gave hopes, that if the Birman peaceably retired, the governor-general would institute a regular inquiry into the grievance which was the subject of complaint. The Birman chief, professing his reliance on the declaration of general Erskine, agreed to withdraw his troops, and conducted his retreat in the most orderly manner. The matter was afterwards investigated, and the guilt of the delinquents being satisfactorily proved, they were delivered over to their own laws, by whose sentence two out of the three that had been accused underwent capital punishment. The amicable termination of this difference afforded favourable opportunity for acquiring a more accurate knowledge than had hitherto been obtained, of a people, whose situation, extent of terri-

tory, and commercial connexions with British India, rendered a liberal intercourse with them highly desirable. The trade between Calcutta, Madras, and Rangoon, the principal Birman port, had of late years so rapidly increased, as to become an object of national importance: more particularly on account of the teak timber, the produce of Ava and Pegu, whence Calcutta and Madras draw all their supplies of wood for ship building and for various other purposes. A commerce in one article so essential, and on a general scale so extensive, as to require an annual return of Indian commodities to the amount of 200,000*l.* was an object well worth cultivating. With this view Sir John Shore (now Lord Teignmouth) thought proper, in 1795, to send a formal deputation to the Birman court. The particulars of this embassy are described by Col. Symes, with whom the conduct of it was entrusted. "The Birmans," says this writer, "under their present monarch, are certainly rising fast in the scale of oriental nations; and it is to be hoped, that a long respite from foreign wars will give them leisure to improve their natural advantages. Knowledge increases with commerce; and as they are not shackled by any prejudices of caste, restricted to hereditary occupations, or forbidden from participating with strangers in every social bond, their advancement will, in all probability, be rapid. At present, so far from being in a state of intellectual darkness, although they have not explored the depths of science, nor reached to excellence in the finer arts, they yet have an undeniable claim to the character of a civilized and well instructed people. Their laws are wise, and pregnant with sound morality; their police is better regulated than in most European countries; their natural disposition is friendly and hospitable to strangers; and their manners rather expressive of manly candour, than courteous dissimulation: the gradations of rank, and the respect due to station, are maintained with a scrupulosity which never relaxes. A knowledge of letters is so widely diffused, that there are no mechanics, few of the peasantry, or even the common watermen (usually the most illiterate class), who cannot read and write in the vulgar tongue. Few, however, are versed in the more erudite volumes of science, which, containing many Sanscrit terms, and often written in the Pali text, are (like the Hindoo Shasters) above the comprehension of the multitude; but the feudal system, which cherishes ignorance, and renders man the property of man, still operates as a check to civilization and improvement. This is a bar which gradually weakens, as their acquaintance with the customs and manners of other nations extends: and unless the rage of civil discord be again excited, or some foreign power impose an alien yoke, the Birmans bid fair to be a prosperous, wealthy, and enlightened people."

The present capital of the Birman empire is Ummerrapoora, and one of its chief ports is Rangoon; which see respectively. Its other principal towns will occur in the course of this work. See Arracan, Ava, Chagaing, Martaban, Merghi, Monchaboo, Muntipoora, Pagahm, Pegu, Persaim, Promé, Syrian, Tenasserem, Tavoy, &c. The chief rivers of this country are Irawaddy, or the river of Ava (see *AVA*), whose numerous mouths and streams very amply provide the means of inland navigation, Krendnem, Mayguc, Pitang, and Thalan. Its lakes are numerous; among which one of the principal is Tounzamahe. The highest range of mountains is probably that which lies on the frontiers of Thibet. The other ranges pass north and south, except a small range running east and west, which supplies the sources of the river of Pegu; but their names are not known, except that of Anouper, between Ava and Arracan. The forests are large and numerous: and supply almost every description of timber that is known in Hin-

doostan; and about four days' journey to the north of the capital firs grow in abundance; but the principal tree of these forests is the teak, which flourishes in many parts of the empire, to the north as well as to the south of the capital. The forests, as well as the mountains, of the interior, and, in general, of the whole northern frontier, remain unexplored: and the tigers that infest them, prevent their being particularly examined.

The present sovereign of the Birman empire assumes the title of "Boa," or emperor; and though the form of government be despotic, yet he is accustomed to consult a council of ancient nobles. There is no country of the East in which the royal establishment is arranged with more minute attention than in the Birman court; it is splendid without being wasteful, and numerous without confusion. The queen and princes have the title of "Praw," which is both a sovereign and a sacerdotal appellation; and is frequently used by an inferior when addressing his superior. In the application of this term, it has been suggested, that there is an obvious analogy between the Birmans and the ancient Egyptians. "Phra," it is said, was the proper name under which the Egyptians first adored the sun, before it received the allegorical appellation of Osiris, and they conferred this title on their kings and on their priests. It has been further conjectured, that the title of "Pharaoh," given to successive kings of Egypt, is a corruption of the word "Phraw," or "Praw," in its original sense signifying the sun, and applied to the sovereign and priesthood, as the representatives on earth of that splendid luminary. However this be, "Praw" is a princely title in the Birman empire. The elder son of the king is denominated "Engy Teekien," or "Engy Praw," or prince royal; and as the crown descends to the male heirs in a direct line, the son takes precedence of his uncles. Next in rank to the princes of the blood royal are the "Woongees," i. e. bearers of the great burthen, who are the chief ministers of state. Their established number is four, and they constitute the great council of the nation. They sit in the "Lstoo," or imperial hall of consultation, every day, except the Birman sabbath; they issue mandates to the "Maywoons," or viceroys of the different provinces; they controul every department of the state, and govern the empire in subordination to the king, whose will is absolute, and whose power is undefined. With these are associated, for the purposes of deliberation, and of the execution of public business, four other officers, called "Woondocks," whose authority is very inferior and limited. The views and wishes of the Woongees are frequently counteracted by the interference of the four "Attawoons," or ministers of the interior, who are selected by the king to be his privy-counsellors, from an opinion of their talents and integrity, and who have access to him at all times, which is a privilege which even the principal Woongee does not enjoy. There are several other subordinate officers, by whom the affairs of government, in its various departments, are transacted. There are also Woons of the queen's household, and of that of the prince-royal; and each of the junior princes has a distinct establishment. The Birman government has no hereditary dignities or employments; for on the demise of the possessor, all honours and offices revert to the crown. The order of nobility has different degrees, distinguished by the number of strings, or small chains, that compose the "tsaloe," or chain, which is the badge of the order. No subject is ever honoured with a higher degree than 12; and the king alone wears 24. Rank among the Birmans is indicated by every article of use and of ornament; the shape of the beetle-box, which is carried by an attendant after a person of distinction wherever he goes, his ear-rings, cap of ceremony, horse-furniture, and even the metal of which his spit

ring-pot and drinking cup are made, specify and distinguish the several gradations of society; and a person who assumes the insignia of a degree, which is not his legitimate right, is subject to certain penalties. The court dress of the Birman nobility consists of a long robe, of flowered satin or velvet reaching to the ancles, with an open collar and loose sleeves; over this hangs from the shoulders a scarf, or flowing mantle; and on the head is worn a high cap of velvet, either plain, or of silk embroidered with flowers of gold, according to the rank of the wearer. Ear-rings are also a part of male dress; persons of condition use tubes of gold about three inches long, and of the thickness of a large quill, expanding at the end like the mouth of a speaking trumpet; others wear a heavy mass of gold, beaten into a plate, and rolled up, which forms a large orifice in the lobe of the ear, and by its weight drags it down to the extent sometimes of two inches. The rank of the females is also distinguished by their dress. The hair, which is tied in a bunch at the top of the head, and bound round with a fillet, has its peculiar and discriminating embroidery and ornaments. Over a short shift, which reaches to the pit of the stomach, and is drawn tight by strings, so as to support the breasts, is a loose jacket with close sleeves; and round the waist is rolled a long piece of silk or cloth, reaching to the feet, and sometimes trailing to the ground. When women of condition go abroad, they put on a silk sash, resembling a long shawl, which crosses their bosom, and is thrown over the shoulders, gracefully flowing on each side. Women in full dress, stain the palms of their hands and their nails of a red colour, for which they use a vegetable juice, and strew on their bosoms powder of sandal wood, or of a bark called *funneka*, with which some rub their faces. Both men and women tinge the edges of their eyelids and their teeth with black. Men of rank wear, in common dress, a tight coat with long sleeves, made of muslin or of very fine nankeen, which is manufactured in the country; also a silk wrapper that encircles the waist; but the working class are naked to the middle, except that in the cold season they use a mantle or vest of European broad cloth, which is highly prized.

With regard to *religion*, the Birmans are Hindoos, not as votaries of Brahma, but sectaries of Boodh; which see. The latter contend with the former for the honour of antiquity, and are undoubtedly far more numerous. The Cingleze in Ceylon are Boodhists of the purer class; and the Birmans acknowledge that they originally received their religion from that island, which they call "Zehoo." It was brought, say the Rhahaans, first from Zehoo to Arracan about 600 years ago, and thence was introduced into Ava, and probably into China; for the Birmans confidently assert, that the Chinese are Boodhists. However this be, it is allowed, that the bonzes of China, like the Rhahaans of Ava, wear yellow as the sacerdotal colour, and that in many of their customs and ceremonies we may trace a very striking similitude. Whatever may be the antiquity of the worship of Boodh, the wide extent of its reception is unquestionable. The Birmans believe in the metempsychosis, and that, after having undergone a certain number of transigrations, their souls will at last be received into their paradise on the mountain of Meru, which is the celestial north pole of the Hindoos, round which they place the garden of Indra, and which they describe as the seat of delights. The Birmans regard mercy as the chief attribute of the deity; and they worship God by extending mercy to all his creatures. Of the religious buildings appropriate to the Birman worship, the temple of Shoedagon, or Dagoung, near Rangoon, that of Shoemadoo at Pegu, and that of Syriam, are the most considerable. (See RANGOON, PEGU, and SYRIAM.) Their priests are denominated Rhahaans; and they have numerous kioums

or convents which differ in their structure from common houses, and much resemble the architecture of the Chinese. They are made entirely of wood; the roof is composed of different stages, supported by strong pillars; the inside comprehends one large hall; the whole house is open at the sides; some of them are curiously carved with various symbolic representations of the divinity. They have no apartments for the private recreation of the Rhahaans; publicity being the prevailing system of the conduct of the Birmans, who admit of no secrets either in church or state. The convents in the neighbourhood of Rangoon are very numerous; and hence it appears that the number of Rhahaans, and of Phonghis, priests of an inferior order, vulgarly called Tallapoins, must be very considerable, amounting to 1500. Like the Carmelites, they go barefooted, and have their heads shaven, on which they never wear any covering. The only colour of the garments worn by the priesthood is yellow: the greatest part of their bodies is covered with a long loose cloke, that is wrapped round them; they profess celibacy, and abstinence from every sensual gratification. The prescribed punishment for a Rhahaan detected in an act of incontinence, is expulsion and public disgrace. The delinquent is seated on an ass, and his face is daubed with black paint interspersed with spots of white; and he is thus led through the streets, with a drum beating before him, and afterwards turned out of the city. But such instances of degradation rarely occur. The juniors are restricted from wandering about licentiously, either by day or night; nor can any go abroad without permission from the prior of the convent. The Rhahaans never perform any of the common functions of life, which would tend to divert them from the abstract contemplation of the divine essence. They perambulate the town at the dawn of the morn in order to collect supplies for the day: and these usually consist of boiled rice mixed with oil, dried and pickled fish, sweetmeats, fruit, &c. In their walks they never raise their eyes from the ground, nor do they even stop to solicit donations, and seldom even look at their benefactors, who are more desirous to bestow than they are to receive. The Rhahaans eat only once a day, at the hour of noon; and their superfluous provisions they distribute among the indigent strangers, or the poor scholars, who daily attend them to be instructed in letters, and taught their religious and moral duties. The Rhahaans are never known to take any public and active part in politics or in war; and as the Birmans and Peguers profess the same religion, the conquerors, whoever they were, equally respected the ministers of their faith. The head of the Rhahaans at Rangoon, or the "Seredaw," lives in a handsome monastery about half a mile from the town; and values himself very much on the sacerdotal titles, conferred on him by the present and late king, and which he ostentatiously displays engraven on iron plates. There were formerly numeries of virgin priestesses, who, like the Rhahaans, wore yellow garments, cut off their hair, and devoted themselves to chastity and religion; but these societies have been long since abolished, as being injurious to the population of the state.

The *laws* of the Birmans are inseparable from their religion: and, like the latter, of Hindoo extraction. They profess to have derived them from Menu, the grandson of ramah, the first of created kings, who received the sacred Principles on which they are founded by divine revelation, and who promulgated the code. Numerous commentaries on Menu were composed by the Munis, or old philosophers, whose treatises constitute the "Dherma Saltra," or body of law. The code of Gentoo laws, translated by Mr. Halhed is said to be a compilation from the different commentaries on Menu. These laws, as well as the religion of the Birmans, found their way into the Ava country from Arracan,

and came originally from Ceylon, about 600 years ago. The Birman system of jurisprudence is replete with sound morality; and is distinguished above any other Hindoo commentary for perspicuity and good sense. It provides specifically for almost every kind of crime that can be committed, and adds an ample chapter of precedents and decisions to guide the inexperienced in cases of doubt and difficulty. The trial by ordeal, however, is disgraceful to this code; but it prevails in all countries where the Hindoo religion is professed, and is as ancient as their records. An instance of the exercise of this mode of trial is mentioned by colonel Symes. Two women having litigated a small property in a court of justice; and the judges finding it difficult to decide the question of right, it was agreed to refer the matter to the issue of an ordeal. The parties, attended by the officers of the court, the Rhahaans, and a multitude of people, repaired to a tank, or pond. After certain prayers and ceremonials of a purifying nature, the two litigants entered the pond and waded in it, till the water reached as high as their breasts; they were accompanied by two or three men, one of whom placed them close to each other, and put a board on their heads, which he pressed down till they were both immersed at the same instant. After continuing out of sight for about one minute and a half, one of them being nearly suffocated, raised her head, whilst the other continued to sit upon her hams at the bottom, but was immediately lifted up by the man; after which an officer of the court pronounced judgment in her favour, and of the equity of the decision none of the bye-standers seemed to entertain the smallest doubt. This practice, however, and that of imprecation, are now losing ground, and have of late years been discountenanced by the judicial courts both of India and Ava. Laws dictated by religion are in general conscientiously administered. The criminal jurisprudence of the Birman is lenient in particular cases, but rigorous in others. Whoever is found guilty of an undue assumption of power, or of any crime that indicates a treasonable intent, is punished by the severest tortures. The first commission of theft does not incur the penalty of death, unless the amount stolen be above 800 kiat, or tackal, *i. e.* about 100 l., or attended with circumstances of atrocity, such as murder, or mutilation. In the former case, the culprit has a round mark imprinted on each cheek by gunpowder and punctuation, and on his breast the word thief, with the article stolen; for the second offence he is deprived of an arm; but the third inevitably produces capital punishment. Decapitation is the mode by which criminals suffer, and in the performance of it the Birman executioners are exceedingly skilful. The official hall of justice, where the members of provincial governments, and all municipal officers, are accustomed to assemble for the transaction of public business, in various parts of the Birman empire, is denominated Rhoom. Every man of high rank in the empire is a magistrate, and has a place of this description and name contiguous to his dwelling; but it is always on the outside of the inclosure of his court-yard, and not surrounded by any fence or railing, in order to manifest publicity, and shew that it is the seat of majesty and justice, to which all mankind may have free access.

The population of the Birman dominions is not easily ascertained with accuracy; but Col. Symes was informed, by a person on whose testimony he could rely, that the number of cities, towns, and villages in the empire amounts to 5000, without including the recent addition of Arracan. Supposing, therefore, each town, on an average, to contain 300 houses, and each house 6 persons, the result will give a population of 14,400,000. Few of the inhabitants, he says, live in solitary habitations, but mostly form themselves into

small societies; so that their dwellings thus collected compose their Ruas, or villages; and therefore he concludes that if their number, including Arracan, be reckoned at 17 millions, it will not exceed the truth.

With regard to the *military* and *naval* force of the Birman, we may observe, that though every man in the kingdom is liable to military service, and war is deemed the most honourable occupation, the regular military establishment is very inconsiderable. When an army is to be raised, a mandate issues from the golden palace to all viceroys of provinces, and miongees of districts, requiring a certain number of men at an appointed day; and the levy is proportioned to the population of the province or district, estimated by the number of its registered houses. Every two, three, or four, houses are required to furnish one recruit, or to pay 300 tackal, or about 40 l. or 45 l. in money. This recruit is supplied by government with arms and ammunition, but has no pay. The families of these conscripts are retained in the district which they inhabit as hostages for the good conduct of the soldier; and in case of desertion, or treachery, his wife, children, or parents are dragged forth to execution; nay, cowardice subjects the family of the delinquent to capital punishment. The infantry and cavalry compose the regular guards of the king; the former are armed with muskets and sabres, and the latter with a spear about seven or eight feet long, which they manage on horseback with great dexterity. The royal magazines are said to contain 20,000 firelocks, which are of a very indifferent kind. The most respectable part of the Birman military force is their establishment of war-boats. The king can command, at a very short notice, 500 of these vessels, which are formed out of the solid trunk of the teak tree, excavated partly by fire, and partly by cutting; the largest of them are from 80 to 100 feet long, and 8 feet broad, and they carry from 50 to 60 rowers. The prow is solid, and has a flat surface, on which is mounted a piece of ordnance. Each rower is provided with a sword and a lance; and besides the boatmen, there are usually 30 soldiers, who are armed with muskets. The attack of these gun-boats is very impetuous; and those who conduct them advance to action with a war-song, by which they regulate the strokes of their oars, encourage one another, and daunt their adversaries; and when they grapple, the action becomes very severe, as these people possess singular courage, strength, and activity. As the vessels lie low in the water, their principal danger is that of being run down by a larger boat striking on their broadside. The largest of these war-boats, which are managed with surprising dexterity, both in advancing and retreating, as well as in the time of action, do not draw more than three feet of water. The proper weapons of the country are the spear, the javelin, which is thrown from the hand, the cross-bow, and the sabre; the latter of which is used by the Birman, not only as an implement of war, but for various purposes of manual labour.

The *revenue* of the Birman empire arises from one-fourth of all produce, and of all foreign goods imported into the country. However, as grants to princes of the blood, great officers of state, and provincial governors, are made in provinces, cities, villages, and farms, the rent of which they collect for their own benefit, and money is seldom disbursed from the royal coffer, the Birman sovereign possesses immense treasures.

The *climate* of every part of the Birman empire appears to be distinguished by its salubrity; and the natives are healthy and vigorous. In this respect they possess a decided pre-eminence over the enervated natives of the East; nor are the inhabitants of any country capable of greater bodily exertions

tions than the Birman. The seasons are regular, and the extremes of heat and cold are seldom experienced; at least, the duration of that intense heat, which immediately precedes the commencement of the rainy season, is so short, that the inconvenience of it is very little felt. The forests, however, like some other woody and uncultivated parts of India, are extremely pestiferous; and an inhabitant of the champaign country considers a journey thither as inevitable destruction. The wood-cutters, who are a particular class of men, born and bred in the hills, are said to be unhealthy, and seldom attain longevity.

The soil of the southern provinces of the Birman empire is remarkable fertile, and produces as luxuriant crops of rice as are to be found in the finest parts of Bengal. Towards the north the face of the country is irregular and mountainous; but the plains and vallies, particularly near the river, are exceedingly fruitful; they yield good wheat and the various kinds of small grain which grow in Hindoostan, together with most of the esculent legumes and vegetables of India. Sugar-canes, tobacco of a superior quality, indigo, cotton, and the different tropical fruits, in perfection, are all indigenous products of this country. Besides the teak-tree, which grows in many parts of the Birman empire, as well to the north of Ummerapoora, as in the southern country, there is almost every description of timber that is known in India. The kingdom of Ava abounds in minerals; six days journey from Bamoo, which is a province near the frontiers of China, there are mines of gold and silver, called "Badouem;" there are also mines of gold, silver, rubies, and sapphires, at present open on a mountain near the Keenduem, called "Wobolootaun;" but the most valuable, and those which produce the finest jewels, are in the vicinity of the capital nearly opposite to Keoum-meoum. Precious stones are found in several other parts of the empire. The inferior minerals, such as contain iron, tin, lead, antimony, arsenic, sulphur, &c. occur in great abundance: amber, of a consistence unusually pure and pellucid, is dug up in large quantities near the river: gold likewise is discovered in the sandy beds of streams which descend from the mountains. Between the Keenduem and the Irrawaddy, to the northward, there is a small river called "Shoe Lien Kioup," or the stream of golden sand. Although the Ava empire produces no diamonds and emeralds, it affords amethysts, garnets, very beautiful chrysoites, jasper, loadstone, and marble: the quarries of the latter lie a few miles from Ummerapoora; and it is equal in quality to the finest marble of Italy, and admits of a polish that renders it almost transparent. The sale of marble is prohibited; but great quantities are consumed in the manufacture of the images of Gaudma, which are fabricated in the city and district of Chagain; however, the exportation of these marble divinities out of the kingdom is strictly forbidden.

The commerce of the Birman empire is very considerable. An extensive trade is carried on between the capital and Yunnan in China. The principal article of export from Ava is cotton, of which, it is said, there are two kinds, one of a brown colour, of which nankeens are made, the other white, like the cotton of India. This commodity is transported up the Irrawaddy in large boats as far as Bamoo, where it is bartered at the common "jee," or mart, with Chinese merchants, and conveyed by the latter, partly by land, and partly by water, into the Chinese dominions. Amber, ivory, precious stones, beetle nut, and the edible nests brought from the eastern archipelago, are also articles of commerce; in return for which the Birman procure raw and wrought silks, velvets, gold leaf, preserves, paper, and some utensils of hardware. The commerce between the capital and the

southern parts of the empire is facilitated by the noble river that waters the country. Several thousand boats are annually employed in transporting rice from the lower provinces to Ummerapoora and the northern districts. Salt, and gnapee, a kind of fish-sauce used with rice, are also articles of internal commerce. Articles of foreign importation are mostly conveyed up the Irrawaddy; and some few are introduced by way of Arracan. See ARRACAN. Among the articles of foreign trade, which have found their way into the Birman country, nothing is held in higher estimation than the European glass-ware imported into Rangoon from the British settlements in India. The Birman are so sensible of the advantages of commerce, and so desirous of improving it, and of thus increasing population, which they consider as much more essential to the strength of a state than the extent of its territory, that they have, of late years, tolerated all sects, Pagans and Jews, Mussulmen and Christians, the disciples of Confucius, and the worshippers of fire, and invited strangers of every nation to resort to their ports; and being themselves free from those prejudices of cast, which shackle their Indian neighbours, they have permitted foreigners to intermarry and settle among them. The children of strangers, whatever be the sect to which they belong, born of a Birman woman, equally become subjects of the state, and are entitled to the same protection and privileges, as if they had sprung from a line of Birman ancestry. To British India commercial intercourse with that part of the Birman empire called Pegu is of great importance. This interest involves three distinct objects; that of securing from this quarter regular supplies of timber for ship-building; that of introducing into the country as many of our manufactures as its consumption may require, and of endeavouring to explore a mart in the south-west dominions of China, by means of the great river Ava; and that of guarding with vigilance against every incroachment, or advance, which may be made by foreign nations to divert the trade into other channels, and to obtain a permanent settlement in a country so contiguous to the capital of our possessions. The teak timber for the construction of our ships in that part of the world is an article peculiarly interesting in a political and commercial point of view. Some of the finest merchant ships at Calcutta have been lately built of this timber. Madras is also supplied from Rangoon with timber for all the common purposes of domestic use; and even Bombay, although the coast of Bombay is its principal storehouse, finds it worth while annually to import a large quantity of planks from Pegu. It is also of importance, not only to promote the exportation of timber from the maritime towns of Pegu, but to discourage the building of ships in the Rangoon river, in which the Birman are making rapid progress. National security and commercial advantage demand peculiar attention to both these circumstances. The imports into Rangoon from the British settlements, in the year 1794-5, amounted, it is said, to more than 12 lacks of rupees, or about 135,000*l.*; and these consisted chiefly of coarse piece goods, glass, hardware, and broad cloth; and the returns were made almost wholly in timber. The maritime parts of this great empire are commodious for shipping, and better situated for Indian commerce than those of any other power. Great Britain possesses the western side of the bay of Bengal; the government of Ava, the eastern. From the mouth of the Ganges to cape Comorin, the whole range of our continental territory, there is not a single harbour capable of affording shelter to a vessel of 500 tons burthen; but Ava comprehends, within her extent of coast, three excellent ports; Negrais, the most secure harbour in the bay: Rangoon, and Mergui, each of which is equally convenient and

much

much more accessible than the river of Bengal, which is the only port in our possession within the bay. The entrance into this is an intricate and dangerous channel; but from the harbour of Negrais a ship launches at once into the open bay, and may work to the southward without any impediment besides that which is occasioned by the monsoon. The Birman empire possesses such a variety of advantages resulting from situation, extent, produce, and climate, that it may be reckoned, among eastern nations, second in importance to China alone; whilst, from its contiguity to British India, it is to us of much greater consequence. To preserve a good correspondence and a good understanding with the court of Ava is therefore essential to our prosperity. It is our interest to maintain the independence of the Birmans, and to guard it from foreign encroachment; and then the Birman government will be united to ours in bonds of reciprocal amity and confidence. The result of the embassy of Col. Symes, sent by our governor-general of India to the kingdom of Ava in 1795, has been the establishment of this kind of amity and friendship. To the memorial presented on this occasion, the Birman monarch replied: "I, the king immortal, whose philanthropy is universal, whose anxiety for the benefit and welfare of all mankind never ceases, direct, that all merchant ships of the English nation, who resort to Birman ports, shall pay customs, charges, warehouse hire, searachers, &c. agreeably to former established usage. English merchants are to be permitted to go to whatever part of the Birman dominions they think proper, either to buy or to sell, and they are on no account to be stopped, molested, or oppressed; and they shall have liberty to go to whatever part of the Birman dominions they choose, for the purpose of buying, selling, or bartering, &c. by themselves or their agents; and it is further commanded, that they shall be at liberty to fix a resident at Rangoon, &c. and that English ships driven into Birman ports by stress of weather shall be supplied with all necessaries, &c. at the current rates of the country; and that the enemies of England, European as well as Indian, shall not be allowed to purchase warlike weapons, lead, and powder, which restriction is extended to all nations."

The *manufactures* of the Birmans consist of cotton and silk, saltpetre and gunpowder, various kinds of pottery, and marble statues; they also excel in gilding, to which purpose the greatest part of their gold is applied, and several other ornamental manufactures. Their edifices and barges are constructed with singular oriental taste and elegance; the most remarkable edifice is the Shomadoo at Pegu. Their kiosms and temples, which are numerous, exhibit a very rich and fantastic kind of architecture; and their grand hall of audience, or Lotoo, at Ummerapoora, is as splendid an edifice as can be well executed in wood. Many of their houses are very simple in their structure, and are erected in a day, or even in a few hours. The requisite materials are bamboos, grass for thatching, and the ground rattan. The whole edifice is constructed without a single nail; a row of strong bamboos, from eight to ten feet high, are fixed firm in the ground, which form the outline, and are the supporters of the building; smaller bamboos are then tied horizontally, by strips of the ground rattan, to these upright posts; the walls, composed of bamboo mats, are fastened to the sides with similar ligatures; bamboo rafters are quickly raised, and a roof formed, over which thatch is spread in regular layers, and bound to the wood by filaments of rattan; a floor of bamboo is next laid in the inside, elevated two or three feet above the ground; this grating is supported on bamboos, and covered with mats and carpets. A house of this kind, simple and expeditious in its structure,

is nevertheless a security against very inclement weather; and if it should chauce to be blown down by a tempest, the inhabitants might escape without injury. They have other buildings, however, of a superior kind; and they were formerly constructed of various figures, pyramidal, triangular, or four-sided, surrounded with walls, and adorned with flowers and figures carved in wood, and built with arches. But the art of constructing arches has been lost among the Birmans. From many buildings that now remain, it appears, that they could formerly construct excellent brick arches, both circular and gothic; but now no one in the empire can be found sufficiently skilful to arch over the opening of a window. Masonry has fallen into neglect; the jealousy of the late princes having prohibited to private individuals the use of brick or stone houses. The Birmans have of late years made rapid progress in the art of building boats and ships; and these may be constructed in the Rangoon river for one third less than in the Ganges, and for nearly one half what they would cost at Bombay. It is said, however, that the ships of Pegu are not so firmly constructed as those in our ports. The Birmans, like the Chinese, have no coin; silver in bullion, and lead, are the current money of the country. What foreigners call a tackal, properly kiat, is the most general piece of silver in circulation; it weighs ten pennyweights ten grains and three fourths; its subdivisions are the tubbee, two of which make one moo; two moo one math; four math one tackal; and 100 tackal amount to one viss. Rice is sold by a measure called Tayndaung, or basket, weighing 16 viss, or about 56 pounds; and of measurement there are several subdivisions. The average price of rice at the capital is one tackal, rather more than half a crown, for a basket and a half. At Rangoon and Martaban, one tackal will purchase four or five baskets. The Birman measures of length are a paul-gaut, or inch, 18 of which compose the taim, or cubit. The saundaung, or royal cubit (varying according to the will of the monarch), is equal to 22 inches; the dha, or bamboo, consists of seven royal cubits; 1000 dha make one Birman league, or dau, nearly equal to two British miles and two furlongs; the league is also subdivided into tenths. The Birmans divide their time as follows. The interval in which the finger can be raised or depressed, is called charazi; 10 charazi make one piaan; 6 piaan one bizana, or about a minute. The day of 24 hours, commencing at noon, is divided into 8 portions, or yettee, of 3 hours each. These divisions of time are ascertained by a machine resembling the hour-glass, and sometimes by a perforated pan placed in a tub of water. They are announced by a stroke on an oblong drum, which is always kept near the dwelling of the chief magistrate of the city, town, or village; it is commonly raised on a high bamboo stage, under a roof of mats to protect it from the weather. The Birmans, whatever way they acquired it, have the knowledge of a solar year, consisting of 365 days, and commencing on the 18th day of April. But the common Birman year is lunar, and of course 11 days shorter than the solar year; it is divided into 12 months; but the Birman lunations consist alternately of 29 and 30 days, occasioning a difference between the Newtonian and Birman lunar account of 8 hours and 48 minutes. In order to complete a solar revolution, they intercalate in every third year a month of 30 days; in this third year the first and third months have each 30 days instead of 29; they likewise suppress or pass over a day, and by these the number of days in three solar years amounts to 1095. But every fourth year will occasion the difference of a day on account of our leap-year. This, and some other defects in their mode of computation, are sources of confusion; in order to remedy which, their style, or mode of calculation,

B I R M A N.

has frequently been altered by arbitrary authority. The manner in which the Birman month is subdivided is peculiar to their nation. Instead of reckoning the days progressively from the commencement to the close of the month, they advance no farther than the full moon, from which they recede by retrograde enumeration until the month is finished. The Birman month is divided into 4 weeks of 7 days each. The 8th day of the increasing moon, the 15th or full moon, the 8th of the decreasing moon, and the last day of the full moon, are religiously observed by the Birmans as sacred festivals. On these hebdominal holidays no public business is transacted in the Rhoom; mercantile dealings are suspended; handicraft is forbidden; and the strictly pious take no suitance between the rising and the setting of the sun. The Birman era is said to commence in our year 638, and it is that which is used by the philosophers at Siam; and from them, as a more polished nation, it has passed to the Birmans.

The Birmans are very fond of poetry and music; the former they call yeddoo; when repeated by a scholar, it flows soft and measured to the ear; sometimes in successive, and often in alternate rhymes. They have epic as well as religious poems of high celebrity, and they are fond of writing in heroic numbers the exploits of their kings and generals.

Music is a science which is held in considerable estimation throughout the Birman empire; and the royal library of Ummerapoora is said to contain many valuable treatises on the art. Some of the professional musicians display considerable skill and execution, and the softer airs are pleasing even to an ear unaccustomed to such melody. The principal instruments are a foun, or harp, made of light wood, hollowed and varnished, resembling a canoe with a deck; at the extremity a piece of hard wood is neatly fastened, which tapers to the end, and rises in a kind of curvature over the body of the harp; from this curvature, the strings, usually made of wire, are extended to a bridge on the belly of the instrument; it has two sounding holes, one on each side of the bridge. The size of the foun varies from two to five feet in length. The turr resembles our violin; it has only three strings, and is played on with a bow. It is said to be an original instrument of the country. The pullaway is a common flageolet. The kyzzoup is a collection of cymbals, suspended in a bamboo frame. The patola, or guitar, is a curious instrument, of the form of a crocodile in miniature; the body is hollow, with sounding holes on the back; three strings of wire extend from the shoulder to the tail, and are supported on bridges at each extremity; the strings are tuned by means of pegs in the tail, to which they are fastened; it is played on by the finger, and is generally used to accompany the voice. The boundaw is a collection of drums, of oblong form and different size, which are suspended perpendicularly in a wooden frame by leathern thongs. The whole machine is about five feet in diameter, and four feet high. The performer stands in the centre, and beats on the drums with a small stick. This instrument is always introduced in a full band, and much used in processions. The heem is the pipe of Pan, formed of several reeds neatly joined and sounded by a common mouth-piece, and producing, when skilfully played on, a very plaintive melody. The Birmans are fond of singing and dancing; and the three last days of the solar year are commonly devoted to mirth and festivity. At Pegu they have a theatre, which is an open court, splendidly illuminated by lamps and torches, and in which dramatic performances are exhibited. Indeed, at all festivals they have dramatic entertainments, consisting of music, dancing, and action, with a dialogue in recitative. The subject is

generally taken from the legends of their heroes, especially of Rama. The best actors are said to be natives of Siam; and in one of these we are told that the dialogue was spirited without cant, and the action animated without being extravagant; the dresses of the principal performers were also showy and becoming. By way of interlude between the acts, a clownish buffoon entertained the audience with a recital of different passages, and by grimace and frequent alterations of tone and countenance, extorted loud peals of laughter from the spectators. The Birmans delight in mimicking, and are very expert in the practice, possessing uncommon versatility of countenance. By pantomimic looks and gestures, they exhibit a masterly display of the passions, making sudden transitions from pain to pleasure, from joy to despair, from rage to mildness, from laughter to tears, and of varying the expression of terror and of idiotism, with surprising effect. On the last day of the Birman year, the 17th of April, there is a kind of sport that is universally practised throughout the Birman dominions, to wash away the impurities of the past year, and to commence the new year free from stain. Women on this day are accustomed to throw water on every man they meet, which the men have the privilege of returning. This pastime is conducted with great decorum; and a woman who declines taking a part in it, is considered as avowing her pregnancy, and passes without molestation. At the close of Lent, or during the whole seventh month, called Sadeen-guit, there are illuminations; every house has erected by it a kind of mast, from which are suspended one or more lamps. In the royal palace, a pyramid of lamps, at least 150 feet high, is supported by a bamboo scaffolding. At this time the nobles from all parts of the empire resort to court to pay their homage to the king. During the principal days and nights of these festivals, there is almost a constant succession of wrestling, dancing, music, processions, fire-works, and theatrical entertainments.

The Birman alphabet consists of 33 characters, having as many distinct sounds, exclusive of various marks and contractions, that supply the place of long and short vowels, diphthongs, &c. like the other alphabets of the Hindoo class. It has no representation of the vowel corresponding with our short *a*; this is nevertheless to be pronounced after every simple sound or consonant not supplied with another vowel, unless it be forbidden by a mark of elision placed over the letter, or excluded by the junction of two or more consonants. The Birmans write from left to right; and though they have no distinguishing interval between their words, they mark the pauses of a sentence and the full stops. Their letters are distinct, and their MSS. are in general very beautiful. It has been the opinion of some of the most enlightened writers on the languages of the East, that the "Pali," or sacred language of the priests of Boodh, is nearly allied to the Sanscrit of the Bramins. The character in common use throughout Ava and Pegu is a round Nagari, derived from the square Pali, or religious text; it is formed of circles and segments of circles, variously disposed and combined, whilst the Pali, which is solely applied to purposes of religion, is a square letter, chiefly consisting of right angles. Their common books, like those of the Hindoos in the southern parts of India, are composed of the palmyra leaf, on which the letters are engraved with a stylus. In their more elegant books, the Birmans write on sheets of ivory, or on very fine white palmyra leaves. The ivory is stained black, and the margins are ornamented with gilding, while the characters are enamelled or gilded. On the palmyra leaves the characters are in general of black enamel; and the ends of the leaves, and the margins, are painted

painted with flowers in various bright colours. A hole through both ends of each leaf, serves to connect the whole into a volume, by means of two strings, which also pass through the two wooden boards that serve for binding. In the finer binding of books of this kind, the boards are lacquered, the edges of the leaves cut smooth and gilded, and the title written on the upper board; the two ends are by a knot or jewel secured at a little distance from the boards, so as to prevent the book from falling to pieces, but sufficiently distant to admit of the upper leaves being turned back, while the lower ones are read. The more elegant books are in general wrapped up in silk cloth, and bound round by a garter, on which the Birmans have the art to weave the title of the book. In every Kioum or monastery, there is a library or repository of books, usually kept in lacquered chests. In the royal library the number of these chests was not less than 100. The books were regularly classed, and the contents of each chest were written in gold letters on the lid. Some of these books exhibited very beautiful writing on thin leaves of ivory, the margins of which were ornamented with flowers of gold, neatly executed. The library contained books upon various subjects; more on divinity than any other; but history, music, medicine, painting, and romance, had their separate treatises. Col. Symes thinks it not improbable, from the chests which he inspected, that his Birman majesty may possess a more numerous library than any potentate from the banks of the Danube to the borders of China. Books in the Pali text are sometimes composed of thin stripes of bamboo, delicately plaited, and varnished over in such a manner as to form a smooth and hard surface upon a leaf of any dimensions: this surface is afterwards gilded, and the sacred letters are traced upon it in black and shining japan. The margin is illumined by wreaths and figures of gold, on a red, green, or black ground. As most of the Birmans are taught to read and write, they carry with them a sheet of thick and strong blackened paper, called a parawaik, or paruvek, in which they enter their accounts, copy songs, till they can repeat them from memory, and take memorandums of any things that are curious. On these parawaiks the zares, or writers, in all courts and public offices, take down the proceedings and orders of the superior officers. It is about 8 feet long, and 18 inches wide, and folds up like a fan; each fold being about six inches, and in length the whole breadth of the sheet. They write on this with a pencil of flatites; and the characters are effaced by rubbing them over with charcoal, and the leaves of a species of dolichos.

In the recitation of poetry, the language is exceedingly melodious; even the prose of common conversation appears to be measured, and the concluding word of each sentence is lengthened by a musical cadence, that marks the period to the ear of a person wholly unacquainted with the meaning.

Of the *cosmography* and *astronomy* of the Birmans, deduced from their most ancient writings, the following particulars will be sufficient. They conceive that the universe, called logha, which signifies successive destruction and reproduction, after it had been destroyed by fire, water, or wind, is again, of itself, restored to its ancient form. The earth, they suppose to be a plane, somewhat elevated in the centre, and surrounded by a chain of very lofty mountains. Its diameter is 1,203,400 juzana, each juzana being 44,800 cubits, or nearly 12 miles; its circumference is three times its diameter; and its thickness 240,000 juzana, of which one half is dull, and the other half a solid rock, and the whole supported by a double thickness of water, resting on twice its thickness of air, below which is a vacuum. Besides our earth, there are 10,100,000 others, mutually touching in three points, and

forming a similar number of equilateral spaces, which, not being penetrated by the sun's rays, are filled with water intensely cold. In the middle of the most elevated part of our earth, the Birman writings place Mienmo, the largest of all mountains, elevated above the surface of the sea 84,000 juzana, and descending as far below it, supported by three feet of carbuncles, having its eastern face silver, the western glass, the northern gold, and the southern pale-coloured carbuncle, and surrounded by seven chains of hills. In the middle of the ocean, opposite to the four cardinal points of this mountain, are placed four large islands, the habitations of men and other animals; and besides these, the Birman writers allow 2000 of a smaller size, 500 belonging to each of the larger ones. The ocean is in various parts of very different depths. All living beings are distributed into three classes; generating beings; those which are material, but do not generate; and immaterial beings, or spirits, each of which is subdivided into several distinct species. The Birman writings admit of transmigration, alleging, that in death, whether of man, beast, or any living being, the soul perishes with the body, and after this dissolution, out of the same materials another being arises, which, according to the good or bad actions of the former, becomes either a man, or an animal, &c. and they teach, that all beings are revolving in these changes, till they become entitled by their actions to Nieban, the most perfect of all states, in which they are free from change, misery, death, sickness, or old age. The Birman writings also announce the opinion of an infinite number of worlds in constant succession, without beginning and without end. These writings mention eight planets, viz. the Sun, Moon, Mercury, Venus, Mars, Jupiter, Saturn, and another named Rahu, which is invisible. The Sun is 50 juzana in diameter, the Moon 49, Mars 12, Mercury 15, Jupiter 17, Venus 19, and Saturn 13; and their circumferences are triple their respective diameters. They suppose that the sun, moon, and stars revolve round the great mountain Mienmo in a circle, the plane of which is parallel to the earth. The stars, according to them, pursue a constant course, without declining to the north or south; but the sun, moon, and other planets have a declination; and the sun, in proceeding from the north to the south, and from the south to the north, always touches the twelve constellations, which we call the twelve signs of the zodiac, and in the space of one year returns to the same place in the heavens from which he set out. This same revolution is performed by the moon in a month. The sun's motion, they say, is quicker than that of the moon; and by his diurnal revolution, when he is in the southern island it is mid-day, in the northern it is mid-night, in the eastern island the sun sets, in the western it rises. Although the sun, moon, and stars appear to us round, we are not to suppose them to be spheres, but this is a fallacy of vision. The invisible planet Rahu serves the purpose of explaining eclipses; for, being a huge monster, he takes the sun and moon either in his mouth or under his chin, and thus causes either total or partial eclipses. As to the heat and cold which are experienced at different seasons of the year, the Birmans say, that, from the vernal equinox to autumn, the sun is always tending to the north, and the moon inclining to the south; the season is then hot, because the sun's rays, which are naturally hot, then prevail; but from the autumnal equinox to the vernal, the sun inclines to the south, and the moon to the north, and the moon's rays, which are by nature cold, predominate, and produce cold. They assign seven causes of rain, of which some are physical, and some moral. These astronomical and physical ideas of the Birman writings were probably brought from Hindoostan, together with their religion and laws; but

for a more particular account of them we shall refer to the Asiatic Researches (*ubi infra*).

Among the Birmanians there are several histories, containing an account of the lives and actions performed by the different families of their princes; which histories are very fabulous, and abound with the recital of omens and prodigies. Indeed, the Birmanians are much attached to divination. No person will commence the building of a house, a journey, or the most trivial undertaking, without consulting some person of skill, in order to find a fortunate day or hour. Friday is a most unlucky day, on which no business ought to be commenced. On medicine the Birmanians have several books, containing a description of 96 genera of diseases, with various recipes for their cure. Mummy is with them a favourite medicine, and they are not unacquainted with the use of mercury in the cure of lues venerea; but their mode of administering it is neither certain nor safe. Most of their remedies, however, are taken from the vegetable kingdom; and they are chiefly of the aromatic kind, nutmegs being one of their most favourite medicines. Although they are well acquainted with the plants of their country, the practice of their physicians is almost altogether empirical, and they possess certain recipes and nostrums, the efficacy of which they extol, and which have been transmitted from their ancestors for several generations. They combine with their medical practice great faith in amulets and charms. In surgery, they proceed no further than dressing wounds and setting bones. Of late the inoculation for the small-pox has been introduced into Arracan.

The state of *agriculture* in the Birman empire is not particularly illustrated by Col. Symes. It seems, however, to be pursued with considerable avidity; and the soil in many parts is capable of cultivation, and its productions, which are naturally numerous, admit of further improvement. The cattle used in some parts of the country for tillage and draft are remarkably good; they put only a pair of them to the plough, which is little different from the plough of India, and turns up the soil very superficially. In their large carts they yoke four stout oxen, which proceed with the speed of a hand-gallop, and are driven by a country-girl standing up in her vehicle, who manages the reins and a long whip with ease and dexterity. Many of the rising grounds are planted with indigo; but the natives suffer the hills for the most part to remain uncultivated, and only plough the rich levels. They every where burn the rank grass once a year to improve the pasture. The Birmanians will not take much pains; they leave half the work to nature, which has been very bountiful to them. In the neighbourhood of Loonghee, many fields are planted with cotton, which thrives well; sesamum is also cultivated in this soil, and is found to answer better than rice, which is most productive in low and moist grounds. In the suburbs of Pagahm, there are at least 200 mills employed in expressing oil from the sesamum seed. In this operation the grain is put into a deep wooden trough, and pressed by an upright timber fixed in a frame: the force is increased by a long lever, on the extremity of which a man sits and guides a bullock that moves in a circle; thus turning and pressing the seed at the same time. The machine is simple, and yet effectually answers the purpose. Waggon's form a caravan for travelling from the southern country towards the capital. Of these there are sometimes as many as 18, each of which is drawn by six bullocks, and is covered with a tilted roof of bamboo, overlaid with painted cloth, for throwing off the rain. They contain not only merchandize, but also whole families, the wives, children, monkeys, cats, parroquets, and all the worldly substance of the wag-

goners. Each bullock has a bell under his throat. They travel slowly, from 10 to 15 miles a day. At night they are disposed in a circle, and form a barrier, within which the carriers feed their cattle, light fires, and dress their victuals, secure from the attacks of tygers, which much infest the less populous parts of the empire.

We shall close this article with a brief account of the *persons, disposition, and manners* of the inhabitants of the Birman empire, and of some of their singular *customs*. The Birmanians, in their features, bear a nearer resemblance to the Chinese than to the natives of Hindoostan. The women, particularly in the northern part of the country, are fairer than the Hindoo females, but less delicately formed; they are, however, well made, and in general inclined to corpulence; their hair is black, coarse, and long. The men are not tall in stature, but active and athletic: their appearance is youthful from the prevalent custom of plucking their beards instead of using the razor; they tattoo their thighs and arms into various fantastic shapes and figures, which in their opinion operate as a charm against the weapons of their enemies. Neither the men nor women are so cleanly in their persons as the Hindoos of India, among whom diurnal ablution is a religious as well as a moral duty. Girls are taught, at an early age, to turn their arms in a manner which makes them appear distorted: when the arm is extended, the elbow is inverted, the inside of the joint being protruded, and the external part bending inwards. The general disposition of the Birmanians is strikingly contrasted with that of the natives of India, from whom they are separated by a narrow range of mountains, which in many places admit of an easy intercourse. Nevertheless, the physical difference between the nations could scarcely be greater, if they had been situated at the opposite extremities of the globe. The Birmanians are a lively, inquisitive race, active, irascible, and impatient. As the passion of jealousy seems to have no influence among them, their wives and daughters are not concealed from the sight of men; and they are allowed as free intercourse with each other as the rules of European society admit; but in other respects women have just reason to complain of their treatment. They are considered as very inferior and subordinate; and even the law stamps a degrading distinction between the sexes; the evidence of a woman not being received as of equal weight with that of a man, and a woman not being suffered to ascend the steps of a court of justice, but being obliged to deliver her testimony on the outside of the roof. The custom of selling their daughters, and even their wives, to strangers, though confined to the lowest classes of society, and frequently the consequence of pecuniary embarrassment, is not regarded as shameful, nor is the female dishonoured by it; and hence it is that women surrender themselves the victims of this barbarous custom with apparent resignation. But no man, who leaves the country, is permitted to carry his temporary wife along with him. Every attempt of this kind is watched and guarded; and a ship, in which any females are conveyed away, can never return to a Birman port but under penalty of confiscation of the property, and the infliction of a heavy fine and imprisonment on the master. Men are allowed to emigrate; but the exportation of women, would, in the opinion of the Birmanians, impoverish the state, by diminishing the sources of its population. The females, who are reduced to the necessity of pursuing a course of prostitution, are not at their own disposal, nor are they allowed to receive the earnings of their unhappy profession. They are slaves sold by creditors to a licensed pander, for debts more frequently contracted by others than themselves. According to the laws of Pegu, he, who

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who incurs a debt which he cannot pay, becomes the property of the creditor, who may claim him as a slave, and oblige him to perform menial service until he liquidates the debt. His immediate relations are also liable to be attached; and innocent women are often dragged from domestic comfort, and are sold to the licensed superintendant of the tackally, who, if they possess attractions, pays a high price for them, and reimburses himself by the wages of their prostitution. On the banks of a small creek, between the town of Maindu and Bassien, is a village called Mima-Shun-Rua, or the village of prostitutes, which is inhabited altogether by women of this description. Birman wives are said to be in general chaste and faithful; their sedulous employment affording no leisure for the corruption of their minds. A woman of the highest rank seldom sits in idleness at home; her female servants, under her direction and superintendance, like those of the Grecian dames of antiquity, ply the various labours of the loom. Weaving is chiefly a female occupation; and most Birman families manufacture all the cotton and silk that are required for their domestic consumption. The women in this country manage also the most important mercantile concerns of their husbands, and attend to their interests in all out-door manufactures; they are to the greatest degree industrious, and are said to be good mothers; and they therefore merit a higher rank than that which is assigned them, and better treatment than they experience. The Birmans, in some respects, particularly towards their enemies and invaders, display the severity of barbarians, but in others all the humanity and tenderness of polished life. At home they manifest an amiable benevolence, administering aid to the infirm, the aged, and the sick; filial piety is inculcated as a sacred precept, and its duties are religiously observed. A common beggar is no where to be seen; every individual is certain of receiving assistance, which, if he is unable to procure it by his own labour, is provided for him by others.

Among the Birmans, marriages are not contracted till the parties attain the age of puberty; the contract is purely civil; and the ecclesiastical jurisdiction has no concern with it. The law prohibits polygamy, and recognizes only one wife; however, concubinage is admitted to an unlimited extent. Concubines, who live in the same house with the legitimate wife, are obliged by law to perform menial services for her; and when the husband dies, they become the property of the surviving widow, unless he shall have emancipated them by a specific act previous to his decease. When a young man is desirous of espousing a girl, his mother, or nearest female relation, first makes the proposal in private; if the suit be well received, a party of his friends proceed to the house of the parents of the young woman, with whom they adjust the dotal portion. On the morning of the bridal day, the bridegroom sends to the maiden three loongues, or lower garments; three tubbeeks, or sashes; and three pieces of white muslin; such jewels also, ear-rings, and bracelets, as his circumstances will admit: a feast is prepared by the parents of the bride, and formal writings are executed: the new-married couple eat out of the same dish: the bridegroom presents the bride with some lèpæk, or pickled tea, which she accepts, and returns the compliment; and thus the ceremony ends.

When a man dies intestate, three-fourths of his property go to his children born in wedlock; and one-fourth to the widow, who is the guardian both of the property and the children, until the latter attain the age of maturity. A Birman funeral is solemnized with much religious parade and external demonstration of grief; besides the mourning relations, the attendants, who follow the corpse, which is car-

ried on a bier, are women hired for the occasion, who precede the body, and chant a dirge-like air. The Birmans burn their dead; but as the ceremony of burning is expensive, the bodies of paupers are either buried or cast into the river. The mode of burning is as follows: the bier is placed on a funeral pile six or eight feet high, made of billets of dried wood laid over one another, with intervals for admitting a free circulation of air, so as to increase the flame. The Rhahaans walk round the pile, reciting prayers to Gaudma, until the fire reaches the body, when the whole is quickly reduced to ashes, which are gathered and deposited in a grave. Persons of high distinction are embalmed, and their bodies are preserved in some kioum, or religious building, six or eight weeks before they are committed to the funeral pile. Honey is said to be the principal ingredient used for preserving the body from putrefaction.

As to their food, the Birmans, compared with the Indians, are gross and uncleanly. Although their religion forbids the slaughter of animals in general, yet they apply the interdiction only to those that are domesticated. All game is eagerly sought after, and in many places publicly sold; reptiles also, such as lizards, guanas, and snakes, constitute a part of the subsistence of the lower classes. They are also extremely fond of vegetables.

Among the vegetable productions of this country we may enumerate the white sandal-tree, and the aloexylum verum, much valued for the grateful odour of their smoke; the teak-tree (*tectonatheca*) already mentioned; the ebnoxylum verum, producing the true jet black ebony wood; the sycamore fig, Indian fig, and banyan tree; the *bigonia indica*, *nauclea orientalis*, *corypha feribus*, one of the loftiest of the palm-trees, and *excoecaria Cochinchinensis*, remarkable for the crimson under-surface of its leaves. To the class of plants used in medicine and the arts, we may refer the ginger and cardamum, found wild on the sides of rivers, and cultivated in great abundance; the turmeric, used by the natives of the coast to tinge and flavour their rice and other food; the betel pepper, *fagara pipenta*, and 3 or 4 kinds of capicum; the *jullicia tinctoria*, yielding a beautiful green tinge; *morinda umbellata*, gamboge, and earthamus, furnishing yellow dyes; the red wood of the *lawsonia spinosa*, and *Cisalpina japonica*, and the indigo. The bark of the *nerium antidysentericum*, called *codagapala*, and that of the *laurus culivava*, the fruit of the *strychnos nux vomica*, the *castia fitula*, the tamarind, and the *croton tiglium*, the inspissated juice of the aloe, the resin of the camphor-tree, and the oil of the ricinus, are occasionally imported from this country for the European dispensaries. The cinnamon laurel, sometimes accompanied by the nutmeg, the sugarcane, bamboo, and spikenard, are found throughout the whole country; the last on dry hills; and the bamboo and sugar cane in rich swamps. The sweet potatoe, *ipomæa tuberosa*, mad-apple and love-apple (*solanum melongena* and *lycoperficon*), *nymphæa nelumbo*, gourds, melons, water-melons, and various other excellent plants, enrich, by cultivation, this country; and the plantain, coco-nut, and sago palm, are produced more spontaneously. The vine grows wild in the forests, but its fruit is much inferior for want of cultivation, and through excess of heat, to that of the south of Europe; but this country is amply supplied with the mango, pine-apple, *sapiodous edulis*, mangosteen plum, *averrhoa carambola*, cullard-apple, papaw-fig, orange, lemon, and lime, and many other exquisite fruits. The animals of the Birman empire correspond with those of Hindoostan. The wild elephants of Pegu are very numerous; and, allured by the early crops of rice, commit great devastation among the plantations that are exposed to their ravages. The king

is the proprietor of these animals; and one of his Birman majesty's titles is "lord of the white elephant, and of all the elephants in the world." The forests abound with tigers. Their horses are small, but handsome and spirited, hardy and active; and are frequently exported in timber-ships bound for Madras and other parts of the coast, where they are disposed of to considerable advantage. Their cows are diminutive, resembling the breed on the coast of Coromandel; but their buffaloes are noble animals, much superior to those of India, and are used for draft and agriculture; some of them are of a light cream colour, and are almost as fierce as tigers who dare not molest them. The ichneumon or rat of Pharaoh, called by the natives Ounbaili, is found in this country; but there is no such animal as the jackal in the Ava dominions, though they are very numerous in the adjoining country. Among the birds, which are the same with those of other parts of India, is one called the Henza, the symbol of the Birman nation, as the eagle was of the Roman empire; it is a species of wild fowl called in India the Braminy goose; but the natives of Ava do not deify this bird.

The Birman seem to be in possession of several small islands in the gulf of Martaban, the Magnus Sinus of antiquity, and of others to the south and west. Symes's Embassy to the Kingdom of Ava, 3 vols. 8vo. passim. Asiatic Researches, vol. vi. p. 163—308. See ARRACAN, AVA, and PEGU.

BIRMINGHAM, is justly esteemed the greatest manufacturing town in England, and we may safely assert, that in the quantity, variety, elegance, and utility of its manufactured articles, it surpasses any town in Europe. To enable the stranger and foreigner to appreciate the general character of this place, with its various subordinate features, we will endeavour to depict them to the fancy, in a concise and perspicuous narrative. Its distinguishing characteristic is appropriately displayed in the following lines by Mr. Jago, in his poem of "Edge-hill."

" 'Tis noise, and hurry all,—the throng'd street,
The close pil'd warehouse, and the busy shop.
With nimble stroke the tinkling hammers move;
While slow and weighty the vast sledge descends,
In solemn base responsive, or apart,
Or socially conjoined in tuneful peal.—
How the coarse metal brightens into fame,
Shap'd by their plastic hands! what ornament!
What various use!—Nor this alone thy praise,
Thine too of graceful form, the letter'd type!
The friend of learning, and the poet's pride."

The etymology of the name of this town is not readily attained, as it has been written Brumwycheham, Bromwychem, and various other ways; indeed, in common conversation, it is frequently pronounced Bromidgham. The town lies near the centre of the island, in the north-western extremity of the county of Warwick. It is in the diocese of Lichfield and Coventry, in the deanery of Arden, and in the hundred of Hemlingford. The superficial contents of the parish are 2864 acres. In 1800 here were 16,403 houses, 1875 of which were uninhabited. The whole population was 73,670, of whom 34,576 were males, and 38,954 were females.

In the scale of national importance, Birmingham bears an exalted situation: without recurring to its ancient history, the modern inhabitants have, by laudable industry, raised it perhaps to the acme of manufacturing and commercial fame. The sagacious and elegant Burke emphatically pronounces Birmingham the "Toy Shop of Europe." This designation must not, however, be taken in its literal

sense, as the articles of utility made in this town far exceed those intended only for show and ornament. Many of our cities are attractive for their venerable ruins and grand cathedrals, but of those Birmingham is destitute. The traveller, who delights in seeing the human race profitably employed to their own, and their country's advantage, will disregard the smoke which sometimes envelops the town, and discern through the veil the bright beams of industry enlightening vast piles of riches: justice, however, will compel him to acknowledge, that profligacy has contrived to insinuate itself within too many dwellings of the labouring classes, producing idleness, discontent, drunkenness, and riots, of which several instances might be cited, exclusive of that grand convulsion which attended the commencement of that revolution in France, which in its consequences has so severely oppressed this, and almost every other nation. The Ikenild-street, one of the great Roman military roads, comes within a mile of Birmingham, and in Sutton park and Coldfield, four miles from the town, it remains nearly as perfect as it just completed; one of the principal evidences of the antiquity of Birmingham is, that it is contiguous to two Roman roads, the Ikenild, and Shirley streets.

The family of Birmingham were lords of this manor till 1537, at which period it is said to have been obtained by the duke of Northumberland, through the success of a deep-planned scheme. Having endeavoured in vain to purchase it, he contrived to make Edward Birmingham appear as an accomplice in a highway robbery, and offered him his interest to save a forfeited life, on condition of selling him the manor. The manor-house, which is now called the mote, still remains, though the site has been converted into a manufactory, and an apartment is shewn, where the ancient lords held their court-leets.

The parish of Birmingham is smaller than any in its neighbourhood. Mr. Hutton observes, that when Alfred founded a town, he allotted a much smaller space of land to it, than when he portioned a village, obviously intending the former for trade and commerce, and the latter for agriculture; this circumstance seems to prove that Alfred found Birmingham a town. "The buildings occupy the south-east part of the parish, which, with their appendages, are about 800 acres. This part being insufficient for the extraordinary increase of the inhabitants, she has of late extended her buildings along the Bromsgrove road, near the boundaries of Edgbaston, and on the other side planted some of her streets in the parish of Aston."

"The situation is elevated, and the soil one solid mass of dry, reddish sand, through which the water descends freely, thus making even the cellars comfortable habitations;" the same author adds facetiously, that though metals of various sorts are found in great plenty above the surface, we know of nothing below except sand, gravel, stone, and water. All the riches of the place, like those of an empiric in laced clothes, appear on the outside. "There is not any natural river in the parish, but in the lower parts of the town are two excellent springs of soft water, suitable for most purposes, one at the top of Digbeth, the other Lady well; and at the latter place are seven of the most complete baths in the kingdom. They cost 2000*l.* in erecting, and are ever ready for the accommodation of hot or cold bathing, for immersion or amusement, with conveniency for sweating. That appropriated to swimming is 18 yards by 36, situate in the centre of a garden, in which are 24 private undressing houses, and the whole surrounded by a wall ten feet high."

Mr. Hutton mentions several instances of longevity, which seem to demonstrate either that the air is too pure to be rendered unwholesome by the smoke of the town, or that

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smoke and steam are not so prejudicial to health as have been imagined: his instances are one person aged 100, a second 103, a third 104, and a fourth 107, four upwards of 90, and 13 upwards of 80.

Birmingham is not a place a gentleman would chuse to make a residence. Its continual noise and smoke prevent it from being desirable in that respect.

Many ancient families who once flourished at and near Birmingham, are mentioned by Mr. Hutton to have fallen into irretrievable decay; one instance is worth transcribing. "We have among us a family of the name of Middlemore, of great antiquity, deducible from the conquest; who held the chief possessions, and the chief offices in the county, and who matched into the first families in the kingdom, but fell with the interest of Charles I., and are now in that low ebb of fortune, that I have frequently, with a gloomy pleasure, relieved them at the common charity board of the town."

It appears upon record, that in 1251, William de Birmingham, lord of the manor, procured an additional charter from Edward III. reviving some decayed privileges, and granting others; among the last was that of the Whitfuntide fair, to begin on the eve of Ho'y Thursday, and to continue for four days. At the alteration of the style in 1752, it was prudently changed to the Thursday in Whitsun week, that less time might be lost to the injury of the manufacturers and their workmen. The same person also procured another fair, to begin on the eve of St. Michael, (which is commonly called the Onion fair, on account of the great quantity of onions sold at the time) both of which are at this day in great repute. The horse fair, which formerly was kept in Edgbalton-street, was, in 1777, removed to Brick-kiln-lane; and that for beasts, which used to be in the High-street, into Dale-end, in 1769.

Near Birmingham, on the London road, is Camp-hill, where the army of prince Rupert were encamped, during the siege in 1643. The inhabitants are accused of disloyalty by lord Clarendon, for seizing the carriages which contained the royal plate and furniture. The prince, with 2000 men, had been commanded by the king to open a communication between Oxford and York, but the hardy and imprudent inhabitants of this town dared to oppose this force, with only a company of foot, and a troop of horse. Though they had thrown up some slight works, and blockaded the streets, yet the king's army forced through these trifling obstructions, and entered the town sword in hand. The earl of Denbigh, a royalist, was killed in this affair, as was a clergyman, who acted as governor for the parliament, and who refused quarter. Birmingham had a narrow escape from destruction, for the exasperated commander ordered the place to be burnt, but some favourable circumstance confined the conflagration to a few houses in Bull-street.

The plague of 1665, was imported into the town in a box of cloaths brought to the White Hart inn. Hence the fatal poison insinuated itself through the streets and houses, destroying great numbers of the inhabitants, whose bodies soon filled the church-yard, and also an acre of land at Ladywood-green, which was afterwards called the Pest-ground.

Although some degree of eminence attached to Birmingham previously to the reign of Charles II., yet it is from that period that its rapid increase must be dated. Building leases then became common, and numbers of houses arose to accommodate the increasing population which assembled, in consequence of the cultivation of the mechanical arts.

About the year 1700, the number of streets in Birmingham

was only 30, but now there are nearly 250; besides, several of the oldest are considerably improved and augmented. This will, in some measure, assist the imagination in comprehending the amazing increase of the town in size, wealth, and manufactures, during that time; and it is no presumption to suppose, that it has not yet arrived at its zenith: one instance of increase will be sufficient to point out the general improvement. Between the roads to Wolverhampton and Dudley, there were only three houses March 14, 1779. By that day twelve months they increased to 55, and March 14, 1781, there were 144. The same day in 1791, there was an addition of 833.

Thomas Sherlock, bishop of London, purchased of the ladies of the manor in 1730, land worth 400l. per annum; in 1758, the income was doubled. He always refused to let it on building leases, alleging, that his successor would be compelled to remove the rubbish at the expiration of the terms; sir Thomas Gooch, who held the land after the above prelate, procured an act about 1766, for setting aside the prohibitory clauses of the bishop's will; immediately let the ground, and improved the rents to 2400l. per annum; it appears from the books of the poor-rates, that less than 5000 houses pay the parochial dues, and more than 8000 houses are exempt; this fact denotes the prevailing description of population.

Manufactures, &c. The extraordinary increase in the size, population, and prosperity of Birmingham, arises principally from its proximity to the coal mines, from the nature of the soil, from its canals, from the successful exertions of a few individuals in some manufacturing speculations, and from its being exempt from borough, and corporate laws and restrictions. To investigate and detail the whole of these causes, with their effects, would occupy more space than we can consistently appropriate. The most prominent characteristics, however, shall be narrated. To the late John Taylor, esq. a man of great industry and ingenuity, the public are indebted for the gilt button, the japanned and gilt snuff-box, with the numerous class of enamels; also the painted snuff-box, at which employ, one servant earned 3l. 10s. per week, by paisting them at a farthing each. In his shops were weekly manufactured buttons to the amount of 800l. exclusive of other valuable productions, and eighty guineas have been given him for a single toy made at his shop. He died in 1775, at the age of 64, after acquiring a fortune of 200,000l. His son is now partner in one of the largest provincial banking houses in England.

The greatest and most noted manufactory of this place, and perhaps in Europe, is that at Soho, about two miles from Birmingham. This is the property of Messrs. Boulton and Watt, who have advanced certain pieces of mechanism and productions of art to a state of excellence, that have excited the astonishment and admiration of nations. The large warehouses, work-shops, and the elegant mansion of the former gentleman, cover the declivities of a hill, which a few years back was a barren heath, tenanted only by rabbits, and a warraner's hut; now this once desolated scene is converted into an emporium of arts and beauties. Such are the wonderful powers of human ingenuity and industry. In 1757, this spot, with some contiguous land, was leased for 99 years, to Messrs. Ruston and Evans, who erected a house and a mill for rolling metal, &c. At Lady day, 1762, Mr. Boulton bought the whole, and removing to it soon afterwards from Birmingham, commenced the present extensive premises, which were nearly completed in 1765, at an expence of 9000l. He now admitted a partner, Mr. Fothergill, into the concern, and

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established an extensive correspondence throughout Europe. To obtain and support a reputation, every encouragement was afforded to men of genius in drawing, modelling, and other branches of the arts. An imitation of or molu in vases, tripods, and candelabras, was adopted, accompanied by so much skill and elegance, that universal approbation followed; this led to the manufacture of wrought silver, and an application was made to parliament in 1773, for an assay office, to be established at Birmingham. The poly-graphic art had its origin at Soho. This method of copying pictures in oil, by a mechanical process, was conducted by F. Epinton, who has since executed a great number of fine specimens of painting, or staining of glass. The encaustic mode of staining glass, or fixing the vivid and fine graduating colours upon that transparent material, was supposed to be lost, but it has been revived and brought to great perfection by this gentleman. Since 1784, he has executed several large windows for various cathedrals, churches, and gentlemen's mansions. (See GLASS-PAINTING.) Among the various machines, &c. invented and constructed at Soho, there is one entitled to distinguished notice for its great national utility and importance. This is the *steam engine*, which has acquired extraordinary force and improvements by Mr. James Watt, one of the proprietors of the Soho firm. To him the scientific world is much indebted for various other inventions and improvements in mechanics. With a vigorous comprehensiveness of mind, he embraces every mathematical and mechanical subject from the simplest to the most complex and profound. He procured a patent for the steam engine in 1768, and seven years afterwards, entering into partnership with Mr. Boulton, began to construct those machines at Soho. Since that period, they have been generally adopted in the mines and manufactories all over the kingdom. (See STEAM ENGINE.) The following list of curious and useful articles are manufactured at these works, which, when fully employed, give support to upwards of 600 labourers. Buttons of all kinds; polished steel, and jettina steel-toys; polished steel watch chains; patent cork-screws, &c. Buckles and satchets of all sorts; plated and silver goods for the dining and tea-table, side-board, &c.; medals and coins of various sizes and metals. The late beautiful new coinage of copper, and also the re-stamped dollars; all come from the Soho mint. The coining mill or engine first erected here in 1783, has been much improved since that period, and is now adapted to work eight machines at once, each of which will strike from 70 to 84 pieces per minute, the size of a guinea; or between 4,000 and 5,000 per hour. Thus the eight machines will work between 30,000 and 40,000 coins in one hour. These machines are operated on by the steam-engine, and perform the following processes: 1st, rolling the masses of copper into sheets; 2nd, fine rolling of the same cold, through cylindrical steel rollers; 3rd, clipping the blank pieces of copper for the die; 4th, shaking the coin in bags; 5th, striking both sides of the coin, and milling it, at the same time displacing it, and placing another for the same operation. To its other properties, this ingenious machine adds the almost magical one of preventing fraud, by keeping an accurate account of every coin which passes through it. Dr. Darwin has described this singular apparatus in the following apposite poetical lines:

—“Now his hard hands on Mona's refted creft,
Bofom'd in rocks, her azure ores areft;
With iron lips his rapid rollers feize
The lengthened bars in their expanfive fqueeze;
Defcending fcrews with pond'rous fly-wheels wound

The tawny plates, the new medallion's round;
Hard dies of steel, the cupreous circles cramp,
And with quick fall, his mafsy hammers ftamp.
The harp, the lily, and the lion join,
And George and Britain guard the fplendid coin.”

Rolled metals of all kinds of mixtures, are prepared here; besides pneumatical apparatus, large and portable; also copying machines, and in short, almost every sort of article for use or ornament.

Besides the manufactories already named, Birmingham contains several others, which are entitled to our consideration; and although we cannot allow space for particulars, yet we must not pass them altogether unnoticed.

Messrs. Richards's in High-street, is styled the toy-shop of Birmingham; the elegance and variety of the articles are not to be equalled, with the exception of the show-room at Soho. Mr. Clay's japan manufactory is not less celebrated, particularly when it is considered that the japan is fixed on common brown paper. To those may be added Clarke and Ashmore's manufactory of whips. Gill's gun, bayonet, and sword manufactory, supposed to be one of the best in the world; and Galton's for sporting guns. Previous to the reign of William III. guns were mostly imported from Holland; but that monarch having once expressed some regret at this circumstance, and deplored the necessity of sending abroad for the article, Sir Richard Newdigate, M.P. for Warwickshire, being present, assured the king that his constituents would undertake to supply the demands of government. An order was given, and being readily and correctly executed, Birmingham has continued from that period to be the great and principal place of manufacture for this destructive weapon. See GUN.

Leather appears to have been manufactured here in great quantities in the early periods of the history of Birmingham; but in 1795, there was but one tanner in the place.

Within the last century, the manufacture of steel into almost every kind of toy and ornament took its rise: a large street bears the name of Steel-house-lane, from the extensive works carried on there. Here are also very large brass works erected on the banks of the canal, on the road to the five ways, near which stand the ruins of the mansion built by the late John Baskerville, who made great improvements in the art of printing. See BASKERVILLE.

Places of Amusement and Curiosity. In New-street is a museum, or repository of natural and artificial curiosities, the property of J. Bisset, a gentleman who has published some ingenious poems and useful books. His “Magnificent Directory,” is a novel, handsome, and useful work, in which are contained elegantly engraved, emblematical cards of address of a great number of the merchants, manufacturers, tradesmen, &c. throughout England.

The first *Theatre* established at Birmingham was situated in Moor-street about 1740; that in King-street was erected 1765, and enlarged 1774; in the same year it was transferred to a religious society; and another built in New-street, at an expence of 5660l. and managed with great success by Mr. Yates. In 1791, it was burnt by some incendiaries, who have never been discovered; since that period, the proprietors have rebuilt it in a very splendid manner for 14,000l. with an assembly room and a tavern annexed to it. Mr. Macready of Covent Garden theatre, is the present manager, who generally presents his audiences with the best London performers during the summer months. Concerts and musical parties are held weekly during winter; and the summer produces a variety of public gardens, the principal of which are Vauxhall and Spring-gardens.

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Government. Birmingham is governed by three acting magistrates; the officers chosen annually are the high-bailiff, who inspects weights and dry-measures, and the markets; the low-bailiff, who summons juries, and chuses all the other officers; two constables and one headborough; two high tasters, who examine the quality of beer and its measure; two low tasters or meat conners, who inspect the meat exposed to sale, and cause that to be destroyed which is unfit for use; two assurers, and two leather-fellers, whose offices are now only nominal.

Deritend, a hamlet of Birmingham, sends its inhabitants to the court leet of that town, where all the above officers are chosen and sworn, in the name of the lord of the manor.

An act of parliament passed in 1752, which established a *Court of Requests*, consisting of 72 commissioners, three of whom are a quorum; they sit every Friday morning in a room of the Red Lion inn; the clerks attend to give judicial assistance, who are always professors of the common law, and chosen by the lord of the manor and the commissioners for life: ten of the commissioners are ballotted out every other year, and ten others elected from among the inhabitants. The beneficial effects of a humane society for the recovery of suspended animation were first extended to Birmingham in 1790. About the same period a committee of respectable inhabitants was established to watch over the common interests, under the title of the "Commercial Committee."

In 1791, W. Villars, esq. then high bailiff, opened a market for hay, straw, &c.

A public library was founded in 1779, which has flourished greatly, and contains nearly 10,000 volumes, supported by upwards of 500 subscribers. An elegant pile of building was erected in Withering-street for the purposes of the institution in 1797. A rival made its appearance in 1796, with every prospect of success; besides these, there are medical and law libraries, and many reading societies. Birmingham contains two churches, and four chapels; besides several meeting-houses.

Churches. St. Martin's church, denominated the Old church, was raised previously to the year 1300. It is of stone, and occupies the site of, or is the first sacred building belonging to the place. In 1690, it was thought necessary to case the church and tower with brick. The walls support the arms and monuments of several titled and ancient families. Under the south window are two of white marble, one of which is supposed to have been erected for William de Birmingham, who was captured by the French at the siege of B-legard in 1297. He wears a short mantle, &c. and bears a shield with the bend lozenge. This church was repaired and altered in 1786, at an expence of 4000*l.* The patronage belonged to the family of Birmingham till 1537, since which period it has been possessed by the Dudleys, the crown, the Marrows, the Smiths, and finally the Tenants. The rectory was valued in the king's books 1291, at 5*l.* per annum, and in 1536, at 19*l.* 3*s.* 6*d.* The income is now upwards of 1000*l.* and expected to be 2000*l.* after the expiration of certain leases.

St. Philip's, or the *New* church, is a handsome pile of building, but how Mr. Hutton or any other person could fancy and say that the steeple is erected after "the model of St. Paul's in London, but without its weight," is to us inconceivable, as there is not a line of it that reminds the spectator either of the dome or turrets of the metropolitan edifice. It must be allowed that the tower of St. Philip's finishes with an attic and a diminutive cupola, but there ends the resemblance. This church is advantageously situated on an eminence, and the site was given by Robert Philips, esq.

It was begun by act of parliament in 1711, under a commission consisting of 20 of the neighbouring gentry appointed by the bishop of the diocese under his episcopal seal. In 1715, it was consecrated, and finished in 1719, at the real cost of only 5012*l.* though the estimated value was nearly 20,000*l.* This circumstance arose from the gift of materials, &c. The church-yard consists of four acres, and is intersected by handsome walks, shaded by trees in double and treble rows, and is surrounded by elegant buildings. Two thousand persons may be conveniently accommodated in St. Philip's church, which has contained nearly 3000. William Higgs, first rector, founded a theological library for the use of the neighbouring clergy, and bequeathed 200*l.* to augment it. The Rev. Spencer Madan erected a room in 1792, adjoining the parsonage, and termed it the parochial library. The rectory is worth about 300*l.* per annum.

St. Bartholomew's Chapel, capable of containing 800 persons, was erected in 1749, on a site given by John Jennens, esq. an opulent land-holder of Birmingham. Mrs. Jennens, through the good offices of Mrs. Weaman, added 1000*l.* and the remaining sum was received in contributions from pious inhabitants. The chapel and tower are handsome, and the former presents a line north and south. The altar-piece is the gift of Basil, earl of Denbigh, and the communion plate that of Mary Carless.

St. Mary's Chapel was erected in 1774; on a spot of ground given by Mary Weaman, whose family has the patronage. The incumbency is valued at 200*l.* per annum.

St. Paul's Chapel is a stone building erected in 1779, by virtue of the same act which founded St. Mary's. Charles Colmore, esq. gave the ground; a steeple is intended, and the east window was decorated in 1791, with painted glass, representing the conversion of St. Paul, by Francis Eginton, who received 400 guineas for the same.

The house of a celebrated physician of Birmingham, Dr. Ash, was purchased in 1789 by an attorney, who converted it into an elegant chapel, at the expence of his own ruin, where he caused the service of the church to be chanted by a numerous choir, accompanied by an organ. Dr. Croft, and some other clergymen, afterwards purchased it, and engaged to officiate there regularly. The congregation chiefly consists of soldiers from the neighbouring barracks.

Dissenting Meeting Houses. *Old Meeting-street* received its name from the old meeting erected in the reign of William III. which was destroyed in 1791 by the mob. The trustees recovered 1390*l.* 7*s.* 5*d.* damages, and rebuilt the present building, at an expence of 5000*l.*

The *New Meeting* built 1730, shared the fate of its parent in 1791, and has never been rebuilt. The celebrated Dr. Priestley presided over the spiritual concerns of this place of worship at the period of its destruction, and narrowly escaped personal injury, or perhaps death, from the furious populace. He fled, and finally retired into exile, within the state of Pennsylvania, where he died 1804, with the fame of an excellent philosopher and experimentalist. (See PRIESTLEY.) The trustees having lost their licence, could not recover damages, but the king granted his warrant upon the treasury for 2000*l.*

The *Union Meeting* in Livery-street, originally an amphitheatre for the exhibition of equestrian exercises, being unoccupied at the period of the riots, the congregations of the two meetings hired, and converted it into a place of worship. After the re-erection of the old meeting, they separated, resigning the Union meeting to the new meeting

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assembly, who occupy it till their place of worship is re-built.

Carrs-Lane Meeting, a kind of chapel to the old meeting, was erected in 1748. This society has 800*l.* bequeathed by John England in 1771, and 40*l.* 18*s.* per annum, termed Scot's trust.

A *Baptist Meeting* in Canon-street, was founded in 1738, and has continued prosperously to the present period.

The *Quakers* have a meeting in Bull-street, frequented by a large, peaceable, and rich congregation; behind it is a spacious burial-ground. The methodists are now very numerous; previous to 1782, there was but one congregation, whose place of worship had been a theatre; whence they removed to a splendid meeting in Cherry-street, erected at an expence of 1200*l.* John Westley, their chief priest, preached in it for the first time July 7, in the above year; three others have since been erected and purchased in Colchill-street, Deritend, and Newhall-street. The last was erected as a new Jerusalem temple, for the Swedenborgians, but in too magnificent a style for their revenues. The methodists bought it, and the original possessors built a smaller temple.

A small *Roman Catholic Chapel* is situated at Easy-hill, in the place of one destroyed during the destructive riots. A Jewish synagogue, a baptist's meeting, and an independent meeting, lady Huntingdon's meeting, and some other places of worship, are found in this town, which, like most manufacturing places, is distinguished for its number of dissenters of different sects.

Charities. Some of the streets of Birmingham are kept in repair by emoluments arising from small estates. William Lench, who lived in the reign of Henry VIII. bequeathed certain estates to the town, in trust to sixteen inhabitants, for repairing the streets. This person founded the almshouses in Steel-house lane for poor widows. Fentham's trust is 100*l.* per annum, and applied to teaching poor children reading, and for cloathing ten poor widows. The date of the donation is 1712. Mr. Crowley gave in 1733, six houses for the support of a school for ten girls.

The *Free School* was erected on the site of the guild of the holy cross, which had an endowment of lands for the maintenance of two priests, worth twenty marks per annum, given by Thomas de Sheldon, John Colshill, John Goldsmith, and William Attflowe. In 1593, the bailiff and inhabitants obtained a patent for augmenting the foundation, and adding a brotherhood, which flourished till the general dissolution, and was then valued at 31*l.* 2*s.* 10*d.* per annum. Edward VI. granted the lands belonging to the guild in 1552. at the suit of the inhabitants to nineteen persons, as bailiff and governors of the free grammar school of king Edward VI., to hold in common socage at a rent of 20*s.* per annum. Their successors erected the present building in 1707, which is large and handsome, has a neat tower in the centre, and a statue of Edward VI. in front. The chief master's salary is 120*l.* the second 60*l.* two ushers 40*l.* each for writing and drawing, and a librarian 10*l.* There are seven exhibitions of 25*l.* per annum each for the university of Oxford, and the possessions are valued at 1200*l.* per annum.

The *Blue Coat School* was erected 1724. but enlarged and improved in 1794, at an expence of 2500*l.* The revenues are 1327*l.* and 150 boys and 40 girls receive the benefits of the institution.

The *Dissenter's Charity School* was held at the old meeting, but after that was destroyed, a building was purchased in Park street, and has been much improved. The children received are 40 boys and 20 girls.

The *Work-house* erected 1733, cost 1173*l.* a wing was added for an infirmary 1766, and another in 1779, at an expence

of 1100*l.* The inhabitants pay a rate of 6*d.* in the pound, which raises 17,000*l.* per annum, and relief is afforded to 7000 persons. There are twelve overseers.

The *General Hospital* was erected 1766, and two wings were added 1791. It is supported by voluntary contributions, and many large bequests; the physicians generally give their assistance gratis.

The *Prisons* in Peck-lane and Deritend are disagreeable and unwholesome, and both are licensed as public houses.

The *Canal* between this place and Wednesbury, was made in consequence of an act obtained in 1767. It is twenty-two miles in length, uniting with the Staffordshire canal; the shares were 140*l.* each, and the expence 70,000*l.*; they sold in 1782 for 370*l.* each, and in 1792 for 1170*l.* Sir Thomas Gooch leased the proprietors six acres of land at 47*l.* per annum, which they converted into a wharf, and erected a handsome office on it. The boats are drawn by one horse, and are about twenty-five tons burthen. Coals are little more than half the price they were before this canal was made. Several other canals, equally beneficial, have since been completed, opening a communication between this town, and almost every principal town in the kingdom.

The *Barracks* stand on five acres of land, held by government at one penny per yard. They were erected in 1793 for 13,000*l.*, and will accommodate 162 men.

There are three extensive Breweries near Birmingham, Richards's in Deritend for ale, Giles and Forrests, Worton-lane, for ale and porter, and the Britannia, Walmer-lane, belonging to Clay and co.

The riots, already alluded to, constitute an unpleasant feature in the history of this town, and whilst they serve to characterize the folly and insatiation of the lower classes of society, will, we trust, operate as a warning example to the rising generation. A few persons assembled at the hotel Birmingham, July 14, 1791, to celebrate the anniversary of the French revolution. A mob collected round the house, broke the windows, and immediately proceeded to Dr. Prichley's new meeting. This, and the old meeting, were soon burnt to ashes, and the doctor's house and furniture, with his valuable library, apparatus, and MSS. shared the same devastating fate. On July 15, the mansions of John Ryland, esq. at Easy-hill, and Bordesley-hall, the seat of John Taylor, esq. together with the house, stock in trade, books, furniture, &c. of Mr. Hutton, author of the "History of Birmingham," were destroyed. Saturday the 16th witnessed the destruction of Mr. Hutton's house at Saktley, the residences of George Humphreys, William Ruffel, and John Taylor, esqrs. The latter, Bordesley-hall, was occupied by lady Carhampton, mother to the duchess of Cumberland, but neither her blindness through age, nor connection with the king, could prevent the mandate of removing her furniture from the mob, who frantically offered to assist: "She was therefore, like Lot, hastened away before the flames arose, but not by Angels." The reverend Mr. Hobson's and Mr. Herwood's houses were next burnt; those of the Rev. Mr. Coates, Mr. Hawkes, and Thomas Ruffel, esqrs. were plundered. On Sunday the 17th, Kingwood meeting perished in flames, the parsonage-house, and that of Mr. Cox, licensed for public worship. The mob this day plundered Edgbaston-hall, Dr. Withering's, and attacked Mr. Male's house, but hearing in the evening, that a troop of horse approached, they gradually dispersed, after destroying property to the amount of 60,000*l.* To reimburse the sufferers, an act was obtained in 1793. The war succeeding, greatly injured Birmingham, and this cannot be more

clearly proved than by referring to the 1875 uninhabited houses in the year 1800. There are two morning papers published at Birmingham; Aris's Birmingham Gazette, and Swinney's Birmingham Chronicle, &c. Mr. Swinney also carries on a considerable type foundery, which is the only provincial one in the kingdom. "This neighbourhood," says Mr. Hutton, "may justly be deemed the seat of the arts, but not the seat of the gentry. None of the nobility are near us, except William Legge, earl of Dartmouth, at Sandwell, four miles from Birmingham. The principal houses in our environs are those of the late sir Charles Holte at Alfton; sir Henry Gough Calthorpe at Edgoston; George Birch, esq. at Handsworth; John Gough, esq. at Perry; and John Taylor, esq. at Bordesley and at Mofely, all adjoining the manor of Birmingham; exclusive of these, there are many retreats of our first inhabitants, acquired by commercial success." Hockley Abbey, near Soke, is the residence of Mr. Richard Ford, an ingenious smith, who had the honour of presenting his majesty with an iron carriage made by himself. It is a modern curious building, with the upper part representing a ruin, and is surrounded by beautiful grounds and walks, interspersed with fanciful curiosities. The most considerable seats in the vicinity of Birmingham, are Hagley, 12 miles distant; Eville, 18 miles distant; and the Leafowes, six miles distant. The latter will long be preserved in the memory of every reader of Shenstone, whose creation it was, and whose taste it displayed in an eminent degree. It now belongs to Charles Hamilton, esq. who has judiciously restored the neglected beauties of the place. Hagley, the seat of lord Littelton, has been particularly celebrated in the writings of Pope, Thomson, Hammond, and other poets. Eville, the seat of the earl of Stanford, is a scene of great natural beauty. For further particulars relating to Birmingham, its manufactures and neighbourhood, see Hutton's "Hist. of Birmingham," 8vo. Shaw's "Hist. of Staffordshire," fol. "A companion to the Leafowes, Hagley, and Eville," 12mo. Bisset's "Poetic Survey round Birmingham," 8vo. Phillips's "History of Inland Navigation," 4to. &c.

BIRON, ARMAND, DE GONTAULT, baron of, in *Biography*, was born about the year 1524, and rose gradually from the condition of a page to Margaret queen of Navarre, to the rank of marshal of France, which he obtained from Henry III. in 1577. After the death of this king, he was one of the first to acknowledge Henry IV. as lawful possessor of the crown, and served him with advantage at the battles of Argues and Ivry. At the close of the action, to the victorious issue of which he contributed, by his command of the reserve, though he was not engaged, he said to Henry, who had much exposed himself, "You, sire, have acted the part of Biron to day, and he has acted yours." Under Henry III. he occupied the post of lieutenant-general of Guenne, in which he gained great advantages over the Calvinists; and he also reduced part of Normandy to the obedience of Henry IV. To his son, who solicited a small force for the purpose, and with the promise of ruining the army of the dukes of Parma and Mavenne, he replied; "I believe you may; but then we shall have nothing farther to do but to plant cabbages at Biron." Soon after, in 1592, he lost his life by a cannon ball at the siege of Epernai. In his military character, he was a rigid disciplinarian, and required prompt obedience. When an officer, whom he had commanded to burn a house, desired an order to this effect, under his own hand, Biron instantly discharged him, alleging "he would have nothing to do with people who were afraid of justice; and that every soldier who dreaded a pen, must tremble at a sword."

He was a polite scholar, but of a mercenary and intemperate disposition. He wrote "Commentaries" of his transactions, which were lost. Gen. Dict. Nouv. Dict. Hist. Mod. Un. Hist. vol. xxi. p. 54, &c.

BIRON, CHARLES DE GONTAULT, duke of, the eldest son of the preceding, was born in 1562; and having served under his father, he distinguished himself in several battles and sieges. Henry IV. distinguished him by tokens of forbearance and favour, on account of his faithful and active services. He created him admiral of France in 1592, marshal and governor of Burgundy in 1594, and honoured him with erecting the barony of Biron into a dukedom and peerage. He also employed him in several important diplomatic embassies: but his pride and ambition rendered him incapable of gratitude. Allured by flattering prospects, he engaged with Spain and Savoy in a conspiracy against his master; and at length his haughty conduct caused him to be arrested for his treasons, tried, and condemned to lose his head; and the sentence was executed in the court of the bastille, July 31, 1602. He submitted with reluctance, and betrayed cowardice at the time of his death. He was vain, arrogant, and malicious; he changed his religion twice before he attained the age of 16 years, and manifested a total want of principle and integrity. His passion for gaming reduced him, notwithstanding his rapacity, to various difficulties; and he was only estimable when he was actively employed. Although the king incurred some blame for sacrificing the life of a servant who had been eminently useful, and honoured with his peculiar friendship, Biron deserved to suffer as a traitor. Gen. Dict. Nouv. Dict. Hist. Mod. Un. Hist. vol. xxi. p. 99, &c.

BIRON, in *Geography*, a town of France, in the department of the Dordogne, $3\frac{1}{2}$ leagues south of Belvez.—Also, an island in the gulf of St. Lawrence, 26 leagues west of cape Anzeilla. N. lat. $47^{\circ} 50'$. W. long $61^{\circ} 5'$.

BIROSTRIS, in *Conchology*, a species of BULLA, that inhabits Java. The shell has two beaks, which are elongated and smooth; margin thickened outwardly. Gmelin, Litter. This species is not unlike *Bulla velva*, but is smaller, being only about the size of a horsebean; and it is also narrower; smooth, whitish, flesh-coloured; beaks unequal, obliquely truncated, and one of them a little ascending; aperture nearly equal, but widest at one end.

BIROTA, *Bivotum*, from *bis* and *rota*, *wheel*, a kind of vehicle denominated from the two wheels whereon it moved. The birota, by the constitution of Constantine, was drawn by three mules, and carried 200 pounds weight; by which it was distinguished from the *rheda*, which carried 1000 pounds, and was drawn by eight, and in winter by ten mules.

BIRR, in *Geography*, or, as it is called by act of parliament, *Parsons Town*, the largest post and market town in the King's county, Ireland, situated on the river called the *Little Brosna*, which divides the King's county from the county of Tipperary, on the south west. This town has breweries, distilleries, malt-houses, cloth and serge manufactories, a bank, an excellent market, and a barrack for two companies of foot. The castle at the western extremity of the town, belonging to the family of Parsons, was besieged by Sarsfield, lord Lucan, general of the Irish, in the war of the revolution of 1688, and relieved by general Kirk. There is a statue of William, duke of Cumberland, standing on a stone pillar of the Doric order, erected in 1747, in honour of the victory at Culloden. Birr is 65 miles west by south from Dublin, 6 south from Banagher on the Shannon, and near 12 from Portanna.

N. lat.

N. lat. 53° 4'. W. long. 7° 52'. Beaufort.—Coote's Survey of King's County.

BIRRETUM, or **BIRETUM**, in *Writers of the Middle and Lower Ages*, a thin black cap or cover for the head, made of linen, fitted close to the head, and pointed by a pyramid, anciently worn by priests, soldiers, doctors, &c. Du-Cange. The word *birretum*, sometimes written *birretum* and *biretum*, is also applied to a cap or coif of a judge, or serjeant at law. The birretum also denotes the cap worn by the novices in the Jesuit's order, formerly of a square, now a round figure. The birret was the ordinary cover of the head in France 500 years ago. It took its denomination from *birrus* or *birrum*, the coat anciently used by ecclesiastics; with which the cap was then of a piece, and made part of it; so that the whole covered, not only the head, but the shoulders. Afterwards, when they began to retrench the lower part, still retaining the upper, it was no longer called *birrus*, or *birrum*, but diminutively *birret*, or *birretum*.

BIRRUS, an ancient habit worn by the Christians in Africa. The word is also written *byrrus*, supposed to be formed from *πυρρος*, on account of its red colour. Some will have the birrus an episcopal habit. Others extend it to all the clergy. Others, on juster grounds, make it the common coat of all the Christians in that quarter.

BIRS, or **BIRSH**, in *Geography*, a river of Swisserland, which runs into the Rhine near Basle. Near this river, and not far from the town of Basle, are the hospital and burying ground of St. James, famous in the history of Swisserland for a desperate combat in 1444, between the Swiss and the dauphin of France, afterwards Lewis XI. in which Swiss valour and intrepidity were very signally displayed. Upon this occasion 1500 Swiss charged 8000 of the enemy's cavalry with such determined and well conducted valour, as to drive them back; and when the enemy received reinforcement, the Swiss renewed the assault, and forced them to repass the river Birs, and join the main body of the army. The Swiss, encouraged by this success, and also exasperated with the most spirited indignation against the invaders of their country, rashly attempted, against the remonstrances of their officers, to force their passage over a bridge guarded by a large body of the enemy; but this gallant effort not succeeding, they threw themselves into the river, and gained the opposite shore, in the face of a battery of cannon, that was playing against them. But they were now opposed to an army of 30,000 men advantageously posted in an open plain. In these desperate circumstances they had no alternative, but to throw down their arms, or gloriously expire. They bravely preferred death; 500 took possession of a small island near the bridge, and after resolutely defending themselves to the last extremity, were cut to pieces. A like number forced their way through the ranks of the enemy, and marched towards Basle; when they were opposed by a large party of horse posted to prevent the inhabitants of the town from sallying forth to the relief of their countrymen. Being now surrounded on all sides, they threw themselves into the hospital of St. James; and, lining the walls of the burying-ground, resisted for some time the united assaults of the French army. At length the hospital being set on fire, and the cannon having battered down the walls of the burying-ground, they no longer fought in hopes of victory; but still resolving to sell their lives as dearly as possible, they continued to defend themselves to the last gasp.

Æneas Sylvius (afterwards pope Pius II.) relates, among other actions of singular valour excited by this heroic troop, the following instance, that deserves to be recorded. Four

French foldiers assaulted a single Swiss, and having killed and stripped him, proceeded to insult the corpse; one of his companions, incensed at this brutal action, seized a battle-axe, rushed upon the four, slew two of them, and drove the others to flight; then flinging the dead body of his friend upon his shoulders, carried it to a place of security; and, returning to the attack, fell by the hand of the enemy. Of the whole number, only 15 escaped from the field of battle; and these, agreeably to the old Spartan discipline, were branded with infamy, for not having sacrificed their lives in defence of their country. Among those who were desperately wounded and left upon the field, only 32 were found alive. The names of many of these glorious combatants were registered, and still remain upon records. The loss of the enemy was great; and they were effectually prevented from prosecuting their designs upon Swisserland, and compelled to retire in a shattered state into Alsace. Lewis himself declared that such another victory would ruin his army. This combat may be considered as forming a remarkable era in the history of the Swiss; for it gave rise to their treaty with Charles VII.; being the first alliance which they contracted with France. The Swiss still talk of this famous action with the warmest enthusiasm; and the inhabitants of Basle form parties every year, and go to an inn situated near the hospital and burying-ground, in order to commemorate, in a red wine produced from some vineyards planted on the field of battle, the heroic deeds of their countrymen, who so gloriously sacrificed their lives. This wine is highly prized by the Basileans, and called "the blood of the Swiss."

By the side of the Birs there is a fertile plain, on which are several pleasant villages; and the extremity of the plain is closed by a rock, through which opens the celebrated pass called "Pierre Pertuis," which see. At the bottom of this rock, the Birs bursts from the ground in several copious springs, and turns two mills within a few paces of its principal source.

BIRSK. See **BORSK**.

BIRSKA, a river of Siberia, which runs into the Lena, 28 miles south-west of Olekminsk.

BIRSTEIN, a town of Germany, in the circle of the Upper Rhine, and county of Henberg; 26 miles E. N. E. of Frankfurt on the Mayne.

BIRTERBURY, or **BITTERBUI Bay**, a considerable bay on the west coast of Ireland, in the county of Galway, open to the Atlantic. It is capacious and well sheltered, has good ground, and will admit the largest ships, which may ride here from four to eight fathoms water; yet it is probably never visited, except by fishermen and smugglers. N. lat. 53° 20'. W. long. 9° 53' 30" from Greenwich. M^cKenzie.

BIRTH, in a general sense. The word is of Saxon origin, and is used to denote both the act of coming into life, which is called child-birth, and the offspring or thing born, and in these senses we meet with it in our best writers.

But thou art fair, and at thy birth coming into the world.
Shakepear's King John.
Others hatch their eggs, and tend the birth, (young ones) until they are able to shift for themselves. Addison.
Cicero says, "Ferae diligunt partus suos," beasts love their offspring.

BIRTH, in *Midwifery*, is used as synonymous to labour, or the power by which the fœtus is excluded from the uterus, and in this sense we say, the birth (labour) was easy, expeditious, tedious, difficult, &c. It is also, though not very properly, used by midwives, to signify the external orifice of the vagina; thus when in labour, the head of the child begins

to dilate the external orifice, or to emerge, it is said to be in the birth.

BIRTH, Natural, when the head of the fœtus presenting to the uterine orifice, the labour is completely effected by the pains, without the interference of art. See **LABOUR, Natural**.

BIRTH, Premature, when by any accident or derangement of the health of the woman, or of the fœtus, pains are excited, and the fœtus is expelled before it has attained its maturity. See **ABORTION**, and also **LABOUR, Premature**.

BIRTH, Preternatural, or **across**, when, in labour, the arm, shoulder, side, breech, or any other part than the head of the fœtus present to the uterine orifice. See **LABOUR, Preternatural**, and **CROSS birth**.

BIRTH, Laborious, when in labour the head of the fœtus presenting, yet on account of the straightness of the pelvis, the pains are insufficient for its expulsion, whence recourse is necessarily had to the assistance of the lacer, forceps, crotchet, &c. See **LABORIOUS Birth**, or **LABOUR**.

BIRTH, Monstrous, when the fœtus is deformed or misshaped, and has more or fewer organs than is natural. See **MONSTER**.

BIRTHS, Seven Months, *partus septimestris*, children born at the end of the seventh month, or 210 days from the time of conception, being now complete in all their members, and having acquired a certain degree of strength, and firmness of constitution, are not unfrequently reared or brought up.

BIRTHS, Eight Months, *partus octimestris*, that is, children born at the end of the eighth month, or after completing 240 or 242 days in the womb. These were supposed by the ancients, but erroneously, to be less vivacious, and consequently less likely to be preserved alive, and to grow up to manhood, than seven months children. This opinion, founded on a mistaken idea of the upright position of the fœtus in utero during the former months of pregnancy, and of the necessity of its making an evolution, about the end of the seventh month, to prepare it for the birth, is considered under the article *Position of the fœtus in Utero*, which see.

For the number of births, see **MARRIAGE**, under which the proportion of *births* to marriages, of *births* to burials, and of male *births* to females is computed. See also **MORTALITY**.

BIRTH, After. See **PLACENTA**.

BIRTH is also used for a person's descent; and it is either high or low according to the circumstances of his ancestry.

BIRTH, BERTH, or **BIRTHING**, among *Seamen*, denotes the due distance observed between ships lying at an anchor, or under sail. A convenient place a-board for a mess to put their chests, sleep, &c. is also called a *birth*.—There is usually one of these in ships of war between every two guns. And a proper place to moor a ship in is called by the same name, as is also the station in which a ship rides at anchor. To *take a good birth*, is to remove to some distance off any point, rock, or other thing which the seamen would avoid or go clear of.

BIRTH, Exposition of, among the *Ancients*, was where a new-born infant was exposed or cast away, and left to the mercy of the first comer, who might either take and bring it up, or suffer it to perish. See **EXPOSING of Children**.

BIRTH, Supposition of, *partus suppositio*, in the *Civil Law*, is a crime for which accusation may be intended by those who have interest therein, and is punished with death, like the *crimen falsi*, or forgery.

BIRTH, Suppression of, *partus suppositio*. See **ABORTION**.

BIRTH-Day, the anniversary return of the day on which a person was born. This answers to what the ancients called γενέθλιον, *genethlion*, *natalitius dies*, *natalitia*, and, in the middle age, *genetivus*. The ancients made much of their religion to consist in the celebration of birth-days, and took omens from the force of the felicity of the coming year. We meet with birth-days of the gods, emperors, great men, poets, and even private persons; and besides, the birth-days of cities, as Rome and Constantinople, were celebrated with great pomp by the inhabitants. Virgil's birth-day was held very strictly by the wits and poets who succeeded him. Pliny (Epist. lib. iii. ep. 7.) assures us, that Silius kept it with more solemnity than he did his own.

The manner of celebrating birth-days was by a splendid dress; wearing a sort of rings peculiar to that day; offering sacrifices, the men to their genius, of wine, frankincense; the women to Juno; giving suppers, and treating their friends and clients; who, in return, made them presents, wrote and sung their panegyrics, and offered vows and good wishes for the frequent happy returns of the same day. The birth-days of emperors were also celebrated with public sports, feasts, vows, and medals struck on the occasion. But the ancients, it is to be observed, had other sorts of birth-days besides the days on which they were born. The day of their adoption was always reputed as a birth-day, and celebrated accordingly.

The emperor Adrian, we are told, observed three birth-days; viz. the day of his nativity, of his adoption, and of his inauguration. (Fab. Bib. Græc. tom. xii. lib. vi. cap. 6.) In whose times it was held, that men were not born only on those days when they first came into the world, but on those also when they arrived at their chief honours and command in the commonwealth, e. gr. the consulate. Hence that of Cicero in his oration Ad Quirites, after his return from exile: "A parentibus id quod necesse erat, parvus sum procreatus, a vobis natus sum consularis." Besides, those who returned from banishment were also considered as being born again, *renati*, and ever after called the day of their return their birth-day. Thus Cicero to Atticus: "Diemque natalem reditus mei cura ù in tuis ædibus amantissimis agam tecum, & cum meis." Censorinus has a treatise *De Die Natali*, addressed to Q. Cæcilius, as a compliment on his birth-day.

BIRTH-Days of the Saints and Martyrs, *natales sanctorum*, denote the days of their deaths.

In reality, *natalis*, among the ancients, was not restrained to birth-days, but extended to all feast-days.

Hence it is we meet with *natalis solis*, *natalis calicis*, *natalis ecclesie*, *natalis reliquiarum*, &c.

BIRTH-fin, in *Theology*, the same with *original sin*, which see.

BIRTH-Wort, in *Botany*. See **ARISTOLOCHIA**.

BIRTHA, in *Ancient Geography*, *Tekrit*, a town of Asia, in Mesopotamia, on the Tigris, south of the confluence of the Zabus Minor with this river.—Also, a town of Arabia Deserta, seated on the Euphrates, according to Ptolemy.

BIRTHAMA, or **BITHABA**, a town of Asia, in Assyria, according to Ptolemy.

BIRTHIN, in *Geography*, a river of Monmouthshire, which runs into the Usk, near the town of Usk.

BIRU, a town of South America, in the empire of Peru, distant 10 leagues from Truxillo, and inhabited by about 70 families of Spaniards, Indians, Mulattoes, and Mestizos. About half a league to the north of it is a rivulet, from which are cut several trenches for watering the grounds, which of course are equally fertile with those in the vicinity of Truxillo. S. lat. 8° 24' 59". W. long. 66° 17'.

BIRUCKPOUR, a fortress of Hindocstan, in Malva country,

country, and circar of Chanderee; 55 miles east of Chanderee.

BIRVIESCA, **BRIBUSCA**, or **BRIEIESCA**, a mean and wretched town of Spain, in Old Castile; 15 miles N. E. of Burgos.

BIRUISA, a river of Siberia, which runs into the Tchiuna. N. lat. $57^{\circ} 35'$. E. long. $95^{\circ} 14'$.

BIRUTCH, or **BIRUITSCH**, a town and district of Russia, in the government of Voronetz, seated on the river Sofna, which falls into the Don; 50 miles south of Voronetz.

BIRZA, or **BIRZ**, a town of Poland, in the palatinate of Troki. N. lat. 56° . E. long. $24^{\circ} 40'$.

BIS, in *Botany*, a name given by some old writers to the napellus, or monk's-hood, and by others to the cicuta or hemlock.

Bis, *Lat. twice*. In *Music*, when a passage which ought to be repeated, has, through mistake, or to save room, been omitted, the word *bis* placed over such passage, with dots at the beginning and end, implies that the whole is to be repeated.

Example.



Bis-annua, a name given by *Botanists* to those plants which ordinarily do not flower till the second year.

BISA, or **BIZA**, a coin in Pegu, current there for half a ducat. The denomination is also given to a kind of weight used in the same country, equivalent to two Venetian pounds five ounces, or to three pounds nine ounces of the smaller weight of that city.

BISACCIO, in *Geography*, a town of Italy, in the kingdom of Naples; 12 miles N.N.E. of Conza. N. lat. $41^{\circ} 3'$. E. long. $15^{\circ} 35'$.

BISACUTA, in *Middle Age Writers*, an axe with two edges, or which cuts either way; or a missile weapon pointed at both ends. Walsingham represents the *securis bifacuta* as peculiar to the Scottish nation. See **BATTLE-Axe**.

BISALTÆ, in *Ancient Geography*, the name of a people who inhabited a small country bordering on the Sinus Strymonicus, in the northern part of Macedonia. Their chief cities were Eporia, Ossa, and Calitera.

BISALTIDE, in *Entomology*, a species of **PAPILIO** (*Dan. Fesl.*) that inhabits Surinam. The wings are slightly tailed, fulvous, black at the tips; beneath, two ocellar dots on the anterior pair, and three on the posterior ones. Fabricius, &c.

BISAMRAZE, in *Zoology*, *Sorex moschatus*, Gmelin, and *long nosed beaver* of S. G. Gmelin. it. &c.

BISANTHIER, *Moschus moschiferus*, or *Thibet musk* in Gesn. Quadr.

BISANTHE, or **RÆDISTUS**, in *Ancient Geography*, a town of Thrace, on the confines of the Propontis, at the bottom of a kind of gulf, and at a small distance S.W. from Perinthe.

BISANT. See **BESANT**.

BISBÆA, a feast celebrated by the Messapii, after the pruning of their vines, to obtain of the gods that they might grow again the better. The word is formed from *βισσῶν*, used by some for a vine.

BISCAINO, **BARTOLOMEO**, in *Biography*, an eminent

artist, was born at Genoa in 1632, and instructed in the first principles of painting and design by his father Giovanni Biscaino, a landscape painter of reputation. He afterwards perfected himself, particularly in the art of colouring, under Valerio Castelli. By his early death, at the age of 25 years, the expectations of those who admired his talents and performances were disappointed. Some of his etchings are executed in a bold style, resembling those of Castiglione, but all more finished. His figures are elegant, firmly composed, and drawn in a very masterly manner; he has given beauty and character to the heads; and the other extremities are peculiarly correct, and marked with great spirit. Some of the principal are the following: "Moses in the ark of bulrushes;" "A Nativity, with angels;" "The wife-men's offering;" "The Circumcision of Christ;" and a "Bacchanalian." Strutt.

BISCARA, or **BESCARA**, in *Geography*, a decayed city of Africa, in the kingdom of Algiers, the capital of the district of Zaab or Zeb, belonging to the province of Constantine. It is the residence of a Turkish garrison, and has a small castle, built by Hassan, the bey of Constantine, and chiefly defended by six small pieces of ordnance, and a few unwieldy muskets, mounted on carriages. It is a place of great antiquity, built by the Romans, and destroyed by the Arabs, who afterwards rebuilt it. It is at present as indifferently peopled as it is weakly defended; the houses being infested by swarms of scorpions, vipers, and poisonous reptiles, and the inhabitants being obliged to desert the city and retire into the country in the summer, when these noxious animals are intolerable. The inhabitants of this place, and its adjacent district, called "Biscaris," lead a kind of wandering life, and live in tents. Few of them can be employed in agriculture and pasturage from the nature of the country; but those of the superior class carry on some commerce, notwithstanding their poverty and indigence, in negroes and ostrich feathers. The poorest of them migrate every year to the city of Algiers, and other towns of the kingdom, and are employed in the meanest and most subordinate offices, such as cleansing of streets, emptying vaults, sweeping chimneys, and carrying burdens. Having in the course of two or three years accumulated a capital of from six to ten zechins, they return home, and on account of the scarcity of coin among them are reckoned among the wealthy of the land. In the capital, they constitute a kind of corporation, and have even a common treasury for the purpose of mutually relieving one another. They are the only class of free servants, and are highly esteemed for their fidelity. In winter, as well as in summer, they sleep wrapped up in rags, on a kind of benches before the shops, and others place themselves at the gates of the different roads, for the convenience of opening them to passengers. They are not only deserving of the confidence that is reposed in them, but their disposition is placid and obliging, and their perseverance in labour is indefatigable. Those among them who are guilty of any breach of trust, are punished by their chiefs. They are employed by the Europeans as servants, and as they can speak, besides the language of the country, the "lingua Francia," are found singularly useful. The villages which they inhabit in their own country are small, and remarkable only for their meanness and poverty. N. lat. $34^{\circ} 30'$. E. long. $5^{\circ} 15'$.

BISCARGIS, or **BISSANGIS**, in *Ancient Geography*, a town of Spain, on the right side of the Iberus, N.W. of Dertosa.

BISCAY, in *Geography*, a province of Spain, called, "the lordship of Biscay," is, in its most appropriate and restricted sense, bounded on the north by the Bay of Biscay, on the south

south by a chain of the Pyrenées, which separates it from Old Castile and Alava, on the west by Asturias, and on the east by Guipuscoa; and in extent its length is about 116 miles, and breadth much less, the greatest breadth being 80 miles, but very unequal. In its more general and comprehensive sense, Biscay is divided into three parts; viz. Biscay, properly so called, Guipuscoa, and Alava; and, accordingly, it is bounded on the west by that narrow tract of Old Castile which reaches to the sea and Asturias; parted from Old Castile on the south-east by the ridge of the Asturian mountains branching from the Pyrenées, and by the same mountains from Navarre, and by the river Cidaris from France, on the east; and washed on the north side by the Cantabrian sea, now commonly called the bay of Biscay. The country is for the most part mountainous and barren; but its vallies produce corn sufficient for the supply of the inhabitants, and a small quantity of flax. Apples are very plentiful, of which is made cyder, the common beverage of the people. They have also a weak wine, called "Chacolino," which is pleasant, though it will not keep long, and is used instead of small beer. They have also citrons and oranges in great abundance. The adjacent sea supplies excellent fish, and the forests yield great quantities of timber for shipping. But the most valuable treasure of this country consists of its inexhaustible mines of excellent iron, which is transported from hence into all parts of the world. The country has been long famous for its iron-works, and especially for its manufacture of swords and knives. Some have computed the amount of its annual manufacture of iron and steel into arms, nails, iron tools, bars, &c. at 300,000 quintals. The air of this province is mild, pure, and more temperate than that of the other provinces of Spain; and the inhabitants have been distinguished by their attachment to liberty, and resistance to oppression. Their ancestors the Cantabri, were but imperfectly subdued by Augustus, and their mountains have, in every succeeding age, afforded them a retreat from the encroachments of arbitrary power. The Biscayners are said to be of Celtic or Gothic extract; and have preserved more of their ancient genius, laws, government, and language than perhaps any other people in Europe, except the Welsh, Scots Highlanders, and wild Irish, who are probably of the same origin, and whose language much resembles the Biscayan. They have always maintained a distinguished reputation for valour; and the best soldiers and sailors of Spain have been the natives of this country. They essentially differ from the other Spaniards in the openness of their temper, and animation of their manner; and though they are choleric even to a proverb, and not destitute of pride and vanity, they are obliging, polite, and friendly. Their females are beautiful, lively, and cheerful. Their dress is neat and pastoral; their hair falling down their backs in long plaits, with a handkerchief twisted round it. The most singular part of the dress of the men is the covering of their legs, round which they wrap a piece of coarse grey or woollen cloth, fastening it with many folds of tape. The three provinces of Biscay, Alava, and Guipuscoa, have been the asylum of liberty and industry, and to these causes their prosperity may be ascribed. When the king, who is styled merely "lord of Biscay," wants a supply either of men or money, he announces his will to the province; which furnishes its contingency of both; the latter being levied upon the different cities and communities, according to a certain register, so that in effect Biscay may be said to tax itself. In this province are no bishops. Its privileges, which are extensive, it has watched over with a jealous eye. The language of Biscay is accounted aboriginal; it is said to be the Cantabrian, or ancient language of Spain, which was a branch of the

Celtic, and first gave way to the Roman; which see. It is so totally different from the Castilian, that the peasants scarcely understand a single word of Spanish. The capital of Biscay is Bilboa, which see. Its other chief towns are Orduna, Durango, Fontarabia, St. Sebastian, Tolosa, and Vittoria.

BISCAY, *Bay of*, that part of the Atlantic which lies north of the province of Biscay, between the projecting coasts of France and Spain, and extends from Cape Ortegal to Breil. It advances farthest to the land between Bayonne and St. Sebastian; and it likewise advances considerably at Rochelle and Rochefort.—Also, a large bay on the coast of Newfoundland, between cape Race and cape Pine. It lies in the N.E. corner of Trepassey bay, on the S.E. part of the island. N. lat. $46^{\circ} 50'$. W. long $53^{\circ} 6'$.

BISCAY, *New*, a province of Mexico in North America in the audience of Guadalajara, bounded on the north by New Mexico, on the east by New Leon and the river Bravo, on the south by Cinaloa and Culiacan, and on the west by Navarre, Sonora, and Haqui, on the borders of the gulf of California. It is computed to be about 300 miles from east to west, and 360 from north to south. The country is mountainous, but well watered, fruitful, and moderately temperate, rich in corn, cattle, and other productions; and also in mines of silver and lead. The original inhabitants have four large towns in the morasses, which are difficult of access, and by means of which they avoid total subjection; and therefore the Spaniards have built three small fortified and well inhabited towns for the defence of their silver mines. The capital is Durango. This province lies between the latitudes of 27° and 33° N. and between 105° and 108° W. long.

BISCEGLIA, a town of Naples, in the province of Bari, having the see of a bishop, suffragan of Trani; it is pleasantly situated on an eminence in the midst of orchards and villas. The walls are of stone and very lofty; and it has hundreds of subterraneous reservoirs and cisterns, cut in the solid rock, and arched over with stones and stucco, in order to collect and preserve the rain water, which is the only sort with which they are supplied in a district, so totally destitute of springs. Bisceglia is 4 miles distant from Trani.

BISCHBURG, or BISCHOFBURG, a town of Prussia, in the county of Ermeland, 54 miles south of Konigsberg.

BISCHEIM, a town of Germany, in the circle of the Upper Rhine, and county of Lichtenberg, on a small river which runs into the Rhine, 8 miles N.E. of Strasburg.

BISCHOFFLACK, or SCHOFIA KOLOKA, a town of Germany, in the duchy of Carniola, 27 miles N.N.E. of Trieste.

BISCHOFFSHEIM, a town of Germany seated on the Tauber, in the circle of Franconia, but belonging to the electorate of Mentz; 64 miles S. E. of Mentz.

BISCHOFFSTORF, a town of Germany, in the duchy of Stiria, 13 miles E.N.E. of Gratz.

BISCHOFSSHEIM, a town of Germany, in the circle of Franconia, and bishopric of Wurzburg, seated on the Rhom, 32 miles north of Wurzburg.—Also, a town of Germany, in the circle of the Upper Rhine, and county of Hanau-Munzenburg, 3 miles W.N.W. of Hanau.

BISCHOFSTEIN, or BISTEIN, a town of Prussia, in the county of Ermeland, 42 miles south of Konigsberg.

BISCHOFSWERDA, a town of Germany, in the circle of Upper Saxony, and margraviate of Meissen, seated on

an island in the river Wefenitz, the principal commerce of which is in white thread; it has two churches; 20 miles east of Dresden.

BISCHOWSWERDER, a town of Prussia, in the province of Oberland, 80 miles S.S.W. of Königsberg.

BISCHOFZELL, a town of Switzerland, in the Thurgaw, seated at the confluence of the rivers Sitter and Thur, 11 miles south of Constance. This town has a castle, in which resides the bailiff of the bishop of Constance, who exercises jurisdiction over the Catholics, and receives a moiety of the fines. N. lat. 47° 25'. E. long. 9° 13'.

BISCHOP, or **BISKOP**, **JOHN DE**, in *Biography*, an excellent artist, was born at the Hague in 1646, and is much commended as a painter; and his drawings, in which he imitated with great exactness the style of the best masters, are much esteemed and fought after by the curious. But he is most generally known as an engraver. His works are chiefly etchings, harmonized with the graver; and though slight, yet free, spirited, and pleasing. He gives a richness to the colour, and a roundness to the figures, far beyond what is usually done with the point, so little assisted by the graver. His figures are generally well drawn, more in a mannered than a correct style; but his extremities are not always well marked, nor his heads equally expressive and beautiful. His excellence was owing chiefly to his own genius, as he never studied under any master. He worked chiefly at Amsterdam, and died in 1686. The following prints are worthy of notice: viz. "Christ and the Samaritan woman" from Annibale Caracci; "Joseph distributing corn to the Egyptians," from B. Breenberge; "the Martyrdom of St. Laurence," from the same. Strutt.

BISCHOP, or **BISKOP**, **CORNELIUS**, a painter of portrait and history, was born at Antwerp, say some, or according to others, at Dort, in 1630; and was the disciple of Ferdinand Bol, whose pencil, tint of colouring, style, and manner, he resembled, and to whom he has been thought by some competent judges not to be inferior. He died in 1674. A painting by this master, consisting of a few figures by candle-light was so much admired by Louis XIV., that he purchased it at a high price, and placed it in the royal collection. The king of Denmark also admitted his works among those of the best masters. It is observed, however, that they are not worthy of that high commendation which is bestowed upon them by the Flemish writers. Pilkington.

BISCHWILER, in *Geography*, a town of France, in the department of the Lower Rhine, and chief place of a canton in the district of Strasburg, seated on the Motte near the Rhine, and defended by a castle, flanked with towers, and guarded by ditches; 10 miles north of Strasburg. The town contains 3449 inhabitants, and the canton 13,968. Its territorial extent comprehends 265 kilometres, and 21 communes.

BISCIA, in *Ichthyology*, one of the synonymous names among old writers for the pipe-fish, tobacco-pipe-fish, needle-fish, or trumpet-fish; and *syngnathus acus* of Linnæus and Gmelin.

BISCOPSVAARE, in *Geography*, a town of Norway; 48 miles east of Bergen.

BISCROMA, Ital. for a demifemiquaver, in *Music*. If

single, it has three hooks ; if two or more, they have

three ties . See **TIME-TABLE**.

BISCUIT. See **BISKET**.

BISCUIT, in *Pottery*, a name given to porcelain, when baked and not glazed; and this is more or less beautiful, according to the nature of its composition. See **PORCELAIN** and **POTTERY**.

BISCUTA, in *Entomology*, a species of **FORMICA**, with a bidentated thorax; and a double petiole scale. Inhabits Cayenne. Fabricius Spec. Inf.

BISCUTELLA, formed of *bis*, and the diminutive of *scutum*, the fruit resembling a double shield, in *Botany*, *Buckler-mustard*, or *bastard Mitridate mustard*. Linn. gen. 808. Reich. 872. Schreb. 1084. Juss. 239. Gært. t. 141. Thlaspidium. Tournef. 101. Class and order, *Tetradynamia Siliculosa*. Nat. Ord. *Siliquose, cruciformes, or cruciferae*. Gen. Char. *Cal.* perianth four-leaved; leaflets ovate, acuminate, gibbous at the base, coloured, deciduous. *Cor.* four-petalled, cruciform; petals oblong, obtuse, spreading. *Stam.* filaments six, the length of the tube of the corolla; two opposite shorter; anthers simple. *Pist.* germ compressed, orbiculate, emarginate; style simple, permanent; stigma obtuse. *Per.* silicle erect, compressed, flat, semibifid, with roundish lobes, two-celled; partition lanceolate, ending in a rigid style; cells two-valved, affixed to the partition on its straight margin. *Seeds* solitary, roundish, compressed, in the middle of the cell. *Obf.* The two outer leaflets of the calyx in some species have a tubular-concave melliferous prominent base.

Ess. Char. *Silicle* compressed, flat, rounded above, and below two-lobed. *Cal.* leaflets gibbous at the base.

Species, 1. *B. auriculata*, ear-podded buckler-mustard. Thlaspi. Bauh. pin. 107. n. 3. prodr. 49. n. 8. Raii hist. 837. n. 4. *Leucium montanum* fl. pedato. Col. ecphr. 2. 59. t. 61. Jondraba Barr. ic. 230. "Calyxes gibbous on each side with the nectary, filicles running into the style." In a wild state this plant rises about a foot in height, but in gardens nearly two feet, dividing into several branches; the flowers are produced at the ends of the branches, in loose panicles, and are of a pale yellow colour. The nectarious gland is very large, and the calyx bagged out very much at the bottom. A native of the south of France and Italy. Cultivated in Kew garden by Mr. J. Sutherland in 1683, and flowering in June and July. 2. *B. apula*, spear-leaved buckler-mustard. *B. didyma*. Lin. spec. 911. Hort. Cliff. 329. 2. Upl. 185. Thlaspi. Raii hist. 837. n. 3. Clypeola didyma. Cluf. Hist. 2. 133. Jondraba. Col. ecphr. 1. 283. t. 285. f. 1. "Silicles scabrous; leaves lanceolate, sessile, ferrate." A native of Italy. Cultivated in 1759, by Mr. Miller. Flowering in June and July. 3. *B. lyrata*. Thlaspi bifcutatum, &c. Bocc. sic. 45. t. 23. Raii hist. 837. n. 6. "Silicles scabrous; leaves lyrate." A native of Spain and Sicily. 4. *B. coronopifolia*. "Silicles smooth; leaves toothed, rough with hairs." Allioni thinks this a variety of the second, proceeding from a dryness of soil; for it is found in very dry barren places in Spain, Italy, and Germany. Gouan is of opinion that this and the second, third, and fourth are one species. 5. *B. levigata*, smooth buckler-mustard. *B. didyma*. Scop. Carn. n. 804. Clypeola didyma. Crantz. Austr. 20. *Leucium*. Col. ecphr. 1. 283. t. 285. f. 2. Raii hist. 836. n. 2. "Silicles smooth; leaves lanceolate, ferrate." The whole plant is acrid; the root perennial, according to Jacquin, but, according to others, annual. A native of Italy and Austria. Found at very different heights in the mountains, with variation of stature, from half a foot to a foot and a half. Flowering in lower situations in April and May; in higher ones in July and August; in our gardens in June and July. Introduced here in 1777 by M. Thouin. 6. *B. sempervirens*, shrubby buckler-mustard.

mustard. *Thlaspi bifcutellatum*, &c. Bar. ic. t. 841. Boec. mus. 197. t. 122. "Silicles somewhat scabrous; leaves lanceolate tomentose." A native of Spain. Introduced into Kew garden in 1784, by Messrs. Lee and Kennedy.

Propagation and Culture. These are all annual plants, except the last, and perish soon after they have perfected their seeds. They should be sown in spring or autumn, upon a border of light earth, in an open situation, where they are to remain. Those sown in autumn will come up about three weeks, live through the winter, and flower early in the following summer, and thus good seeds may be always obtained; but those that are sown in the spring decay in bad seasons before the seeds are ripe. The autumnal plants flower in June, and the spring plants in July, and their seeds ripen in about six weeks, and if they are permitted to scatter, young plants will be produced without any care. They require only to be kept free from weeds, and to be thinned where they are too close, leaving them eight or nine inches asunder. They have no great beauty to recommend them. Martyn's Miller.

BISDORF, in *Geography*, a town of Germany, in the circle of Upper Saxony, and principality of Anhalt-Cothen, 3 miles north of Cothen.

BISECTION. See BISSECTION.

BISELLIARI, or BISELLIARI, in *Antiquity*, those who enjoyed the honour or privilege of the bisellium.

The word occurs in ancient inscriptions. CN. PLAE-TORIO VIVIRO AUGUSTALI BISELLIARIO. Gruter. Inscr. p. 1099.

The honor *bisellii* appears to have been much the same with what in France is called *droit de fauteuil*; and the bisellarii those who in public assemblies enjoy this distinction of the *fauteuil*, while other persons are obliged to stand, or sit on benches, stools, or ordinary chairs. Scaliger, in his index to Gruter, mistook the bisellarii for artificers who made these seats.

BISELLIUM, from *bis* and *sellu*, a chair, a kind of seat or chair, larger and richer than ordinary, big enough to hold two persons, wherein to sit in courts, theatres, and other public assemblies.

BISEPTENGUTTATA, in *Entomology*, a species of COCCINELLA, of a pale yellow colour, with fourteen white spots. Schaller. Country unknown.

BIS-ERGOT, in *Ornithology*, a name given by Buffon to the Gmelinian *tetrao biclearatus*.

BISERRULA, so named from the fruit "biserrato fructu," in *Botany*. Lin. Gen. 893. Reich. 966. Schreb. 1209. Juss. 358. Gaertn. t. 154. Pelecinus, Tournef. 234. Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceae* or *leguminosae*. Gen. Char. Cal. perianth, one-leaved, tubular, erect, semiquinquefid; teeth subulate, equal, the two upper ones more remote. Cor. papilionaceous; banner larger, reflected on the sides, ascending, roundish; wings ovate-oblong, free, shorter than the banner; keel the length of the wings, obtuse, ascending. Stam. filaments diadelphous (simple and nine-cleft), ascending at their tips, inclosed within the keel; anthers small. Pist. germ. oblong, compressed; style tubulate, ascending; stigma simple. Per. legume large, linear, flat, two-celled; partition contrary to the valves. Seeds very many, kidney-form, compressed.

Ess. Char. legume two-celled, flat; partition contrary.

Species. 1. *B. Pelecinus*, bastard hatchet-vetch. Astragalus. Mor. hist. 2. 107. f. 2. t. 9, f. 6. Securidaca. Bauh. Pia. 349. 3. Clus. hist. 2. 238. Ger. enac. 1234. f. 6. Park. Theatr. 1089. f. 5. Raii hist. 939, n. 16. Lunaria radiata Robini. Bauh. hist. 2. 348. f. 2. An annual

plant growing naturally in Italy, Sicily, Spain, and the south of France. Cultivated in Kew garden in 1640.

Propagation and Culture. It is propagated by seeds, sown in this country in autumn, on a bed of light earth, where the plants will come up in about three weeks, and live well in the open air. They should either be sown where they are to remain, or transplanted when very young. After the plants are come up, they will only require to be kept free from weeds, and to be thinned to the distance of a foot from one another. They flower in June, and the seeds ripen in September. They may be also sown in spring, and treated in the same manner. Two or three of these plants may be cultivated for the sake of variety, but they have not much beauty. Martyn's Miller.

BISERT, in *Geography*, a town of Russia, seated on a small river which runs into the Upha, in the government of Perm, 80 miles S. E. of Perm.

BISERTA, or BIZERTA, a sea-port town of Africa, in the kingdom of Tunis, pleasantly situated upon a canal betwixt an extensive lake and the sea, at the bottom of a large gulf, about 8 miles to the southward of Cape Blanco. N. lat. 37° 5'. E. long. 10° 15'. It is about a mile in circuit, defended by several castles and batteries, the principal of which are towards the sea. Bizerta is a corruption of the "Hippo-Diarrhytus" or "Zaritus" of the ancients; though the present inhabitants derive its name from their own language, and suppose it to be the same with "Bensherd," i. e. the offspring of a canal or rivulet. The lake upon which Bizerta is seated has an open communication with the sea; and, according to an observation of the younger Pliny (Ep. xxxiii. l. 9.), is either continually receiving a fresh stream from the sea, or else discharging one into it; so that the water lost by the lake by exhalations is soon supplied by the sea, which in hot seasons runs into it with a very brisk current, in order to maintain the equilibrium, in the same manner as is observed between the Atlantic ocean and the Mediterranean. The mullets of this lake are reckoned the best in Barbary. Great quantities of their roes are dried and made into "Botargo," and sent from hence to the Levant, where they are esteemed a great dainty. The channel of communication betwixt the lake and the sea is the port of "Hippo-Diarrhytus," which still receives small vessels; though it must have been formerly the safest as well as the most beautiful haven of this part of Africa. There are still remaining the traces of a large pier, that was carried out into the sea, to break off the N. E. winds; the want of which, together with the disinclination of the Turks to repair it, will in a short time make the haven useless, which, in any other country, would be inestimable. Scylax calls it only "Hippo," and Diodorus Siculus gives it the name of "Hippouacra." By the direction of Scipio's marches it seems to have been the rich anonymous town mentioned by Livy (l. xxix. 28.) If the Turks encouraged trade and industry it would deserve this appellation, because, besides fish and fruit of all kinds, it abounds with corn, pulse, oil, cotton, and a variety of other valuable productions. The gulph of Bizerta, the "Sinus Hipponensis" of the ancients, is a beautiful sandy inlet, nearly four leagues in breadth. As its bottom is low, it affords a delightful prospect through a variety of groves and plantations of olive trees, to a great distance into the country; but to the eastward the view is bounded by a high rocky shore, extending as far as cape Zibeeb. Bizerta was formerly a large town, and is said to have contained 6000 houses; whereas now the town, and its dependent villages, scarcely contain the same number of inhabitants. It has, nevertheless, two capacious prisons for slaves, a large

magazine for merchandize, and two towers, with some other out-works to defend the entrance of the haven. It is well supplied with fresh water from the surrounding springs, and with great variety of fish from the adjacent lake. Most of the inhabitants are employed in the fishing-trade, which begins about the end of October, and ends in the beginning of May. The people are poor, and reckoned proud, ill-natured, and treacherous; insomuch that Muley Hafun Bey, one of their sovereigns, used to say of them, that neither fear nor love could keep them faithful. Bizerta has eight villages under its government, a large plain called "Mater," and the territory of Choros, the "Clypea" or "Corobis" of the ancients, which is extensive, and inhabited by a number of persons who are poor, meanly clad, and coarsely fed. Their dress consists merely of a piece of coarse cloth wrapped round their bodies, and another, in the form of a turban, round their heads; and most of them are without covering either to their feet or legs. Those of the poorer class sleep on skins laid on the floor; and the rich lie in narrow couches fixed against the wall, about five or six feet high, to which they ascend by a ladder. Their choicest dainty is their "coufcou," made of flour, eggs, and salt, which they dry and keep through the year. They are expert horsemen, and ride without either saddle or bridle; nor do they ever shoe their horses. They are much exposed to the depredations and oppressions of the neighbouring Arabs. The Bisertines, both of the city and country, are very superstitious, and hang about their own necks, and those of their horses, a number of amulets, which are scraps of paper or parchment, on which strange characters are inscribed, and sewn up in a piece of leather, silk, &c. and thought, when worn about their persons, to be a preservative against all accidents.

BISET, CHARLES EMANUEL, in *Biography*, a painter, of history and conversations, was born at Mechlin, in 1633; and in his early productions manifested a lively and ready invention. He was distinguished by the multitude of figures which he introduced into his designs, and by his variety of drapery, peculiar to every nation. At a distance, his pictures, which consisted chiefly of balls, concerts, and gay assemblies, correctly designed and well-coloured, had a strong effect; but more nearly inspected, they shewed a neatness of pencil, a spirited touch, and a good expression. Pilkington.

BISER, in *Ornithology*, *Columba livia*, or rock dove, in Buffon's Hist. Birds.

BISHOP, in *Ecclesiastical History*, a prelate, or person consecrated for the spiritual government and direction of a diocese. The word comes from the Saxon *bischof*, and that from the Greek *ἐπίσκοπος*, an *overseer* or *inspector*; which was a title the Athenians gave to those whom they sent into the provinces subject to them, to see whether every thing was kept in order; and the Romans gave the same title to those who were inspectors and visitors of the bread and provision. It appears from a letter of Cicero, that he himself had a bishopric; being "episcopus Oræ et Campaniæ."

A bishop differs from an archbishop in this, that an archbishop with bishops consecrates a bishop, as a bishop with priests ordains a priest: that the archbishop visits a province, as the bishop a diocese; that the archbishop convokes a provincial synod, as the bishop a diocesan one; and that the archbishop has canonical authority over all the bishops of his province, as the bishop over the priests in his diocese. It is a long time since bishops have been distinguished from mere priests or presbyters; but whether that distinction be of divine or human right, whether it was settled in the apostolical age, or introduced afterwards, is much controverted.

Those who are advocates for the divine right of episcopacy, and who trace its institution to the times of the apostles, maintain that, in the earliest age of the Christian church, there were three different orders of ministers appointed by the apostles for the discharge of the public offices of religion; viz. bishops, priests, or presbyters, and deacons. In proof of this point they refer us to the testimony of ancient ecclesiastical writers, whence they deduce, as they conceive, the most satisfactory evidence, that bishops were instituted by the apostles, and that they continued afterwards as a distinct order from that of priests. To this purpose they allege, that Irenæus, a father of the second century, says (l. iii. c. 3.), "We are able to enumerate those who by the apostles were made bishops in the several churches, and their successors, to this time." He adds, "Polycarp was not only instructed by the apostles, and acquainted with many of those who saw our Lord, but was also by the apostles made bishop of the church of Smyrna in Asia." Tertullian also, a writer of the same century (*De Præscr. adv. Heræt.* p. 78.), challenges certain heretics to "exhibit the order of their bishops, so succeeding each other from the beginning, that the first bishop had for his author and predecessor some one of the apostles, or of those apostolical men who persevered with the apostles; for in this manner apostolical churches assert their rights: thus, the church of Smyrna has Polycarp, who was placed there by John; the church of Rome has Clement, who was ordained by Peter; and other churches shew other persons, who, by being placed in the bishoprics by the apostles, transmitted the apostolical seed." Cyprian also says (*Ep. 69. ad Flor.*), "that the bishop, who is one and presides over the church, through the proud presumption of certain persons, is despised; and thus the man, who is honoured by the sanction of God, is judged unworthy by men." In an epistle ascribed to Ignatius (*Ad Antioch.* c. 7.), but probably spurious, though very ancient, it is asserted, that Evodius was consecrated a bishop by the apostles. And Chrysostom says (*Hom. 42. in Ignat.*), "that Ignatius conversed familiarly with the apostles, and was perfectly acquainted with their doctrine, and had the hands of apostles laid upon him." In a fragment of an epistle of Dionysius bishop of Corinth in the second century, preserved by Eusebius, (*H. E. l. 4. c. 23.*), it is said, that Dionysius the Areopagite, who was converted by St. Paul, was appointed the first bishop of Athens. Eusebius and Socrates have given us the catalogues of the bishops of many cities, from the times of the apostles; and Epiphanius (*lib. 2. Hær. 66.*) has left us a catalogue of the bishops of Jerusalem, from St. James the apostle to Hilarion, who was bishop in his time. It is further alleged, that bishops, priests, and deacons, are mentioned together as three separate orders. Ignatius, in his Epistle to the Magnesians (§ 2.), mentions Damas as bishop of Magnesia, Bassus and Apollonius as presbyters, and Sotian as deacon, in the same church; and in his epistle to the Philadelphians (§ 7.), he says, "Attend to the bishop, to the presbytery, and to the deacons;" and in his epistle to the Trallians (§ 2.), he says, "Be ye subject to the bishop, as to Jesus Christ; to the presbyters, as the apostles of Jesus Christ; and to the deacons, as to ministers of the mysteries of Jesus Christ;" he then adds, (§ 3.), "without these there is no elect church, no congregation of holy men." The authority of Ignatius, who lived in the beginning of the second century, is considered as decisive. Clement of Alexandria, in the subsequent part of the same century, speaks of the three progressive orders of deacons, priests, and bishops (*Strom. l. 6.*); and there are several early instances of bishops, who had been presbyters and deacons in the same church. Irenæus was first presbyter, then bishop

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bishop of Lyons; Dionysius first presbyter, then bishop of Rome; and Eleutherius, first deacon, then bishop of Rome; and all these three lived in the second century. "When your captains," says Tertullian (*De Fugâ in Perf.*), "that is to say, the deacons, presbyters, and bishops fly, who shall teach the laity that they must be constant?" And upon another occasion, speaking of baptism, he says (*De Baptism. c. 17.*), "the high-priest, who is the bishop, has the chief right of administering it, then the presbyters and deacons, but not without the authority of the bishop." Origen, in many places, speaks of bishops as superior to presbyters and deacons; and many authors compare the bishops, called by the Greeks *ἐπίσκοποι*, and by the Latin fathers "summi sacerdotes," and "principes sacerdotum," presbyters and deacons of the Christian church to the high-priest, priests, and Levites under the Jewish dispensation; and hence presbyters afterwards obtained the name of priests. Clement, a disciple of the apostle, says (*Ep. ad Cor. § 40.*), "To the high-priest are given his proper duties; to the priests their proper place is assigned; and to the Levites their proper services are appointed;" in which passage this ancient father is speaking of the bishop, presbyters, and deacons of the Christian church; and Tertullian, in the passage just cited, called the bishop the high priest. Jerome, though he is sometimes represented as unfavourable to the cause of episcopacy, is still more express, and denominates (*Epist. ad Evag.*) the order of bishops, priests, and deacons, an apostolical tradition. "To what purpose," says Optatus (*lib. i.*), "should I mention deacons, who are in the third, and presbyters who are in the second degree of priesthood, when the very heads and princes of all, even certain of the bishops themselves, were content to redeem life with the loss of heaven?" In the tenth canon of the council of Sardis, held A. D. 347, it is enjoined that a person should not be rashly and lightly appointed a bishop, a priest, or a deacon. It is further pleaded, that episcopal power was not called in question in the three first centuries; but towards the end of the fourth century, Acrius, an Arian, wrote against it, and maintained that there ought to be no order in the church superior to that of presbyters. Nevertheless, it is alleged that no advocate is found for his opinion in the centuries immediately following; and that even Acrius allowed there had been bishops in the Christian church from the earliest period. From these several testimonies it is inferred, that bishops were appointed by the apostles; that there were three distinct orders of ministers, viz. bishops, priests and deacons, in the primitive church; and that there has been a regular succession of bishops from the apostolic age to the present time; and the enemies of episcopacy are challenged to produce evidence of the existence of a single ancient independent church fairly established, which was not governed by a bishop. While the apostles lived, the churches, it is said, were subject to their authority and government; and to this circumstance it is owing that little is said concerning the distinction and power of ministers, in the Acts and Epistles; but when the gospel was spread into distant parts, and the apostles were under a necessity of discontinuing their visits, or rendering them less frequent, they found it expedient for the better government of the Christians, and in order to put a stop to their schisms and contentions, which began to make their appearance both among the presbyters and their congregations, to place the supreme authority in one person, who, from the superintending care which he was to exercise, was called *ἐπίσκοπος*, a bishop; and this word, which was perhaps at first applied indiscriminately to all who had any spiritual office in the church, was now conferred on him who was its chief governor.

The bishops were at first appointed by the apostles, and

afterwards chosen by the presbyters and the congregations at large; and in both cases they were generally taken from the presbyters of the respective churches, except in those instances in which they were the immediate companions of the apostles. Accordingly Jerome, (*De Eccles. Script.*) where he is speaking, as it is supposed, of the apostolical times in which James was made bishop of Jerusalem by the apostles; Timothy bishop of Ephesus, and Titus bishop of Crete, by St. Paul; and Polycarp bishop of Smyrna, by St. John; observes that "churches were governed by the common advice of presbyters; but when every one began to reckon those whom himself had baptized, his own, and not Christ's, it was decreed in the whole world, that one, chosen out of the presbyters, should be placed over the rest, to whom all care of the church should belong, and so the seeds of schism should be removed." When St. Paul was at Miletus, A. D. 58, and convened the elders of the church at Ephesus, no mention is made of the bishop; and in his address to them he calls them "bishops or overseers of the flock;" hence it is inferred, that the word bishop was not then the appropriate name of the person who held the first office in the church, or rather, that there was as yet no such person in the church at Ephesus. But in the year 64, St. Paul found it necessary to place Timothy in that situation, with power to prevent the preaching of any unsound doctrine, and to ordain and exercise authority over presbyters, that is, with episcopal power; and in his epistle, written to him in that year, he speaks expressly of the "office of a bishop," and gives a detailed account of the qualifications of a bishop. See 1 Tim. i. 3. v. 1. 19. 22. 1 Tim. iii. 1. We have also a similar account in the epistle to Titus, written in the same year; and he was invested with the further power of rejecting heretics from the churches over which he presided. See Titus iii. 10. Hence it is concluded, that in the year 64 there was such an office as that of bishop. St. Paul, addressing his epistle to the Philippians, used the word bishops in the plural number, and does not mention presbyters; whence it is thought by Chrysostom, Theodoret, Jerome, and indeed by almost all commentators, that by bishops we are here to understand presbyters; and it is therefore presumed, that there was then no bishop, in the strict sense of the appellation, at Philippi, A. D. 62. From a comparison of these different passages it has been conjectured, that Paul began to establish episcopacy immediately after his release from his first confinement at Rome. However, it is acknowledged, that at this early period there was not a bishop in every church. Nevertheless, it is inferred from St. Paul's epistles, that he gave the ministers of the churches which he founded, a certain power over their respective congregations, and as St. Paul and the twelve apostles acted equally under the influence of the Holy Ghost, it is presumed that they invested all, whom they appointed to preach the gospel, with a similar degree of power; and thus church authority is derived from the apostles themselves. This power, thus originally given, was not limited to the primitive ages; it is supposed to have been transmitted to those "faithful men who shall be able to teach others also" (2 Tim. ii. 2.), and to remain in the church under different modifications, as essentially necessary for the purposes specified by the apostle, *Ephes. iv. 13, 14.*

At first the jurisdiction of a bishop was confined to the walls of his own city; but afterwards, when the gospel made its way into towns and villages, the concerns of the Christians that inhabited them, would naturally fall under the cognizance and direction of the bishops of the neighbouring cities; and thus dioceses would be gradually formed. See *DIocese*. In process of time, it is supposed, the affairs of the church would require the consultation and

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co-operation of different bishops; and therefore, as before, one of the presbyters of a city was raised to be a bishop, and to have authority over other presbyters, so one of the bishops of a province was selected and invested with certain authority over other bishops, and he was called an archbishop; and in the appointment of archbishops, the civil importance of the city seems to have been regarded, for we find the metropolitan bishops were generally archbishops, and hence archbishops were called metropolitans. Archbishops, it has been said, were first appointed in the second century; and they had power to assemble the bishops within their respective provinces, to regulate the election of bishops, to consecrate them, to hear appeals from their decisions, and to take cognizance of their general conduct. See ARCHBISHOP and PATRIARCH.

It is sometimes urged, that bishops, priests, and deacons, are now, in their office and authority, very different from what they formerly were; but this, say the advocates of episcopacy, is no more than a necessary consequence of a change of times and circumstances. They do not contend that the bishops, priests, and deacons of England are at present precisely the same that bishops, presbyters, and deacons, were in Asia Minor, 1700 years ago. They maintain, however, that there have been always bishops, priests, and deacons in the Christian church, since the days of the apostles, with different powers and functions in different countries and at different periods; but the general principles and duties, which have respectively characterized these clerical orders, have been essentially the same at all times and in all places; and the variations which they have undergone, have only been such as have ever belonged to all persons in public situations, whether civil or ecclesiastical, and which are, indeed, inseparable from every thing in which mankind are concerned in this transitory and fluctuating world. A learned prelate, who flatters himself that, by the testimonies and arguments, of which we have above given a general account, he has proved episcopacy to be an apostolical institution, readily acknowledges, however, that there is no precept in the New Testament, which commands that every church should be governed by bishops. As it has not pleased the Almighty to prescribe any particular form of civil government for the security of temporal comforts to his rational creatures; so neither has he prescribed any particular form of ecclesiastical policy as absolutely necessary to the attainment of eternal happiness. And though the Scriptures contain no directions concerning the establishment of a power by which ministers are to be admitted to their sacred office, yet he conceives, that from the apostles, episcopal ordination has been regularly conveyed to us; and the legislature of this kingdom has recognized and confirmed this power to bishops. See ORDINATION. Elements of Christian Theology, by lord bishop of Lincoln, vol. ii. p. 376—401.

Persons, on the other hand, who do not admit episcopacy to be of apostolic and divine institution, contend, that the terms *ἐπίσκοπος* and *πρεσβύτερος*, that is, bishop and presbyter, are used promiscuously in the New Testament, to which they think it necessary to appeal, as to the sole authoritative rule of faith and practice, and that they denote the same, and not a distinct order or office in the Christian church. To this purpose they allege the passage already cited, Acts xx. 17. 28. in which the same persons are denominated presbyters and bishops. Thus also the name, office, and work of a bishop and presbyter appear to be the same, in Titus i. 5. 7.; and unless the apostle be charged with arguing very incoherently, he must mean the same thing by elder, v. 5., and bishop, v. 7. In like manner, presbyters are exhorted (1 Pet. v. 1, 2.) to discharge the office of

bishops. The word *ἐπίσκοπος*, it is said, was properly the name of office, and *πρεσβύτερος* was a title of respect, borrowed from the Jewish custom, which was analogous to that of other nations, of calling not only the members of the Sanhedrim *πρεσβύτεροι*, elders or senators, but also the members of the city council. It has been moreover affirmed, that not a single passage from the apostolical writings has yet been produced, in which it appears from the context, that the two terms *πρεσβύτερος* and *ἐπίσκοπος* mean different offices; and that there is the strongest positive evidence, which the nature of the thing can admit, that in these writings the two terms uniformly mean the same office. The apostle Paul, in the directions he gave to Timothy, about the proper supply of churches with suitable ministers, takes particular notice, merely, of two orders, one called bishops, and the other deacons; and hence, it is argued, that if by bishops be meant, what in modern style is so denominated, those who have the charge of many presbyters, it is astonishing that he should not think it of importance to give any directions about the qualifications of presbyters, whilst he is particular in specifying the qualifications of deacons, who were to occupy an order allowed to be much inferior to the other; and if he here means by bishops only presbyters, as some friends of episcopacy have supposed, it is strange that an office so important as that of bishops, if it was a different and superior office, should have been entirely overlooked. From St. Paul's address to the Philippians, ch. i. 1. it is inferred, that there were but two orders then established, viz. bishops, i. e. ordinary pastors or presbyters, and deacons. If there was a bishop in the modern sense at Philippi, when the apostle wrote that letter, it seems strange that the chief person in the society should be the only person disregarded by the apostle. Moreover, in the epistle written by Polycarp to the same society, about 60 years after this time, we find mention of only these two orders, the presbyters and the deacons; nor is it of any consequence whether we call their pastors bishops with the apostle, or presbyters with Polycarp, as both speak of two orders only among them. In the whole book of Acts, the stated pastors of the churches are denominated presbyters; the collection for the poor Christians is sent to the presbyters; nor do we find a single hint of any different classes of presbyters. The appellation *ἐπίσκοποι*, bishops, occurs but once, and in the passage where it is applied to those that are denominated presbyters. It is urged further, that the imposition of hands, which has been considered by many as a necessary attendant on ordination, is attributed in 1 Tim. iv. 14. to the presbytery; Paul and Barnabas were ordained by certain prophets and teachers in the church of Antioch, and not by any bishop, of whom there is not a word in that whole solemnity, presiding in that city, Acts xiii. 1, 2, 3; and it is alleged, as an acknowledged and incontestible fact, that presbyters, in the church of Alexandria, ordained even their own bishops for more than 200 years in the earliest ages of Christianity. It appears also, from the first epistle of Clemens Romanus to the Corinthians, chap. xlii. that there were two distinct orders, viz. bishops and deacons, established by the apostles in the church; and by bishops he means the same with those who, in the book of Acts, are called *πρεσβύτεροι*, presbyters, or ordinary teachers. Since it must therefore be admitted, that in the New Testament, and also in this work of Clement, the words *ἐπίσκοπος* and *πρεσβύτερος* are, not occasionally, but uniformly, used synonymously, the discovery that there was not any distinctive appellation for such an office as that now called bishop, is adduced as affording a strong presumption, that it did not exist. Another testimony alleged to the same purpose is

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that of Polycarp, who takes notice only of two orders of ministers in the church; for in ch. v. of his epistle to the Philippians, he enjoins the people to be subject to their presbyters and deacons, as to God and Christ; hence it is inferred, that if this ancient father had known of any higher order in the church, such as was that of a bishop in less than 150 years after his time, he would have been the principal, if not the only person, to whom their subjection would have been enjoined by a Christian writer. It is observed further, that though he specifies the duties and qualifications of deacons in ch. v. and those of presbyters in ch. vi. and through the whole of the epistle, those of the people, he nowhere mentions what is proper in the character and conduct of a bishop. Upon the whole, it seems evident that Polycarp knew of no Christian minister superior to the presbyters.

It has been alleged by the advocates of episcopacy, that the bishops are the proper successors of the apostles, not in the general character of teachers, but in their special function as apostles (see Stillingfleet's works, vol. i. p. 371.); whilst the presbyters and deacons were merely the successors of those who were, in the beginning, ordained by the apostles. But that the apostles could not have any proper successors has been evinced by the following considerations. The indispensable requisite in the character of an apostle, which was that of having seen Jesus Christ after his resurrection, demonstrates that their office could be but temporary. Besides, they were distinguished by prerogatives, which did not descend to any after them; of this kind were their having received their mission immediately from Christ, and not by any human ordination or appointment; the power of conferring miraculous gifts by imposition of hands; and the knowledge which they had by inspiration of the whole doctrine of Christ. Moreover, the object of their mission was altogether of a different kind from that of any ordinary pastor; and this was to propagate the gospel throughout the world both among Jews and Pagans, and not to take charge of any particular flock. Further, as a full proof that the matter was thus universally understood, both in their own age, and in the times immediately succeeding, no one, on the death of an apostle, was ever substituted in his room; inasmuch that when that sacred college was extinct, the title became extinct with it. It is alike true also of the evangelists, that their office was temporary, and that their charge extended to the whole church; and their title, like that of an apostle, sunk with those who first enjoyed it. Such were Philip, Timothy, Titus, and probably Mark, and Luke. As to the dates or postscripts subjoined to the epistles in the common bibles, and distinguishing Timothy and Titus by the appellation of bishops, it is now universally agreed among the learned, that they are of no authority. They are not found in some of our best and most ancient MSS.; and they are generally allowed to be the spurious additions of some eastern bishop or monk, at least 500 years after Christ. It is certain, however, that in the three first centuries, neither Timothy nor Titus is styled bishop by any writer. In the island of Crete, of which Titus is said to have been ordained the first bishop, there were no fewer, according to the earliest accounts and catalogues extant, than 11 bishops. Indeed, so little can the instructions given by Paul to Timothy and Titus be made to quadrate with any ordinary ministry that ever obtained in the church, that the learned Dr. Whitby (see his Preface to the epistle to Titus) concludes, that their's was extraordinary as well as temporary, and that they were not succeeded in it by any that came after them. Hence it is inferred, that all the arguments alleged in favour of the distinction between bishops

and presbyters in the early age of the church, by Epiphanius and others, from some passages in the epistles to Timothy and Titus, proceed upon the mistaken notion, that they were properly bishops in the modern acceptation of the term; a notion utterly unknown to that Christian antiquity, which deserves the name of primitive, and also incompatible with the authentic accounts we have concerning these extraordinary ministers, who were not made bishops till about 500 years after their death.

Some have deduced an argument in favour of the apostolical antiquity of episcopacy, from the epistles to the seven churches of Asia mentioned in the Apocalypse, which are addressed to the angels of these separately in the singular number. From the first chapter of that book it appears, that each epistle is intended for the whole church or congregation mentioned in the direction or superscription; and yet one person, called the angel of that church, is addressed in the name of the whole. Hence some have inferred, that the person denominated angel, was an order differing from that of other ministers, and superior to it: whilst others have considered the appellation as descriptive of the whole collective body. An intermediate opinion, advanced by some critics, is more probable. This supposes the necessity, for the sake of order, that in their consistories or congregations one should preside, both in the offices of religion, and in their consultations for the common good; and that this president, or chairman, is here addressed under the name of angel. This interpretation affords us also the most plausible account of the origin of the more considerable distinction, which afterwards obtained between bishop and presbyter. It was the distinction of one pastor in every church, marked by the apostle John, though not made by any who had written before him, which led Tertullian, whose publication first appeared about a century after the apostles, to consider him as the institutor of episcopacy. By those who deny the superiority of bishops to presbyters in the first age of the church, it is alleged, that the first reformers and founders of the church of England, as well as many of its most learned and eminent doctors, have not pretended this distinction to be of divine, but merely of human institution; not grounded upon scripture, but only upon the custom or ordinances of this realm. To this purpose, the declaration made of the functions, &c. of bishops and priests, and signed by more than 37 civilians and divines, among whom were 13 bishops, Cranmer and others, affirms, that in the New Testament there is no mention made of any degrees or distinctions in orders, but only of deacons or ministers, and of priests or bishops. (See Bp. Burnet's Hist. Ref. vol. i. Append. p. 321.) Besides, the book, entitled "The Institution of a Christian Man," subscribed by the clergy in convocation, and confirmed by parliament, owns bishops and presbyters to be the same. Moreover, that the main ground of settling episcopal government in this nation, was not any pretence of divine right, but the convenience of that form of church government to the state and condition of the church at the time of the reformation, the learned Stillingfleet affirms (Irenic. c. 8. Works, vol. ii. p. 396, &c.), and proves it to be the sentiment of archbishop Cranmer and of other reformers, in the reigns of Edward VI. and of queen Elizabeth, such as archbishop Whitgift, bishop Bridges, Loe, Hooker, Sutcliffe, Hales, Chillingworth, &c. It was also the opinion of archbishop Usher, that bishop and presbyter differed only in degree and not in order; and that in places where bishops could not be procured, the ordination of presbyters was valid. See ORDINATION. "As for the notion of distinct offices of bishop and presbyter," says bishop Burnet, in his "Vindication of the church of Scotland," p. 336. "I confess it is not so clear

clear to me, and therefore since I look upon the sacramental actions as the highest of sacred performances, I cannot but acknowledge those who are empowered for them must be of the highest office in the church."

Although, in the apostolic times, bishops and presbyters were synonymous, and co-ordinate with respect to their ministerial powers, and they were ordained to their office by prayer, accompanied with imposition of hands; yet a certain priority, or presidentship, for the sake of order, or in deference either to seniority or to distinguished talents, was allowed to one of their number. But he seems to have been only a kind of moderator in their assemblies, and to have had no more power than that of giving a single vote in common with the rest of his brethren. By those who adopt this reasoning, and who trace the original of the distinct order of bishops, which was introduced in the second and third centuries, to this practice, it is allowed that pastors were from the beginning vested with a superintendency over the congregation or church merely in spiritual matters; and it is alleged, that some of the titles that are thus given them in Scripture, such as ἡγούμενοι, προεταμίνοι, guides and governors, imply this kind of superintendence. But at this time several things relating to the church were conducted in common by the pastors, the deacons, and the whole congregation. To this class we may refer all matters of scandal and offence, and also the election of their pastors and their deacons. Accordingly, Clement, in the fore-cited epistle, ch. xlv. speaking of the pastors, uses this expression: "Those who were constituted by the apostles, and afterwards by other eminent men, with the consent of the whole congregation." It appears also, by the epistles of Cyprian, written about the middle of the third century, that for the first three ages of the church, no final resolution was taken in any affair of moment, without communicating it to the people, and obtaining their approbation. In the second century a settled distinction obtained, in several respects, between the president, chosen by a plurality of votes, and distinguished by the appropriate title of bishop, which had before been common to all the presbyters, and the other presbyters. Many other titles, besides that of bishop, which they had all enjoyed in common, were restricted to him who was regarded as their head, such as ἡγούμενος, προεταμίς, πρεσβυτερός, προεταμίος, ποιμήν, and some others. These titles, independently of the talents, virtues and services that attended them, claimed respect and deference. The concurrence of the president thus honoured, was considered as a necessary sanction to all ecclesiastical resolutions and measures; and by degrees every act became valid which bore the stamp of his authority. Those who presided over churches, which were established in some of the principal cities, were honoured with peculiar pre-eminence, and to this advancement analogy to the civil government did not a little contribute. It is not improbable, that the church of Jerusalem, when it became numerous, and was deprived of the ministry of the apostles, who were gone to instruct the other nations, was the first which chose a president or bishop; nor it is less probable, that the other churches followed by degrees this example.

The first ancient author who mentions bishop, presbyter, and deacon, as three distinct orders in the church, is, as we have already observed, Ignatius, who is supposed to have written about the 16th year of the second century. But as several of the epistles ascribed to him, are spurious, no great stress can be laid upon his authority. However, he seems, with peculiar earnestness, to inculcate obedience and subjection to the bishop, as well as to the presbyters and deacons. Mr. Dodwell accounts for his zeal in establishing the bishop's

authority, by supposing that it was at that time a new thing, totally unknown in the church; and, according to this opinion, he says, that it is in vain to look for any trace of episcopal authority in the New Testament. Irenæus, who is supposed to have written about the middle of the second century, sometimes uses the names bishop and presbyter indiscriminately, and at other times with some kind of distinction; but it is not easy to determine, whether by these two appellations he means the same order, or two different orders. Dr. Pearson admits that these names are often interchanged by this father, and others of his time, even to the end of the century; but he affirms at the same time, that in regard to their own contemporaries, the offices of individuals are never thus confounded, inasmuch that a person who was in their time a bishop, is not called a presbyter, nor is a presbyter called a bishop. It is allowed, that the distinction of these orders began about this time generally to prevail, though the difference was not nearly so considerable as it became afterwards. Another author, by whom the three orders seem to be discriminated, and whose testimony is commonly adduced in support of their apostolical institution, is Pius, bishop of Rome, who is supposed to have written before the middle of the second century, but after Ignatius and Polycarp: he uses an expression, however, which does not indicate any high opinion of the superiority of the bishop in his time; "Let the presbyters and deacons reverence thee (the bishop), not as their superior, but as Christ's minister." Clement of Alexandria, at the close of the second century (see his Strom. l. 1.), strongly marks the distinction between presbyter and deacon; but he seems to intimate, that the distinction between bishop and presbyter was, even in his days, comparatively not worthy of his notice. At this time, however, every church had its own pastor, or bishop, and only one under this appellation, and every bishop had only one congregation or church. Sir Peter, afterwards lord, King (ubi infra) has proved these assertions by a variety of citations from ancient writers; he has also shewn, that a bishop's diocese did not exceed the bounds of a modern parish. See DIOCESE. The presbyters, according to this writer, were the curates and assistants of the bishop, and though inferior to them in degree, yet they had the same inherent right with the bishops, and were equal to them in order. "A bishop" says this author, "preached, baptized, and confirmed, so did a presbyter; a bishop excommunicated, absolved, and ordained, so did a presbyter; whatever a bishop did, the same did a presbyter; the particular acts of their office were the same." In the age of Cyprian, about the middle of the third century, it appears that the presbyters were considered as vested with the power of conferring orders. (Cyp. Epist. 5. and 75.) In the age of Hilary, about the middle of the fourth century, it appears, that the whole distinction of the episcopate is ascribed by him to seniority in the ministry, without either election or special ordination. When the bishop died, the senior colleague succeeded of course. As to ordination it was the same in both; and bishop meant no more than first among the presbyters, or senior presbyter. Jerome, who wrote about the end of the fourth and beginning of the fifth century, says (In Titum. l. 5. Op. vol. x. p. 1700.) that, among the ancients, priests and bishops were the same; but that by degrees the care of a church was assigned to one person, in order to prevent dissension. In another place (Op. vol. vi. p. 198.) he says, "Let the bishops know, that they are above priests more by custom than by the appointment of Christ." He also observes (Anecdotes, p. 24. 54.), that at the beginning, churches were governed by the common council of presbyters, like an aristocracy; but afterwards the superintendency was given to one of the presbyters,

presbyters, who was then called the bishop, and who governed the church, but still with the council of the presbyters. Dr. Hammond (Annot. Acts xi. 50.) has advanced a singular opinion, viz. that the apostles instituted only the offices of bishop and deacon, and that the intermediate office of presbyter was soon afterwards introduced. But that such a middle order should be erected at once, immediately after the times of the apostles, is much more unlikely, than that it arose gradually out of an inconsiderable distinction, which had obtained from the beginning.

At the close of the third century, the ecclesiastical government, which very generally prevailed, was of that kind which might justly be denominated a parochial episcopacy. The bishop, who was properly the pastor, had the charge of a single parish; and the parishioners assembled for the purposes of public worship, and for the celebration of religious institutions, in one place, at which the bishop commonly presided; the bishop was assisted by presbyters, who formed his council in judicial and deliberative matters, and who performed religious functions both public and private. To these were added deacons. See DEACON. The next step was the extension of the oversight of one bishop to many congregations, which branched out of the original church by an accession of converts; and in this stage of the progress of episcopacy, the several presbyters had their separate parishes, and continued in subordination to the bishop, who was acknowledged as their common head. At this period, an order of bishops, called *chorepiscopi*, or rural bishops (see CHOREPISCOPI), held the middle rank between bishops and presbyters, being inferior to the former, and superior to the latter. This state of the church may be denominated diocesan episcopacy.

Though bishops, in the opinion of those whose sentiments we are now representing, were originally no other than presbyters; the manner of their ordination being the same, and the presbyters discharging every part of the office of a bishop; no sooner was the distinction between them established, than the bishops began to appropriate certain functions to themselves. It appears, by the act of the third council of Carthage, A. D. 397, that, whereas, before, priests had the power of assigning the time of public penance, and of giving absolution, as also of consecrating virgins, and of making the chrism, without the advice of the bishop, all these things were forbidden by these canons, and appropriated to the bishops. But the principal circumstance by which the bishops were afterwards distinguished, was the power of confirming the baptized, when that chrism was applied. See CONFIRMATION. After the reign of Adrian, when Jerusalem was utterly destroyed, and the Jews dispersed, an opinion began to prevail among Christians, that their ministers succeeded to the characters, rights, and privileges of the Jewish priesthood; and this was another source of honour and profit to the clergy. Another circumstance, which contributed in no small degree to the progress of episcopal authority, was the constitution of provincial councils, which insensibly superseded the importance of particular churches, and enabled the bishops by an alliance with them to obtain a much larger share of executive and arbitrary power. As soon as they became connected by a sense of their common interest, they were empowered to attack, with united vigour, the original rights of their clergy and people. "The prelates of the third century," says Gibbon (Hist. vol. ii. p. 335, &c.), "imperceptibly changed the language of exhortation into that of command, scattered the seeds of future usurpations, and supplied, by scripture allegories and declamatory rhetoric, their deficiency of force and reason. They exalted the unity and power of the

church, as it was represented in the episcopal office, of which every bishop enjoyed an equal and undivided portion. Princes and magistrates, it was often repeated, might boast an earthly claim to a transitory dominion; it was the episcopal authority alone, which was derived from the deity, and extended itself over this and another world. The bishops were the vicegerents of Christ, the successors of the apostles, and the mystic substitutes of the high priest of the Mosaic law. Their exclusive privilege of conferring the sacerdotal character invaded the freedom of clerical and popular elections; and if, in the administration of the church, they still consulted the judgment of the presbyters, or the inclination of the people, they most carefully inculcated the merit of such a voluntary condescension. The bishops acknowledged the supreme authority which resided in the assembly of their brethren; but in the government of his peculiar diocese, each of them exacted from his *flock*, the same implicit obedience, as if that favourite metaphor had been literally just, and as if the shepherd had been of a more exalted nature than that of his sheep." The same causes, which at first had destroyed the equality of the presbyters, introduced among the bishops a pre-eminence of rank, and from thence a superiority of jurisdiction. In spring and autumn, when they met in provincial synod, the multitude was governed by the wisdom and eloquence of a few; and, besides, the office of perpetual presidents in the councils of each province, was conferred on the bishops of the principal city; and these aspiring prelates, who soon acquired the lofty titles of metropolitans and primates, secretly prepared themselves to usurp over their episcopal brethren the same authority which the bishops had so lately assumed above the college of presbyters. Hence gradually arose the pre-eminence which the ambition of the Roman pontiff gained over the other provinces and churches. King's Constitution, &c. of the Primitive Church, ch. 1.—v. Campbell's Eccl. Hist. vol. ii. Mosh. Eccl. Hist. vol. i. p. 104, &c. Neal's Hist. Purit. vol. i. p. 670, &c. 410. Pierce's Vindication.

It is the opinion of many approved writers on this subject, among whom may be reckoned many episcopalians and dissenters in our own country, and many learned foreigners, that no particular form of church government was authoritatively prescribed either by our Lord or his apostles; but that Christians were left at liberty to choose such as might be best adapted to their circumstances and to the state of society, and most conducive to the edification and tranquillity of the church, and of individuals in future ages. See CHURCH.

When new occasions required new measures, in a little time the functions of the priesthood were divided, and the priests distinguished into degrees; the political part of religion being assigned principally to bishops, and the evangelical to the priests, &c. or rather, as some will have it, the functions of teaching and preaching were reserved to the bishop, and that of ordination superadded; which was their principal distinction, and the mark of their sovereignty in their diocese.

By the ancient discipline, bishops were to be married once, and not to put away their wives on pretence of religion; but a second marriage was a disqualification for this order. If they lived chaste, they were ranked as confessors.

Some bishops in the middle age, on account of their *regalia*, or temporalities, were obliged to a military service called *boffis*, by which they were to lead their vassals into the field, and attend the king in his military expeditions. This Charlemagne excused, and even forbade; but the prohibition was little regarded, since we find the thing often practised afterwards. Du-Cange.

The election of bishops was anciently placed in the clergy

and the people of the parish, province, or diocese, or of the clergy and laity, as they were afterwards called; nor did any church apply to the neighbouring bishops to assist at the ordination. Irenæus was ordained by priests only; and such was the general custom of the church of Alexandria, till the beginning of the fourth century. Cyprian also says, that it belonged to the people chiefly to choose worthy pastors, and to refuse the unworthy. Thus Alexander was chosen bishop of Jerusalem. Fabianus and Cornelius of Rome, and Cyprian of Carthage. When the people had thus elected a bishop, they presented him to the neighbouring bishops for their approbation and consent; because, without their concurrent assent, no bishop could be legally instituted or confirmed. This was the case with regard to Alexander, already mentioned, and Sabinus, bishop of Emerita in Spain. After election and confirmation, the next act was the ordination or instalment of the bishop, which was done in his own church by the neighbouring bishops, who were invited to attend on the occasion. The attendance of the neighbouring bishops, which seems to have been at first voluntary on both sides, became customary, and at length necessary; and it was an established rule, that the concurrence of these was indispensable, one of whom laid his hand on the head of the new bishop, when he was recommended by prayer to the blessing of God. In the third century, this was always done by the metropolitan bishop; or at least it was never done without his consent or order. The second council of Nice ordered that bishops should be chosen by other bishops; but in the west, the people preserved the right of choosing their bishops, till after the reign of Charlemagne and his sons; and it was not taken from them till the council of Avignon, in 1050. *Basnage Hist. Eglises Reformées, vol. iii. p. 24.*

Under the plea of the tumult that attended popular elections, the emperors and other sovereigns of Europe, took the appointment in some degree into their own hands; reserving to themselves the right of confirming these elections, and of granting investiture of the temporalities, without which confirmation and investiture, the elected bishop could neither be consecrated, nor receive any secular profits. This right was acknowledged in the emperor Charlemagne, A. D. 773, by pope Adrian I. and the council of Lateran, and universally exercised by other Christian princes; but the policy of the court of Rome contrived to exclude the laity from any share in these elections, and to confine them wholly to the clergy; but the mere form of election appeared to the people to be of little consequence, while the crown was in possession of an absolute negative, which was almost equivalent to a direct right of nomination. Indeed, princes and magistrates, patriarchs and popes, have usurped the power of electing bishops. The election was to be within three months after the vacancy of the see; and the person to be chosen out of the clergy of that church. Formerly the bishop claimed a share in the election of an archbishop; but this was set aside by the popes.

In England, during the Saxon times, the right of appointing to bishoprics is said to have been in the crown, because the rights of confirmation and investiture were, in effect, though not in form, a right of complete donation. But when, by length of time, the custom of making elections by the clergy was fully established, the popes began to except to the usual method of granting these investitures, which was "per annulum et baculum," by the prince's delivering to the prelate a ring, and pastoral staff, or crozier; pretending that this was an encroachment on the church's authority, and an attempt by these symbols to confer a spiritual jurisdiction: and pope Gregory VII. about the close of the 11th cen-

tury, published a bull of excommunication against all princes who should dare to confer investitures, and all prelates who should venture to receive them. At length, however, when the emperor Henry V. agreed to remove all suspicion of encroachment on the spiritual character by conferring investitures for the future "per sceptrum" and not "per annulum et baculum;" and when the kings of England and France consented also to alter the form in their kingdoms, and receive only homage from the bishops for their temporalities, instead of investing them by the ring and crozier; the court of Rome found it prudent to suspend for a while its other pretensions. This concession was obtained from king Henry I. in England, by means of that obstinate and arrogant prelate archbishop Anselm; but king John, about a century afterwards, in order to obtain the protection of the pope against his discontented barons, was also prevailed upon to give up by a charter, to all the monasteries and cathedrals in the kingdom, the free right of electing their prelates, whether abbots or bishops; reserving only to the crown the custody of the temporalities during the vacancy; the form of granting a licence to elect, which is the original of our "congé d'élire," on refusal whereof the electors might proceed without it; and the right of approbation afterwards, which was not to be denied without a reasonable and lawful cause. This grant was expressly recognized and confirmed in king John's Magna Charta, and was again established by stat. 25 Ed. III. ft. 6. § 3. But by stat. 25 Hen. VIII. cap. 20. the ancient right of nomination was, in effect, restored to the crown. The English succession of protestant bishops stands on this last ground. The king being certified of the death of a bishop by the dean and chapter, and his leave requested to elect another, the *congé d'élire*, or usual licence, is sent to them, with a letter missive, nominating the person whom he would have chosen. The election is to be within twelve days after the receipt of it, otherwise the king by letters patent appoints whom he pleases; and the chapter in case of refusing the person named by the king, incurs a *præmunire*. The election or nomination, if it be of a bishop, must be signified by the king's letters patent to the archbishop of the province; if it be of an archbishop, to the other archbishop and two bishops, or to four bishops; requiring them to confirm, invest, and consecrate the person so elected; which they are bound to perform immediately, without any application to the see of Rome. If such archbishop, or bishops, refuse to confirm, invest, and consecrate such bishop elect, they shall incur all the penalties of a *præmunire*. After election, and its being accepted of by the bishop, the king grants a mandate under the great seal for confirmation, which the archbishop configns to his vicar-general, consisting mostly in a solemn citation of such as have any objections to the bishop elect, a declaration of their contumacy in not appearing, and an administration of the oaths of allegiance and supremacy, of simony, and canonical obedience. Sentence being read by the vicar-general, the bishop is installed in the province of Canterbury by the archdeacon: the fact is recorded by a public notary; and the bishop is invested with full powers to exercise all spiritual jurisdictions, though he cannot sue for his temporalities till after consecration. Then follows the consecration by the archbishop, or some other bishop appointed by lawful commissions, and two assistant bishops: the ceremony of which is much the same as in the Romish church, save that, having put on the episcopal robe, the archbishop and bishops lay their hands on the new prelate's head, and consecrate him with a certain form of words. The fees of the whole process are said to amount to about 600*l.*

The process of the translation of a bishop to another bishopric

B I S H O P.

shopric only differs in this, that there is no consecration. The age of a bishop is to be at least thirty years; and, by the ancient discipline, none were to be chosen but those who had passed through all the inferior orders; but, in some cases of necessity, this was dispensed with, and deacons, nay laymen, were raised *per saltum* to the episcopal dignity.

The form of consecrating a bishop is different in different churches. Ordinarily, at least three bishops are required in the ceremony of consecrating a bishop; but, in some cases, a single one might suffice. In the Greek church, the candidate for the episcopate, who is always an *archimandrite* or *hieromachus*, i. e. an abbot or chief monk in some monastery, being named to the vacant see, and the election being confirmed, repairs, at the time appointed, to the church where the consecration is to be performed. Being arrived, he is introduced by the proto-pope and proto-deacon to the archbishop and bishops, who are arranged in proper order on a temporary theatre or platform erected in the church for the occasion. He there gives an account of his faith; declares solemnly that he has neither given nor promised money, or any bribe-worthy service, for his dignity; and promises to adhere steadily to the traditions and canons of the eastern church, to visit his diocese regularly, and to oppose strenuously all innovations and heresies, particularly the errors of the Latin church. This being done, the archbishop says, "The grace of the Holy Spirit, through my humility, exalts thee N. archimandrite, or hieromachus, beloved of God, to be bishop of the cities N. N. which God preserve." With much ceremony the bishop elect is then conducted from the theatre, within the rails of the holy altar, where he kneels down with the other bishops, who hold open over his head the holy gospel with the letters inverted, the archbishop saying aloud, "The divine grace, which always healeth our infirmities, and supplieth our defects, by my hand conducteth thee N. archimandrite, or hieromachus, beloved of God, bishop elect of the cities of N. N. which God preserve!—Let us pray therefore for him, that the grace of the most Holy Spirit may come upon him." Then the priests say thrice, "Lord have mercy upon us;" and while the bishops continue to hold the gospel, the archbishop signs the newly consecrated bishop thrice with the sign of the cross, saying, "In the name of the Father, and of the Son, and of the holy Ghost, now and for ever, even unto ages of ages. Amen." Then all the bishops putting their right hands on his head, the archbishop prays that he may be confirmed in the office of which they have judged him worthy, that his priesthood may be rendered irreproachable, and that he himself may be made holy and worthy to be heard of God. After this, one of the assisting bishops reads a short litany in a low voice, to be heard only by those within the altar, and the other bishops make the responses. At the end of the litany, the archbishop, laying his hand again upon the head of the newly consecrated bishop, prays in very decent and devout terms, that Christ will render him an imitator of himself, the true shepherd; that he will make him a leader of the blind, a light to those who walk in darkness, and a teacher of infants; that he may shine in the world, and receive at last the great reward prepared for those who contend boldly for the preaching of the gospel. After this the pastoral staff is delivered to the new bishop, with a very proper and solemn exhortation from the archbishop, to feed the flock of Christ committed to his care. King's Rites and Ceremonies of the Greek Church.

In the Romish church, the bishop elect being presented by the elder assistant to the consecration, takes the oath:

he is then examined as to his faith; and after several prayers, the New Testament is drawn over his head, and he receives the chrisom or unction on his head. The pastoral staff, ring, and Gospel, are then given him; and after communion, the mitre is put on his head: each ceremony being accompanied with proper prayers, &c. the consecration ends with *Te Deum*.

These last mentioned ceremonies are laid aside in the consecration of English bishops. Nevertheless, the book of consecration, composed by the bishops, and approved by Edward VI. in the third year of his reign, and two years afterwards, confirmed by act of parliament, in which some of them are enjoined, is declared to be the standard for this purpose by the thirty-sixth article. In queen Mary's reign this act was repealed, and the book of common prayer, and the book of ordination, were by name condemned. When Elizabeth came to the throne, queen Mary's act was repealed, and king Edward's prayer-book was again authorized; but the book of ordination was not expressly named, because it had been a part of the common prayer book; and therefore it was not thought necessary to specify the office of ordination any more than any other office of the common prayer book. But bishop Bonner contended, that as the book of ordination had been by name condemned in queen Mary's reign, and had not been since revived by name, it was still condemned in law; and, consequently, that all ordinations conferred according to that form, were illegal and invalid. To obviate this objection, it was declared in a subsequent session of parliament, that the office of ordination was considered as part of the common prayer book; and it was farther declared, that all ordinations which had been performed according to that office, were valid; and upon the same principle a similar clause was inserted in the 36th article.

The function of a bishop in England may be considered as two-fold; viz. what belongs to his *order*, and what belongs to his *jurisdiction*. To the *episcopal order* belong the ceremonies of dedication, confirmation, and ordination; to the *episcopal jurisdiction*, by the statute law, belong the licensing of physicians, surgeons, and schoolmasters, the uniting small parishes (though this last privilege is now peculiar to the bishop of Norwich), assisting the civil magistrate in the execution of statutes relating to ecclesiastical matters, and compelling the payment of tithes and subsidies due from the clergy.

By the common law, the bishop is to certify the judges, touching legitimate and illegitimate births and marriages; and by that and the ecclesiastical law, he is to take care of the probate of wills, and granting administrations; to collate to benefices, grant institution on the presentation of other patrons, command induction, order the collecting and preserving the profits of vacant benefices for the use of the successors, defend the liberties of the church, and visit his diocese once in three years. To the bishop also belong suspension, deprivation, deposition, degradation, and excommunication.

The bishops of England are all barons: barons in a three-fold manner; viz. *feudal*, in regard of lands and baronies annexed to their bishoprics; by *writ*, as being summoned by writ to parliament; and also by *patent* and *creation*. When William the Conqueror thought proper to change the spiritual tenure of frank-almoign, or free alms, under which the bishops held their lands during the Saxon government, into the feudal or Norman tenure by barony; their estates were subjected to all civil charges and assessments, from which they were before exempt; and, in right of succession to those baronies, which were unalienable from their res-

pective dignities, the bishops and abbots were allowed their seats in the house of lords. But though these lords spiritual are, in the eye of the law, a distinct estate from the lords temporal, and are so distinguished in most of our acts of parliament, yet in practice they are usually blended together under one name of "the lords;" they intermix in their votes; and the majority of such intermixture joins both estates. And from this want of a separate assembly, and separate negative of the prelates, some writers have argued very cogently, that the lords spiritual and temporal are now in reality only one estate; which is unquestionably true in every effectual sense, though the ancient distinction between them still nominally continues. For if a bill should pass their house, there is no doubt of its validity, though every lord spiritual should vote against it, of which Selden and Sir Edward Coke give many instances; as, on the other hand, judge Blackstone presumes it would be equally good, if the lords temporal present were inferior to the bishops in number, and every one of those temporal lords gave his vote to reject the bill; though Sir Edward Coke seems to doubt, whether this would not be an "ordinance," rather than an "act," of parliament. Bl. Com. vol. i. 156. Bishops have the precedence of all other barons, and sit in the upper house as barons. They are twenty-four in number, exclusive of the bishop of Sodor and Man, who has no seat in the house of peers, besides two archbishops. Archbishops are distinguished by the titles of "Grace," and "Most reverend father in God by divine Providence;" and bishops, by those of "Lord," and "Right reverend father in God by divine permission." The former are said to be "in throned," and the latter "installed." See ARCHBISHOP.

With respect to the order of precedency among one another, the archbishop of Canterbury takes the lead, then the archbishop of York, next to him the bishops of London, of Durham, and of Winchester. The other bishops follow according to the seniority of their consecration; excepting only, that a bishop being a privy counsellor, takes place after the bishop of Durham.

Bishops have two special privileges next to regal: the first, that in their courts they sit, and pass sentence, of themselves, and by their own authority; the bishops' courts being not like other courts, but writs are sent out in their own name, *teste* the bishop, not in the king's name, as is done in the king's courts: the second, that, like the king, they can depute their authority to another, as their suffragan, chancellor, commissary, &c.

They have this advantage also over lay-lords, that, in whatever Christian country they are, their episcopal degree and dignity are acknowledged; and they may, *quatenus* bishops, ordain, &c.

They have several immunities, as from arrests, outlawries, distress, &c. liberty to hunt in the king's forests, &c. to have *certain tuns of wine duty free*, &c. Their persons may not be seized, as lay-peers may, upon contempt, but their temporalities alone. They may qualify as many chaplains as a duke, viz. six. But, as they have no right to be tried themselves in the court of the lord high steward, as peers, they ought not to be judges there. For, though they are lords of parliament, and sit there by virtue of the baronies, which they hold "jure ecclesiæ," yet they are not ennobled in blood, and consequently not peers with the nobility, but merely lords of parliament. 3 Inst. 30, 31. Staunf. P. C. 153. In cases of capital offence, the bishops usually withdraw voluntarily, but enter a protest, declaring their right to stay. It is observable, that in the 11th chapter of the constitutions of Clarendon, made in parliament 11 Henry II. they are expressly excused, rather than excluded, from sit-

ting or voting in trials, when they come to concern life or limb. The determination of the house of lords in the earl of Danby's case, (Lords' Journ. 15 May, 1679), which hath ever since been adhered to, is consonant to these constitutions, "that the lords spiritual have a right to stay and sit in court in capital cases, till the court proceeds to the vote of guilty, or not." This resolution, however, extends only to trials in full parliament; for to the court of the lord high steward, in which no vote can be given but merely that of guilty, or not guilty, no bishop, as such, ever was or could be summoned; and though the statute of king William regulates the proceedings in that court, as well as in the court of parliament, yet it never intended to new-model or alter its constitution, and consequently does not give the lords spiritual any right in cases of blood which they had not before; and their exclusion is more reasonable, because having no right to be tried in this court, as we have already said, they ought not to be judges there.

By law, the crime of *episcopicide*, which a clergyman commits by killing his bishop, is petty treason.

In Canada there is a bishop, resident at Quebec; and there are two bishops in America. In Denmark they have no archbishop, but there are six superintendents, or bishops; four in Norway, and two in Iceland. The chief see is that of Zealand, which yields about 1000l. a year; the others are those of Funen, valued at 760l., Aarhus at 600l., Aalborg at 400l., Ripan at 400l.; in Norway, Christiana or Aggerhuus at 400l., Christianland at 600l., Bergben at 400l., and Drontheim at 400l. The bishoprics of Skalholt and Holun, in Iceland, are only valued each at 150l.; but though far inferior in nominal value to the others, they may be considered, on account of the cheapness of living in Iceland, equal in real profit to the largest of the others. The bishop of Zealand, who is first in rank, and the bishop of Aggerhuus, are metropolitans. They have no temporalities; keep no ecclesiastical courts; have no cathedrals or prebends, &c. but are only *primi inter pares*, having the rank above the inferior clergy of the province, and inspection over their doctrine and manners. They are allowed two or three parishes each. Their habit is common with that of the other ministers. In Sweden are fourteen dioceses; the archbishopric of Upsala, and the bishoprics of Lindkoeping, Skara, Strængnæes, Wæstera, Wexio, Abo, Lund, Borgo, Gotheborg, Calmar, Carlstadt, Hermosand, and Wisby, or Gothland. The revenues of Upsala and Wæstera amount to about 1000l. a year; and those of the lowest bishoprics to 300l. There are also three superintendents, who rank as bishops, but do not sit in the house; these are the first chaplain to the king, the rector of St. Nicholas at Stockholm, and the first chaplain of the navy. The bishops are bound to residence, except during the meeting of the diet. A consistory of the clergy of the diocese elects the archbishop and bishops, by presenting them to the king for his nomination. They have also ecclesiastical courts, &c.

BISHOP-*abbot*, *episcopus abbas*, was an abbot invested with the episcopal order; of which we meet with several in the richer and more considerable monasteries.

BISHOP, *acephalous*, he who is immediately subject to the papal see, without any metropolitan over him.

BISHOP, *boy*. It was an ancient custom in such churches as had cathedral service, for the little choristers, on St. Nicholas' day, December the 6th, to elect one of their number to be the *episcopus puerorum*, the bearn, i. e. infant, or chorister bishop; who continued to preside over the rest, with an imitation of all the episcopal functions, till Innocent's day, Dec. 28, and then, after solemn processions and great pageantry, he laid down his office. He was

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chosen on St. Nicholas' day, because St. Nicholas was the patron saint of children; he having, when an infant, shewn such singular piety, as the legend says, that when he was at his mother's breast, he would not suck on Wednesdays and Fridays, that he might observe the fasts of the church.

The ceremonies attending the investiture of the *episcopos puerorum*, are prescribed by the statutes of the church of Sarum, which contain a title *de episcopo choristarum*; and also by the processional. From these it appears, that he was to bear the name and state of a bishop, habited, with a crozier or pastoral staff in his hand, and a mitre on his head. His fellows, the rest of the children of the choir, were to take upon them the style and office of prebendaries, and yield to the bishop canonical obedience; and farther, the same service as the very bishop himself, with his dean and prebendaries, had they been to officiate, were to have performed, the very same, mafs excepted, was done by the choristers and his canons upon the eve and the holiday. The use of Sarum required also, that upon the eve of Innocent's day, the chorister bishop, with his fellows, should go in solemn procession to the altar of the Holy Trinity, in copes, and with burning tapers in their hands; and that during the procession, three of the boys should sing certain hymns mentioned in the rubric. The procession was made through the great door at the west end of the church, in such order, that the dean and canons went foremost, the chaplain next, and the bishop, with his little prebendaries, last; agreeably to that rule in the ordering of all processions, which assigns the rearward station to the most honourable. In the choir was a seat or throne for the bishop; and as to the rest of the children, they were disposed on each side of the choir, upon the uttermost ascent. And so careful was the church to prevent any disorder which the rude curiosity of the multitude might occasion in the celebration of this singular ceremony, that their statutes forbid all persons whatsoever, under pain of the greater excommunication, to interrupt or press upon the children, either in the procession or during any part of the service directed by the rubric; or any way to hinder or interrupt them in the execution or performance of what it concerned them to do. Farther it appears, that this infant-bishop did, to a certain limit, receive to his own use, rents, capons, and other emoluments of the church. In case the little bishop died within the month, his exequies were solemnized with great pomp; and he was interred, like other bishops, with all his ornaments. The memory of this custom is preserved, not only in the ritual books of the cathedral church of Salisb'ry, but by a monument in the same church, with the sepulchral effigies of a chorister bishop, supposed to have died in the exercise of his pontifical office, and to have been interred with the solemnities above noted.

From what period we are to date the progress of this ridiculous ceremony, it is not easy to discover, but it seems more than probable that it originated with the ancient MYSTERIES. In the wardrobe account of Edward I. published by the society of antiquaries, we find a boy-bishop, Dec. 7, 1290, saying vespers before the king, in his chapel at Heton, near Newcastle upon Tyne, for which he, and the boys who sung with him, received 40s.

This establishment, but with a far greater degree of buffoonery, was common in the collegiate churches of France. (See Dom. Marlot. Histoire de la Metropole de Rheims, tom. ii. p. 769.) A part of the ceremony in the church of Noyon was, that the children of the choir should celebrate the whole service on St. Innocent's day. (Briton. Dictionnaire des Arrets, artic. Noyon. ed. 1727.) In a curious book,

called Voyages Liturgiques de France (Par. 8vo. 1718, p. 53.) is this account of the same practice in the church of Vienne in Dauphiny. "Le jour de Noël après Vêpres, le jour de S. Etienne, et le jour de St. Jean l'Évangéliste, on faisoit des processions solennelles pour les diacres, les pretres, et les enfans de Chœur, comme autrefois à Rouen. Il y avoit aussi le lendemain à la messe solennité pour eux. Les enfans de Chœur y avoient leur PETIT EVEQUE, qui faisoit tout l'office, excepté à la messe." And in the statutes of the archiepiscopal cathedral of Tullies, given in the year 1497, it is said, that during the celebration of the festival of the boy-bishop, "*Moralities* were presented, and shews of *miracles*, with farces and other sports, but compatible with decorum. After dinner they exhibited, without their masks, but in proper dresses, such farces as they were makers of, in different parts of the city." In England too, it appears, that the boy-bishop, with his companions, went about to different parts of the town; at least visited the other religious houses. (See the Computus Rolls of Winchester College, A. 1461.) And Strype records (Eccles. Memorials, iii. 310. ch. xxxix. and p. 387. ch. 1.) that when this, among other ancient ceremonies, was restored by queen Mary, in 1556, "on St. Nicolas' even, St. Nicolas, that is, a boy habited like a bishop in *pontificalibus*, went abroad in most parts of London, singing after the old fashion, and was received with many ignorant but well disposed people into their houses, and had as much good cheer as ever was wont to be had before."

In the statutes of Eton college, given in 1441, the *episcopos puerorum* is ordered to perform divine service on St. Nicholas's day; and in those of Winchester college, 1380, *pueri*, that is, the boy-bishop, and his fellows, are permitted on Innocent's day to execute all the sacred offices in the chapel, according to the use of the church of Sarum. A similar clause to that at Eton occurs in the statutes of King's college, Cambridge; and Mr. Warton observes, in his History of Poetry, that the anniversary custom at Eton, of going *ad montem* originated from the ancient and popular practice here described.

In a small college, for only one provost, five fellows, and six choristers, founded by archbishop Rotherham in 1481, in the obscure village of Rotherham, in Yorkshire, this piece of mummery was not omitted. The founder leaves by will, among other bequests to the college, "a myter for the barne-bishop of cloth of gold, with two knoppes of silver, gilt and enamelled." Hearne's Liber Niger Seacc. Append. 674. 686.

From the passage already quoted from the Voyages Liturgiques de France, it appears that, at least in one church, the *mas* was not allowed to be celebrated by the boy-bishop; and it is also expressly prohibited in the use of Sarum: but other and more frequent instances occur where the buffoonery was carried even to this height. In a fragment of the cellarers *Computus* of Hyde abbey near Winchester, A. D. 1397, we have a charge "pro epulis *pueri* CELEBRANTIS in festo Sancti Nicolai;" and so late even as the reign of Henry VIII., we find the same ceremony at St. Paul's.

It is surprising that Dean Colet, a friend to the purity of religion, and who had the good sense and resolution to censure the superstitions and fopperies of popery in his public sermons, should countenance this idle farce of the boy-bishop in the statutes of his school at St. Paul's, which he founded with a view of establishing the education of youth on a more rational and liberal plan than had yet been known, in the year 1512. He expressly orders, that his scholars "shall every Childermas (that is Innocent's) day, come to Paul's church, and hear the *childe-bishop's* (of St. Paul's cathedral) sermon

fermon And after it be at the hygh masse; and each of them offer a penny to the chylde bishop, and with them the maisters and surveyors of the scole."

This singular custom was, however, prohibited in the council of Sens, A. D. 1485; and, not so much for its superstition as its levity and absurdity, was abrogated in this country by king Henry VIII. in 1542, the words of whose proclamation may be seen in Mr. Warton's History of English Poetry, vol. iii. p. 322. But queen Mary, who with the catholic liturgy restored all the pageantries of popery to their ancient splendour, revived the mummery before us; and on Nov. 13, 1554, an edict was issued by the bishop of London to all the clergy of his diocese, to have a *boy-bishop* in procession.

We need hardly add, that on the accession of Elizabeth, this silly mockery was set aside; but Mr. Warton was inclined to think, that the practice of our plays being acted by the choir boys of St. Paul's church and the chapel royal, which continued till Cromwell's usurpation, might be deduced from the *mysteries and moralities* which attended the ridiculous festival of St. Nicholas. See the Northumberland Household Book, p. 440. Drake's Eboracum, p. 481. Warton's Hist. of Eng. Poetry, i. 248. ii. 375. 389. iii. 302, 303, 324. Processionale Eccl. Sarum, edit. Rothom. 1555. Dugdale's Hist. of St. Paul's, 205, 206. Antis Ord. Gart. ii. 309. Knight's Life of Dean Colet, p. 362. Hawkin's Hist. of Music, ii. 5. Strype's Eccles. Mem. iii. 202. ch. xxv. 205, 206. ch. xxvi. Dugd. Monast. iii. 169, 170. 279.

BISHOP, cardinal, a bishop in chief, or *in capite*. St Gregory sometimes uses the term for a proper bishop. Anciently there were also bishops, who by a peculiar privilege from the holy see, were ranked, and had a seat among the cardinals.

BISHOPS, cathedral, was also a title given to the proper bishops, by way of distinction from the *chorepiscopi*.

BISHOPS, commendatory, or bishops "in commendam," are cardinals not of the order of bishops, or other prelates, who yet hold bishoprics "in commendam." The appellation had its origin during the residence of the papal see at Avignon, whence scarce any cardinal, priest, or deacon, was created, who held not one, two, three, or more bishoprics in commendam. Du-Cange.

BISHOP designed, episcopus designatus, denoted a coadjutor of a bishop, who, in virtue of his office, is to succeed at the incumbent's death.

BISHOP- elect, is he who has the king's nomination, with the function of the chapter: but without consecration.

BISHOPS, exempt, those freed from the jurisdiction of the metropolitan, and immediately subject to the see of Rome alone.

BISHOP of the palace, episcopus palatii, was probably the same with bishop of the king's chapel, a title in the court of Bohemia. Du-Cange. Is was also a title given those bishops, who, by licence of the pope, dwelt in palaces of kings, to be in readiness for spiritual service and council in church matters.

BISHOP of the prime-see, denoted a "primate," otherwise denominated a "senior bishop." See PRIMATE.

BISHOP in partibus infidelium, he who is dignified with the title of a bishopric, whose district or diocese is in the possession of infidels or heretics. By the canon law, a bishop *in partibus* is qualified hereby to be a coadjutor of another bishop. The denomination took its rise from the expulsion of the bishops and clergy out of the Holy Land by the Saracens; when flying into Italy for shelter, coadjutories were given them for their subsistence.

BISHOPS, regionary. See REGIONARY.

BISHOPS, rural. See CHOREPISCOPI.

BISHOPS, suffragan, are coadjutors or assistants of diocesan bishops, authorised by commission from them.

BISHOPS, vague, those without any diocese, sometimes attendant in camps, or in foreign countries, for the conversion of infidels. The like vague bishops were sometimes also granted by popes to monasteries, exempt from the jurisdiction of the diocesan, where they performed all the episcopal functions. Du-Cange.

BISHOP, universal or catholic, is a title given to the patriarch of Armenia.

BISHOP of the catholic or universal church, a title sometimes assumed by the popes.

BISHOP of bishops, was a title anciently given to the prelates of some of the greater and more honourable sees, as Jerusalem and Rome. The first who had the title was James, bishop of Jerusalem. Some will have the appellation to have been common to all bishops.

BISHOPS, in the Lutheran Church, are those more usually called *superintendents*, which see.

The Calvinists allow of no other bishops besides presbyters; but the Lutherans make some distinction, and give a superiority or pre-eminence over the rest of their "bishops," "superintendents," or "overseers."

BISHOP is also a quality sometimes attributed to secular princes, in respect of their supremacy or jurisdiction in matters belonging to religion. See SUPREMACY. In this sense it is that the emperor Constantine, in a letter to the bishops in his dominions, calls himself "common bishop," as being in some respects general bishop of the whole Roman world.

BISHOP of the Jews, the head of that people in England, chosen by themselves, to whom they submitted to be judged and governed according to their law. Prideaux's Connect. part ii. lib. v. p. 478. This office, which subsisted under our Norman kings, and was licensed by them, answered to the *ÆCHMALOTARCHS* in Babylon, and the *ALABARCHS* in Egypt.

BISHOPS at chess, a kind of pieces, the third in rank, below queens, but above knights, distinguished by their cloven heads. In Latin writers of the middle age, the bishop is called *alphibus*; and by the French *le fou*, the *fool* or *madman*. See CHESS.

BISHOP'S Court. See COURT.

BISHOP'S see, or seat, originally denoted the throne or chair in the church where the bishop sat. It was also denominated *APsis*.

BISHOP'S see also denotes the city or place where the residence of the bishop is fixed.

Every bishop's see was anciently called "sedes apostolica;" though the appellation has since been restrained to the see of Rome.

Anciently bishops seem to have had a right in England to sit as judges in the hundred and county-courts. In after-times, they were forbid to sit in secular courts, and had separate courts erected for them; which proved an occasion of much dispute between the two jurisdictions. No church tenant might be sued in any court but the bishop's. There are also traces of a separate court of the bishops much earlier, among our Saxon ancestors in the eighth century. The regard borne to the character of bishops, made them the common arbitrators even of secular causes; they had the cognizance of all causes concerning lands in "frank-almoign;" and for ecclesiastics, were judges even in capital causes.

BISHOP'S weed, in Botany. See AMMI.

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BISHOP, Bird, in Ornithology. See TANAGRA EPISCOPUS.

BISHOP and his Clerks, in Geography, a cluster of dangerous rocks, near the west coast of South Wales, at the entrance of St. George's channel, four miles west of St. David's. N. lat. 51° 54'. W. long. 5° 20'.

BISHOP'S Auckland. See AUCKLAND.

BISHOP'S Castle, a market and borough town of Shropshire, in England, spreads its scattered houses over the side of a considerable eminence, at the base of which runs the small river Clun. This town is an old corporation, and made its first return to parliament in the 27th of Elizabeth. Previous to that period, it belonged to the see of Hereford, and derived its name from being one of the seats, or castled manor-houses of the bishops. The corporation consists of a bailiff, recorder and fifteen aldermen, who, with about thirty other inhabitants called burgeses, elect two members for the town. Here is a large weekly market on Fridays, which is much frequented by the Welsh, as are its six annual fairs. At some of the latter a great quantity of sheep and pigs are sold. This town was formerly under the protection of a castle, which is entirely destroyed. Bishop's castle is 156 miles N. W. from London. It contains 241 houses, and 1076 inhabitants.

At *Sned*, about two miles and a half N. W. from Bishop's castle, a priory of black canons was founded in the time of Henry III., but was soon afterwards removed to *Cherbury*. This place, seated near the Severn, is supposed to have been built by Ethelreda, and was afterwards possessed by the family of the Herberts, one of whom was created Lord Herbert of Cherbury. This gentleman wrote an account of his own life, which has been published by Horace Walpole at his private press at Strawberry hill. Not far from this town on the borders of Montgomeryshire, is an ancient encampment called *Bishop's Mound*; and at Clun are the remains of an ancient castle, near which is a camp called *Buryditches*. About three miles hence is *Walcot*, the seat of Lord Clive, who is patron of this borough. In the vicinity of Bishop's castle, are three lofty singular hills, respectively named Condon-hill, Church-Stoke-hill, and Squilfar-hill. At *Moor Park*, is a respectable ancient mansion; the grounds are finely diversified, and abound with fine woods.

BISHOP'S Island, a small rocky island in Mal-bay, on the west coast of the county of Clare, in Ireland. N. lat. 52° 38'. W. long. 9° 35'. Beaufort.

BISHOP'S Stortford, a market town of Hertfordshire, in England, is placed on the side of a hill, near the western borders of Essex. Seated in the midst of a corn country, it is remarkable for its number of malt-houses, and for the quantity of malt annually made here; this is distinguished by the name of brown malt, and is disposed of principally to the London brewers. It is conveyed to the metropolis in barges, by a navigable canal, which was cut in 1779, and which joins the river Lee, at about 14 miles distance from this town. Before this navigation was opened, the malt, which is now lodged here, was carried to Ware and Stansted, as the nearest places for water-carriage; but since the above period, Stortford has become the depot for the malt made in this town and the neighbouring villages.

This place was evidently of some note previous to the conquest, as it appears from the Domesday Survey, that the conqueror gave the town and castle to Maurice, bishop of London. From this evidence it appears, that the castle here, which bore the name of Waytemore, was standing prior to the Norman invasion, though some writers assert that it was erected by William. It was probably repaired and strengthened by him, but Mr. Salmon seems justified in

the opinion, that it was constructed by the East Saxons to defend their borders. The lands paying cattle-guard, lie between this place and the Ermine street, one of the great Anglo-Roman roads. The hill, or keep, on which the castle stood, is artificial, being evidently raised with earth brought from some distance. On the top was a well, and a breastwork of stone and mortar. A bank of earth runs from the summit across the moory ground to the north-east. "This castle," says Salmon, "must have been of some consequence in the time of king Stephen, because of the great desire Geoffroy de Magnaville had, either to be master of it, or to have it pulled down; and Maud the empress engaged him to do one or t'other." The security derived from this fortification gave origin to the town, which had increased to some consequence in the time of king John, who created it a borough, and invested the inhabitants with certain corporate privileges. This monarch seized the castle and town from W. de St. Maria, the bishop of London, who was one of the three bishops deputed to execute the pope's interdict upon England. This period was distinguished by the alarming jealousies and animosities between the king and the pope with his prelates; and as Salmon expresses it, "the castle at Stortford, stands yet a monument of king John's power and revenge, and the bishop's lands remain a monument of the pope's entire victory over him." In the time of Edward III. the town and castle, &c. again reverted to the bishop of London, in whose see it still continues, and who appoints a bailiff for this liberty, which includes the town and thirteen contiguous parishes. The bishop's prison was standing in Bishop Booner's time, but that and all the other old buildings have been since demolished.

The streets of the town are disposed in the form of a cross, with two long streets intersecting each other at right angles. Though no particular manufacture is carried on here, yet the town is respectable and populous; it contains 456 houses, and 2305 inhabitants. Here are a very considerable weekly market for grain, &c. on Thursdays, and three annual fairs, which are mostly appropriated to the sale of horses and cattle.

The church, dedicated to St. Michael, is a large lofty structure, and, like most buildings, dedicated to that saint, stands on the highest ground in the neighbourhood. There were anciently three guilds and a chantry endowed here; and in the choir are nine stalls on each side. The interior of this building is decorated with a number of monuments, some of which are ancient. The great tythes of the parish are in the hands of laymen. In the town are some meeting-houses for dissenters, methodists, and quakers, also some almshouses, and a school-house. The latter was built from a subscription among the gentlemen of Hertfordshire and Essex, who were infligated to this act by Dr. Thomas Tooke. This gentleman was zealously indefatigable in promoting and establishing the foundation which has proved beneficial to the town and highly honourable to its founder and patrons. The building stands on arches, beneath which is a space for market and shops. Dr. Tooke revived an annual school-feast here, and charged his own estate with an annual present to the preacher. He also gave a chalice of 20l. value to the church, and was a great benefactor to the school-library, which is a very good one, and was first established by the Rev. Thomas Leigh, who was vicar of the church in 1680, &c. Besides other donations to this library, it is customary for every gentleman to present a book at the time of leaving the school. Bishop's Stortford derives its compound name from being the property of the bishop of London at an early period, and from its situation on the banks of the river Stort, which separates it on the east from the hamlet

hamlet of Hockeill. At a short distance north of this town is Hadham parva, which is noted from being the burial place of the Capels, earls of Essex. Bishop's Stortford is 30 miles north of London. Salmon's History of Hertfordshire.

BISHOP'S *Waltham*, a small town of Hampshire, in England, derives a part of its name from having been a seat of the bishops of Winchester. Some of their palace still remains at a small distance west of the town, and the site now belongs to the sea. Leland describes it as "a right ample and goodly maner place, moted aboute, and a praty brooke running hard by it. It hath been of many bishops' building." The celebrated William of Wykeham, bishop of Winchester, resided here during the last three years of his life, and died in this mansion, A. D. 1404, in the 8th year of his age. The house was partly demolished in the civil wars of Charles I. when bishop Kyri was in possession. Bishop's Waltham is noted for its schools, both for gentlemen and ladies. It contains 191 houses, and 1773 inhabitants, and has three annual fairs.

About five miles south of the town is *Wickham*, a village rendered memorable from being the birth-place of the above-named bishop. See WYKEHAM.

BISHOPING, in *Horsemanship*, is a term probably derived from *Bishop*, the name of a horse-dealer, and denoting a trick of the dealers in horses for making them appear younger than they are, with a view of imposing upon the purchaser.

This is done by excavating the corner tooth of the incisors with a steel graver, or file, and afterwards blackening the cavity with a hot iron. This mark, or excavation, is deemed by many the criterion of age, and that the horse is young while this is preserved.

To avoid being imposed upon, the purchaser should consider the general figure, not only of the corner tooth, but of all the incisor teeth of the upper and lower jaw, for they all undergo a perpetual change of figure by age and wear.

An incisor tooth of the horse, at its first emerging from the jaw, has the visible part of it flat, and covered every where with enamel; the outside sharp and projecting higher than the inside, with a conical cavity in the middle, of various depth in different horses, which renders it of not much value in deciding upon the age; in some it is so short as to be obliterated by the sixth year; in others it is so long as to be found till nine or ten, or later; it is, therefore, not a certain criterion of age: the general figure of the tooth is more to be depended upon in our estimation. The lateral width of the recent tooth, and its flatness, are very remarkable, and can never be imitated; as this wears away the tooth daily increases in its transverse width, that is from front to back, and diminishes in its lateral width, forming, as the wear advances, nearly a triangle; these angles at length by age gradually disappear, and the tooth presents a rounder surface on its upper part, and at length the tooth becomes flattened on the sides, and actually wider from front to back than from side to side. For it should be recollected that the tooth is formed in its whole extent previous to its appearance externally, and that the jaw is absorbed, to allow of its wear; the enamel, like a shell, describing the figure and boundary of the tooth, which hollow shell is afterwards filled up with bone. A transverse section, therefore, of the tooth, or a series of them at different distances from its point, afford the exact figures of the surfaces of the teeth at the various periods of their wear, and allowing for contingencies which occasion the teeth to be worn with more or less rapidity, as in crib biters, &c. will afford the truest criterions of age, and render impolition in this way impracticable.

The teeth also they pretend, in some instances, to excavate on the inside, and to sharpen with a file: these bungling attempts, however, in no way resemble the natural markings or surface of the tooth, nor could impose upon any one the least experienced in observing the teeth. For what we consider the best indications of the age of horses, however, we refer the reader to the article *TEETH of Horses*.

BISHOPRIC, the jurisdiction of a bishop, or the district within which it is comprised, called also "diocese," which see.

There are twenty-four bishoprics, and two archbishoprics, in England and Wales. To the old ones subsisting before the times of the Reformation, Henry VIII., by letters patent added six more bishoprics; viz. those of Westminster, Chester, Gloucester, Peterborough, Bristol, and Oxford, stat. 34 and 35 Hen. VIII., cap. 17. These sees were all founded in the course of the years 1540, 1541 and 1542.

The see of Westminster, having never had but one bishop, was united to that of London, and its bishop translated to Norwich, by Edward VI., in 1550. The remaining bishoprics are comprehended under two provinces, those of Canterbury and York. The province of Canterbury includes the following bishoprics, viz. 1. The bishopric of London, containing Essex, Middlesex, and part of Hertford, and extending its jurisdiction to the West India Islands. 2. Winchester, comprehending Surry, Hampshire, and the isles of Wight, Jersey, Guernsey, and Alderney. 3. Litchfield and Coventry, to which belong Stafford, Derby, and part of Warwick and Shropshire. 4. Lincoln, comprehending Lincoln, Leicester, Huntingdon, Bedford, Buckingham, and part of Hertford. 5. Ely, containing Cambridgeshire. 6. Salisbury, to which belong Wilts and Berkshire. 7. Exeter, including Cornwall and Devon. 8. Bath and Wells, comprehending Somersetshire. 9. Chichester to which belongs Suffex. 10. Norwich containing Norfolk, Suffolk, and a small part of Cambridge. 11. Worcester, comprehending Worcester and part of Warwick. 12. Hereford, including Hereford and part of Shropshire. 13. Rochester, to which belongs part of Kent. 14. Oxford, including Oxfordshire. 15. Peterborough, containing Northampton and Rutland. 16. Gloucester, comprehending Gloucestershire. 17. Bristol, to which belongs the city of Bristol, part of Gloucestershire, and the county of Dorset. 18. Landaff, comprehending Glamorgan, Monmouth, Brecknock, and Radnor. 19. St. David's, including Pembroke, Cardigan, and Caermarthen. 20. St. Asaph, containing the greatest part of Flint, Denbigh, and Montgomery, and some part of Shropshire. 21. Bangor, to which belong the counties of Anglesey, Caernarvon, Merioneth, and part of Denbigh and Montgomery. The province of York, comprehends—22. Durham, containing Durham and Northumberland. 23. Carlisle, including great part of Cumberland and Westmoreland. 24. Chester, to which belong Cheshire, Lancashire, Richmondshire, which is part of York, together with part of Cumberland and Westmoreland. 25. Isle of Man. The value of these sees is not easily ascertained, as it is very different from that which is stated in the king's books. It is a certain fact, whatever may be the primary occasion of it, that the revenues of the bishoprics are very unequal in value, and that there is also a great inequality in the patronage appertaining to the different sees. Adverting to this circumstance, Dr. Watson, the present bishop of Landaff, addressed a "Letter to his Grace the Archbishop of Canterbury," printed in 1783, proposing a scheme for rendering the bishoprics more equal to each other, with respect to both income and patronage, by annexing part of the estates, and part of the preferments, of
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the richer bishoprics, as they became vacant to the poorer. The advantages, resulting from the accomplishment of this object, and recited by the learned prelate, are such as follow: The poorer bishops would thus be freed from the necessity of holding ecclesiastical preferments "in commendam" with their bishoprics; a practice, which bears hard upon the rights and expectations of the rest of the clergy; which is disagreeable to the bishops themselves; which exposes them to much, perhaps undeserved, obloquy; but which certainly had better not subsist in the church. The bishops would also thus acquire a greater independence in the house of lords; and the measure would contribute to reduce the influence of the crown in that house. This plan would likewise ensure a longer residence of the bishops in their respective dioceses, as temptations to translations would be thus removed, and prelates would of course become more attached to their particular situations, gain a more intimate acquaintance with their clergy, and serve, by their doctrine and example, to produce the best effect in the conduct both of clergy and laity. See AUGMENTATION.

In Ireland there are 18 bishoprics, and 4 archbishoprics. Under the archbishop of Armagh, the primates, are the bishops of Meath, Kilmore and Ardagh, Dromore, Clogher, Raphoe, Down and Connor, and Derry. Under the archbishop of Dublin are Kildare, Feins and Laughlin, and Ossory. Under the archbishop of Cashel are Waterford and Lismore, Limerick, Killaloe, Cork and Ross, and Cloyne. Under the archbishop of Tuam are Elphin, Cloyne, and Killala and Achonry. The primacy is estimated at 8000*l.* a year, Derry at 7000*l.*, and the other bishoprics from 4000*l.* to 2000*l.* The catholics have a hierarchy nearly similar; but the metropolitans and bishops are considered by the protestants as merely titular.

The ancient ecclesiastical establishment of Scotland comprised two archbishoprics, those of St. Andrew's and Glasgow, and eleven bishoprics (that of Edinburgh having been only established by Charles I.), which, in the order of antiquity, maybe thus enumerated; Galloway (St. Andrew's,) Dunkeld, Moray; five founded by David I., Brechin, Dunblane, Aberdeen, Ross (Glasgow); that of Argyle, or Lismore, was founded about the year 1200, because the bishops of Dunkeld did not speak the Irish tongue; the bishops of Orkney and of the western islands date from an earlier period, while their sees were not subject to the Scottish crown. But since the revolution in 1688, the ecclesiastical government of Scotland is of the Presbyterian form; and of course they have no bishoprics.

Bishoprics, as well as archbishoprics, may become void by death, deprivation, and resignation; but a bishop must resign to his metropolitan. See ARCHBISHOPRIC.

BISI, BONAVENTURA, in *Biography*, an eminent painter and engraver, and a monk, as some say, of the order of St. Francis, was born at Bologna, and became a disciple of Lucio Massari. His chief excellence consisted in copying in miniature, the pictures of Corregio, Guido, Titian, and other masters, which he finished with surprising beauty and elegance. Many of his works, which are highly valued, are in the duke's gallery at Modena. He also amused himself by etching some few plates from Parmegiano, Guido, &c. One, probably from his own design, was a "Holy family," with Elizabeth and St. John, dated 1631. He died in 1662; but his age is not known. Strutt and Pilkington.

BISIGNANO, in *Geography*, an inconsiderable town of Naples, in the province of Calabria citra, seated on a hill near the river Crati, surrounded by lofty mountains, and defended by a strong fortress. It gives the title of prince to the last remaining branch of the ancient house of San

Severino, and is a bishop's see, suffragan of Rossano; distant 16 miles W. S. W. from Rossano, and about 18 miles N. from Cosenza. N. lat. 39° 38'. W. long. 168° 22'.

BISK, or BISQUE, in *Cookery*, a rich sort of broth or soup, made of pigeons, chickens, force-meat, mutton-gravy, and other ingredients. The word is French, formed, as some think from *biscotta*; because the *bisque*, consisting of a diversity of ingredients, needs several repeated coctions to bring it to perfection. There is also a *demi-bisque*, made at a low expence, in which only half the ingredients are used; and a *bisque* of fish, made of carps, minced with their roes and lobsters.

BISKET, BISQUET, or BISCUIT, usually denotes a delicate kind of bread prepared by the confectioners, of fine flour, eggs, sugar, and rose or orange water; or of flour, eggs, and sugar, with anise-seeds and citron-peel; baked in the oven, in tin or paper moulds. The word comes from the Latin *bis*, twice, and the French *cuit*, coctus, q. d. baked. We find divers sorts of such biskets, as feed-bisket, fruit-bisket, long bisket, round-bisket, Naples bisket, sponge-bisket, &c.

BISKET, *sea*, is a sort of bread much dried, to make it keep for the service of the sea. It was formerly baked twice or oftener, and prepared six months before the embarkation. It will hold good a whole year. To preserve sea biskets from insects, Dr. Hales advises to make the fumes of burning brimstone pass through the casks full of bread. Bisket may be likewise preserved a long time, by keeping it in casks well calked, and lined with tin.

The ship-bisket is too hard for some teeth; and in this case, it may be softened by toasting. But rusk is better; for being made of good fermented bread, sliced, and baked a second time, the pieces imbibe the water easily, soften immediately, and digest more kindly, and are therefore more wholesome than the unfermented bisket. Rusk, says Dr. Franklin, is the true original bisket, so prepared to keep for sea, being twice baked, as its name imports. See Franklin's Maritime Observations, in Amer. Transf. vol. ii. p. 322.

The ancients had their bisket prepared after the like manner, and for the like use as the moderns. The Greeks called it *αριον βισπιζον*, q. d. "bread put twice to the fire." The Romans gave it the name of "panis nauticus," or "capta." Pliny denominates it "vetus aut nauticus panis tufus atque iterum coctus." By which it appears, that after the first baking, they ground or pounded it down again for a second. In some middle-age writers, it is called "paxinas," "paximus," and "panis paximatus."

Among the Romans, we also meet with a kind of land-bisket for the camp-service, called, "buccellatum," sometimes, "expeditionalis annona," which was baked much, both to make it lighter for carriage, and less liable to corrupt, the coction being continued till the bread was reduced one-fourth of its former weight.

The process of bisket baking for the British navy is as follows: and it is equally simple and ingenious. The meal, and every other article, being supplied with much certainty and simplicity, large lumps of dough, consisting merely of flour and water, are mixed up together; and as the quantity is so immense, as to preclude by any common process a possibility of kneading it, a man manages, or, as it is termed, rides a machine which is called a horse. This machine is a long roller, apparently about four or five inches in diameter, and about seven or eight feet in length. It has a play to a certain extension, by means of a staple in the wall, to which is inserted a kind of eye, making its action like the machine by which they cut chaff for horses. The lump of dough being placed exactly in the centre of a raised platform, the

man sits upon the end of the machine, and literally rides up and down throughout its whole circular direction, till the dough is equally indented; and this is repeated till it is sufficiently kneaded; at which times, by the different positions of the lines, large or small circles are described according as they are near to or distant from the wall, till you have fairly the idea of an immense pentagraph. The dough in this state is handed over to a second workman, who slices it with a prodigious knife; and it is then in a proper state for the use of those bakers who attend the oven. These are five in number; and their different departments are as well calculated for expedition and correctness, as the making of pins, or the working or printing of types. On each side of a large table, where the dough is laid, stands a workman; at a small table near the oven stands another; a fourth stands by the side of the oven, to receive the bread; and a fifth, to supply the peel. By this arrangement the oven is as regularly filled, and the whole exercise performed in as exact time as a military evolution. The man on the further side of the large table moulds the dough, having previously formed it into small pieces, till it has the appearance of muffins, although rather thinner, and which he does two together, with each hand; and as fast as he accomplishes this task, he delivers his work over to the man on the other side of the table, who stamps them with a docker on both sides with a mark, on which are cut the broad \blacktriangle , the letters PLY, and the number of the oven in which the biscuits are to be baked. As he rids himself of this work, he throws the biscuits on the smaller table next the oven, where stands the third workman, whose business is merely to separate the different pieces into two, and place them immediately under the hand of him who supplies the oven, whose work of throwing, or rather chucking, the bread upon the peel, must be so exact, that if he looked round for a single moment, it is impossible he should perform it correctly. The fifth receives the biscuit on the peel, and arranges it in the oven; in which duty he is so very expert, that though the different pieces are thrown at the rate of seventy in a minute, the peel is always disengaged in time to receive them separately. As the oven stands open during the whole time of filling it, the biscuits first thrown in would be first baked, were there not some counteraction to such an inconvenience. The remedy lies in the ingenuity of the man who forms the pieces of dough, and who, by imperceptible degrees, proportionably diminishes their size, till the loss of that time, which is taken up during the filling of the oven, has no more effect to the disadvantage of one of the biscuits than to another.

So much critical exactness and neat activity occur in the exercise of this labour, that it is difficult to decide whether the palm of excellence is due to the moulder, the marker, the splitter, the chucker, or the depositer; all of them, like the wheels of a machine, seeming to be actuated by the same principle. The business is to deposit in the oven seventy biscuits in a minute; and this is accomplished with the regularity of a clock; the clack of the peel, during its motion in the oven, operating like the pendulum.

The biscuits thus baked are kept in repositories, which receive warmth from being placed in drying lofts over the ovens, till they are sufficiently dry to be packed into bags, without danger of getting mouldy; and when in such a state, they are then packed into bags of a hundred weight each, and removed into storehouses for immediate use.

The number of bake-houses, belonging to the Victualling Office at Plymouth, are two; each of which contains four ovens, which are heated twenty times a day; and in

the course of that time bake a sufficient quantity of bread for 16,000 men. The granaries are large, and well constructed; when the wheat is ground, the flour is conveyed into the upper stories of the bake-houses, whence it descends through a trunk in each immediately into the hands of the workmen.

The bake-house, belonging to the Victualling Office at Deptford, consists of two divisions, and has twelve ovens; each of which bakes twenty shoots daily, Sundays excepted; the quantity of flour used for each shoot is two bushels, or 112 pounds, which baked produce 102 pounds of biscuit. Ten pounds are regularly allowed on each shoot for shrinkage, &c.

The allowance of biscuit in the navy is one pound for each man per day, so that one of the ovens at Deptford furnishes bread daily for 2040 men.

BISLÁN, in *Geography*, a town of Egypt on the Nile, 3 miles south of Damietta.

BISLEY, anciently called *Bisfele*, is a small market town, and a very extensive and populous parish of Gloucestershire, in England. The parish includes an area of 6000 acres, the surface of which is diversified with steep hills and narrow valleys. On the sides of the former are some inclosed arable lands, interspersed with copes; and the latter are mostly kept for meadow pasturage. Bisley, Chalford, and some neighbouring hamlets, are chiefly inhabited by persons engaged in the woollen manufactures; and many fulling and dressing mills are erected on the river which runs through this parish. A small weekly market is held here on Thursdays, and here are two considerable fairs yearly. The church is a large handsome building, and, being seated on a high hill, is conspicuous for many miles. Here is a small free school, and an endowment for clothing six widows yearly. The canal, which unites the Thames and Severn, passes through this parish; and near the verge of it, at Sapperton, enters a subterraneous tunnel, which is cut through the earth to an extent of two miles and five furlongs. This tunnel is lined with masonry, and arched over at top, with an inverted arch at the bottom, except at those places where the solid rock rendered it unnecessary. The expence of cutting it was about eight guineas per cubic yard; but the plan of uniting the waters of the two great British rivers induced the proprietors to encounter extraordinary expence and trouble. The connection of the rivers Thames and Severn, by means of this canal, and also with the internal parts of the kingdom, by the Oxford and Coventry canals, which lead to Birmingham, and also to the counties of Stafford, York, Chester, and even to Westmoreland, forms a line of communication with the capital of the greatest importance, and which has proved of great utility to the manufacturing towns through which it passes. On the 29th of April 1789, the acting engineer, Mr. Clowes, passed through the tunnel for the first time, in a vessel of 30 tons burthen; and the junction was completed, and a vessel passed from the Severn into the Thames, for the first time, on the 19th of November in the same year, in the presence of a large concourse of people, who came to witness and rejoice at the sight. In 1788, their majesties went from Cheltenham, on purpose to view this tunnel, which excited their surprise and admiration, more particularly when they learnt it had been conducted and completed by a private gentleman. The canal is 30 miles and 7 chains in length; in which course the water is raised 241 feet 3 inches, and made to fall 130 feet 6 inches. In the parish are 922 houses, and 4227 inhabitants. Rudge's History of the County of Gloucester. Phillips' History of Inland Navigation.

BISLINGUA, *double-tongue*, in *Botany*, a named used by many authors for the narrow-leaved *ruscus*, or *butcher's broom*;

broom; called by many others the Alexandrian bay, or *laurus Alexandria*.

BISMARCK, in *Geography*, a town of Germany, in the circle of Upper Saxony, and Old Mark of Brandenburg; 12 miles west of Stendal.

BISMEO, or BIXNEA, a town of Africa in the kingdom of Algiers, 25 miles west from Algiers.

BISMILLAH, in the *Mahometan Customs*, a solemn form, viz. in the name of the most merciful God, constantly placed at the beginning of their books and writings in general as a peculiar mark or distinguishing characteristic of their religion; it being counted an impiety to omit it.

The Jews, for the same purpose, make use of the form, "in the name of the Lord," or "in the name of the great God." Sale.

BISMILLAH is also used among the Arabs, as a word of invitation to eat. An Arab prince will frequently sit down to eat in the street before his own door, and call all that pass, even beggars, by this word, who do not fail to come and sit down to eat with him; for the Arabs are great levellers, and let every body on a footing with themselves. Pocock's *Egypt*, &c. p. 483.

BISMUTH, *Bismutum*, Wallerius; *Wismuth*, or *Bismuth*, Germ; *Bismuth*, Fr.; *Plumbum cinereum*, *Antimonium seminum*, tin-glass, of the older chemists.

Bismuth is a brittle metal, of a reddish white colour, and foliated fracture, is fusible at nearly the same temperature with lead, soluble with ease in nitric acid, and precipitable from it in the form of a white oxyd by the addition of pure water.

§ 1. Ores of Bismuth.

Sp. 1. Native Bismuth. Gediegen Wismuth.

The colour of this mineral is silver-white, with a slight tinge of red, frequently exhibiting an iridescent appearance on its surface. It occurs very rarely in mass, being generally disseminated, or inveiling; it is also met with feather-shaped, or reticular, or in lamellæ of a rectangular or triangular shape, either solitary, or heaped upon each other. It exhibits a metallic lustre of considerable brilliancy. Its fracture is perfectly foliated, or broad striated. It is semiductile, and breaks with some difficulty into irregular, somewhat blunt-edged fragments. Sp. grav. according to Kirwan = 9.57.

Native Bismuth is fusible at a very moderate temperature, often by the heat of a common candle; when exposed to the action of the blowpipe on charcoal, it volatilizes in the form of a white vapour, not infrequently accompanied with an arsenical smell. It dissolves very easily, and with effervescence, in cold nitric acid; and is precipitable in the form of a white powder, on the addition of pure water.

The only two substances, with which native bismuth is liable to be confounded, are the sulphuret of bismuth and dendritical silver; the former of these, however, is not soluble with effervescence in cold nitric acid; and the latter may be distinguished by its colour and ductility.

Bismuth is one of the most partially diffused metals hitherto known; and it is chiefly found native, accompanied with kufsernickel, white and grey cobalt, black blende, native silver, and rarely galena. Its gangue is quartz, calcareous spar, or barosclenite; and it has hitherto been found only in veins in primitive mountains.

It is found at Joachimsthal, in Bohemia; at Freyberg, Annaberg, &c. in Saxony; in Sweden, Transylvania, and Britany.

Sp. 2. Sulphuretted Bismuth. *Wismuth glanz*, Emmerling. *Bismuth sulphuré*, Haüy.

The colour of this substance is between lead-grey and tin-

white; but on the surface it is usually yellowish or iridescent. It is found either lamellar and in mass, or disseminated, or in small acicular crystals. Its primitive figure, according to Haüy, is that of a quadrangular prism. Its internal lustre is metallic and very brilliant; its fracture is broad or narrow striated, or foliated like galena. Sp. gr. according to Kirwan, = 6.131. It stains the fingers in a slight degree; and when reduced to powder, is of a glittering black.

When exposed to the blowpipe, it melts easily, giving out a sulphureous odour and a blue flame, and is almost entirely volatilized before it can be brought to the metallic state. There has been no very accurate analysis made of this ore; but from the experiments of Sage and La Peyrouse it appears to contain about 60 per cent. of bismuth, 36 of sulphur, and a little iron. There is some external resemblance between the lamellar variety of this mineral and galena; but the superior fusibility of the former is an easy and infallible characteristic.

Sulphuret of bismuth is very rare; and, where it occurs, is always accompanying native bismuth. It is found at Joachimsthal, in Bohemia; Altenberg and Johann-Georgenstadt, in Saxony; and at Bastnas, near Riddarhytta, in Sweden.

Sp. 3. Oxyd of Bismuth, *Bismuth ochre*, Kirw. *Wismuth-ocker*, Emmerling. *Bismuth oxydé*, Haüy.

This mineral is of a greenish yellow colour, passing into ash-grey, or straw-colour. It is sometimes found in mass, but more commonly disseminated or inveiling. It is opaque, and possesses a slight degree of internal lustre. Its fracture is fine-grained, uneven, or earthy. Sp. grav. considerable, but has not yet been accurately ascertained. It is either friable, or of the consistence of chalk, but occasionally gives fire with steel, on account of the particles of quartz with which it is mixed.

When exposed to the action of the blowpipe on charcoal, it is very easily reducible to the metallic state. It is soluble in nitric acid without effervescence, and precipitable for the most part by the addition of water.

Oxyd of bismuth is an extremely rare mineral. It has hitherto only been found at Schneeberg, in Saxony, accompanying native bismuth; in the Black Forest mines, in Swabia; and at Joachimsthal, in Bohemia. It is often confounded with the green earthy iron ore; but may be at once distinguished by its easy reduction before the blowpipe. Emmerling, vol. ii. p. 434, &c. Wiedenmann, p. 887. Brochant, v. 2. p. 434. Haüy, v. 4. p. 184. Kirwan, vol. ii. p. 263.

§ 2. Assay and Analysis of Bismuth Ores.

Sulphur and iron are the only substances that have been as yet detected in combination with this metal, as far as can be inferred from very imperfect analyses of the preceding ores. But Klaproth, in his examination of the bismuthic silver ore from Shappbach (*Analyt. Ess.* vol. i. p. 556.), found it to be a combination of lead, silver iron, copper, and sulphur, with bismuth; and from the experiments of this able chemist is deduced the following general method of analysing the ores of bismuth.

Having reduced the ore to a tolerably fine powder, pour upon it, in a capacious flask, five times its weight of nitric acid previously diluted with one third of water. The acid will begin to act immediately, without the assistance of heat; nitrous gas will be disengaged in great quantity; and the solution will assume a greenish yellow colour. When the acid has taken up as much as it can, or nearly so, pour it off, and digest the undissolved residue in a moderate heat, with equal parts of nitric acid and water, renewing the

menstruum from time to time, till all the soluble parts of the ore are taken up. Add together the solutions, and reduce them by gentle evaporation to about half their bulk (if any crystals are deposited, add a little pure warm water just sufficient to take them up again); then pour the whole into a large quantity of rain water, at least twenty times the bulk of the solution. The liquor will immediately assume a milky appearance, and, by standing a short time, will deposit a white heavy precipitate (*a*), which when carefully lixiviated, is *pure oxyd of bismuth*. Add all the liquors together, and concentrate them by evaporation to one half of their bulk; then drop in a strong solution of muriated ammonia, as long as any precipitate takes place; decant the supernatant fluid as accurately as possible, and, without washing the precipitate, digest it for some time with moderately strong nitric acid; the undissolved part of the precipitate being separated, washed, and dried, is *pure muriat of silver* (*b*). The nitrous solution is now to be diluted with a large quantity of cold water, and a precipitate of oxyd of bismuth (*c*) will be thrown down. The diluted nitrous solution being mixed with the other liquor, the whole must be evaporated, till a considerable number of crystals are deposited; at this time, the addition of sulphuric acid will occasion a white deposit of *sulphat of lead* (*d*). The remainder of the solution is now to be supersaturated with caustic liquid ammonia, by which the *iron* will be deposited in the state of brown oxyd, (*e*), and the copper will form with the ammonia a blue solution; this being saturated slightly to excess with sulphuric acid, will deposit the *copper* (*f*) upon a piece of clean iron. The residue of the ore that was undissolved by nitric acid, being weighed, and exposed to a low red heat, will give out its *sulphur* (*g*), the quantity of which may be estimated with considerable accuracy by the loss of weight. It is now finally to be digested with ten times its weight of boiling muriatic acid, by which some oxyd of lead will be taken up; and this, by evaporation and the addition of sulphuric acid, may be procured in the state of sulphated lead (*h*). The residue being washed and dried is the stony gangue of the ore (*i*).

Hence the ore will be decomposed into

- Oxyd of bismuth (*a*) and (*c*),
- Muriated silver (*b*),
- Sulphated lead (*d*) and (*h*),
- Oxyd of iron (*e*),
- Metallic copper (*f*),
- Sulphur (*g*),
- Stony matrix (*i*).

§ 3. *Reduction of Bismuth Ores.*

The separation of this metal from the substances with which it is found united in the mine, and the reduction of it to a marketable state, is perhaps the easiest of all the metallurgical processes, on account of the ready fusibility of bismuth, and its being found for the most part in the metallic state. The following were the methods practised in the time of Agricola (*De Re Metallica*, p. 349.) A round pit, two or three feet wide, was lined with well rammed clay and charcoal, and covered with billet wood, upon which were laid alternate strata of ore and wood. When the pile was thus built to a sufficient height, fire was applied to the top, and the bismuth, as the heat penetrated through the mass, became melted, and trickled down into the hole beneath, where it collected in an irregular mass; being then withdrawn, and broken into pieces, it was remelted in iron or earthen pots, separated from the impurities that floated on its surface, and finally cast into flat cakes, or loaves, for sale. Another method was to divide a large pine tree longitudinally, and cut out the central part of the wood, thus

forming it into a gutter; this being placed somewhat inclined, the ore was laid in the upper end, on a bed of chips and small wood, sufficient, when set on fire, to liquify the bismuth, which flowing down, was collected in a hole or vessel placed at the end of the trough.

The scarcity of wood, has, however, put an end to these rude and extravagant methods; and the ores of bismuth are now reduced in a common reverberatory furnace, the bed of which is lined with charcoal, whence the melted metal is removed in iron ladles, and cast into masses weighing twenty or thirty pounds, in which state it is brought to market.

§ 4. *External Characters and Physical Properties.*

Bismuth is a white metal with a reddish yellow tinge; is considerably hard, but brittle, exhibiting a broad foliated fracture; has a bright, almost specular metallic lustre; and is somewhat sonorous, when struck. Though brittle, it may be compressed very considerably by judicious hammering, and therefore varies greatly in its specific gravity. According to Muschenbroeck, its sp. gr. when fresh melted, is = 8.716; but when laminated, is = 9.638. Bergman fixes its gravity at 9.67; and other authors make it as high as 9.8, or even 10. The laminæ, of which this metal is composed, have but little adhesion to each other; hence the primitive form of its crystals, which is that of a regular octahedron, may very easily be ascertained by dissection. It is fusible at 460° Fahr., and may be poured into a paper cone without burning it. If, after it has begun to solidify, the fluid part is poured off, a groupe of crystals is obtained in tubes, or rectangular volutes. When exposed in close vessels to a violent heat, it sublimes and attaches itself to the cooler part of the apparatus in the form of brilliant plates.

§ 5. *Oxyds of Bismuth.*

The combined action of air and moisture upon bismuth, at the usual temperature, is very slight; it becomes covered with a reddish grey superficial tarnish, and afterwards appears to undergo no further change. At a melting heat, it shortly becomes covered with an iridescent film, and by exposing fresh substances to the air, is wholly converted into a yellowish brown oxyd, weighing about $\frac{1}{12}$ more than the original metal. This oxyd melts into a yellow glass at a moderate red heat, and soon penetrates through the most compact earthen crucibles, though not quite so easily as glass of lead does. When bismuth is exposed to a strong heat, with free access of air, it burns with a faint blue flame, and throws up at the same time a copious white oxyd, which was formerly called *flowers of bismuth*; towards the end of the process the oxyd acquires somewhat of a yellowish tinge, probably on account of a small portion of sulphur, or other impurities. The glass, or vitreous oxyd of bismuth, is a very active flux for earths and the more difficultly fusible oxyds; on account, however, of the superior cheapness and efficacy of lead, it is seldom used for this purpose.

§ 6. *Action of Acids on Bismuth.*

1. Concentrated sulphuric acid has no action on bismuth, except when boiling hot; in this state, it is rapidly decomposed, giving out sulphureous acid gas, and reducing the metal to a white pulverulent oxyd; by a low red heat the decomposition is so complete, that a quantity of actual sulphur is volatilized. The white mass being washed with a little warm water, parts with nearly the whole of its acid, holding a small portion of bismuth in solution: this fluid by careful evaporation, deposits minute soft crystalline needles of sulphat of bismuth, from which, by the mere affusion of water, the metal may be separated in the form of white oxyd. The sulphated oxyd, produced in the first

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part of the process, is remarkably more difficult of reduction than any of the pure oxyds of § 5.

2. Sulphureous acid is incapable of attacking metallic bismuth, but readily combines with its oxyd, forming a white insoluble sulphite of a sulphureous flavour, reducible into metallic globules before the blowpipe, decomposable with effervescence by sulphuric acid, and when distilled, giving out its acid, a mass of pure white oxyd remaining behind.

3. Nitric acid acts upon bismuth in a remarkably violent manner. If the metal is in powder, and the acid somewhat concentrated, at the instant of their mixture, even without the assistance of heat, a rapid decomposition of the acid takes place, accompanied with the production of nitrous gas, azot, and sometimes of ammonia; and the bismuth is converted into a white oxyd. If the acid is previously diluted with an equal weight of water, and the bismuth is added gradually in small pieces, the decomposition goes on more quietly, the metal is dissolved in proportion as it oxydates, and the acid may be made to take up nearly half its weight of bismuth. By cautiously adding to this solution an equal bulk of distilled water (each portion being well mixed with the whole mass by stirring, before the addition of a succeeding portion), a black pulverulent precipitate takes place, which has not yet been analysed, but has been taken for sulphur or charcoal. If the acid made use of is still more dilute, consisting, for example, of four parts of water, and one of nitric acid, the black matter is not dissolved. Nitrat of bismuth, when thus purified, is clear and colourless, and by gentle evaporation crystallizes in the form of flattened rhomboids, or compressed tetrahedral prisms terminated by three sided pyramids. This salt, when exposed to a dry air, is considerably efflorescent; but in a humid air, becomes covered with a white, somewhat moist coating of oxyd. When thrown on hot coals, it detonates feebly, giving out faint red sparks, and leaves behind a greenish yellow oxyd of difficult reduction. If a crystal of nitrated bismuth is thrown into some pure water, it immediately becomes covered with a white opaque oxyd; but the decomposition of this salt is more striking, if a solution of it is made use of. For this purpose, let a jar be nearly filled with clear rain water, and drop into it nitrat of bismuth as long as any precipitation takes place, then mix the whole by agitation, and let it stand for an hour to settle. The bottom of the vessel will now be covered with a fine heavy powder of a dazzling white, which, when repeatedly washed and dried, is pure oxyd of bismuth, formerly called *magistery of bismuth*, and well known as a cosmetic under the name of *blanc de sard*. This preparation, if made with pure nitric acid, and well washed, is of a dead white; but if a little muriatic acid is mixed with the nitric, and the precipitate is washed with a *small* portion of cold water, it will be in the form of minute glittering scales with a beautiful pearly lustre, and is then called by the French *blanc de perles*. In both states it is extensively employed, particularly by the French ladies for whitening the skin, but is subject to turn grey, brown, and even black, by any hydrogenous and sulphureous vapours. This oxyd of bismuth does not appear to retain any nitric acid; and its component parts are fixed by Bergman at 77 of metal, and 23 of oxygen; but, by the more accurate experiments of Klaproth, its contents are ascertained to be 81 of metal to 19 of oxygen. Nitrated bismuth is not, however, totally decomposable by water; for the clear fluid, that is separated by filtration from the oxyd, may still be made to yield a precipitate by a carbonated alkali, muriatic acid, or muriated ammonia. Klaproth found (*Analyt. Ess.* vol. i. p. 557), that 100 grains of bis-

moth, dissolved in nitric acid, yielded with water 88 grains of oxyd, and 35 more were obtained from the diluted solution, by the action of muriatic acid added in drops as long as any precipitate ensued. This oxyd is very easily reduced by fusion in a covered crucible, with a little nitre and tartar.

4. Bismuth in the metallic state is acted upon with difficulty by muriatic acid, even when it is concentrated and assisted by heat. During the digestion, a small quantity of fetid hydrogen gas is given out; and, by slow evaporation, small deliquescent needle-shaped crystals are deposited of muriat of bismuth. This salt, however, may be obtained in much greater quantity, and more easily, by substituting the oxyd of bismuth for the pure metal. If the saline mass, which remains behind after evaporation to dryness, is distilled in a glass retort, nearly the whole of it comes over at a moderate heat, and concretes into a soft white mass, called formerly *butter of bismuth*. Butter of bismuth, like butter of antimony, is intensely caustic to the taste, deliquesces in a moist air, and when dropped into water, is decomposed, a fine white oxyd being precipitated.

5. Liquid oxy-muriatic acid acts upon metallic bismuth with considerably more energy than muriatic acid does: the metal is oxydated without the disengagement of hydrogen, and the result is muriat of bismuth. It is probable, that by substituting the oxyd of bismuth for the pure metal, oxymuriat of bismuth might be produced: this, however, is not as yet confirmed by experiment. If bismuth, previously reduced to fine powder, is poured into oxymuriatic acid gas, the metal is instantly ignited and oxydated, and falls in a shower of fire to the bottom of the vessel.

6. Tincture of galls, or gallic acid, precipitates bismuth of a greenish colour from its solution, as prussiated potash does of a yellowish colour.

7. There is scarcely any thing known concerning the other bismuthic salts. They are formed by digesting the yellow oxyd in the various acids that have not been already mentioned, and are for the most part but little soluble in water. The proportions of their ingredients have not been ascertained with any accuracy, nor are they applied to any use.

§ 7. Action of the Alkalies and Earths on Bismuth.

The fixed alkalies have no effect on metallic bismuth, but unite both in the humid and dry way with its oxyd. Ammonia is said to acquire a greenish yellow colour by digestion with the metal when pulverized, and certainly dissolves its oxyd in considerable proportion. The action of the earths upon bismuth is unknown, except that silic and oxyd of bismuth combine by fusion into a clear greenish yellow glass.

§ 8. Action of the Neutral Salts on Bismuth.

None of the neutral salts in solution appear to exert any affinity on bismuth or its oxyds; but, in a dry heat, many of them are decomposed by it.

Nitre, being mixed with pulverized bismuth, and projected into a red hot crucible, is decomposed with a slight detonation; the bismuth becomes oxydated, and then unites in part with the alkaline base of the nitre.

Muriat of soda, according to Pott, is in some degree decomposable by metallic bismuth. This fact, however, is not confirmed by later chemists; and it is probable, that the salt, which Pott made use of, was not free from muriated magnesia, and that the bismuth was partly oxydated.

Muriated ammonia is totally decomposable by oxyd of bismuth. On the first impression of the fire, very pure ammoniaical gas is disengaged; and by a low red heat, the muriated bismuth rises in the form of a thick white vapour, which concretes, in the receiver and neck of the retort, into *butter of bismuth*; if the oxyd of bismuth is in very small proportion.

proportion to the muriat of ammonia, the greater part of this salt rises entire, but mixed with a little muriat of bismuth, forming the *bismuthic flowers of sal-ammoniac* of the old chemists. When these flowers are thrown into water, the bismuth is deposited in the form of a white oxyd.

Oxymuriat of potash mingled with powdered bismuth, and projected into a hot crucible, is decomposed with great violence, and the metal is completely oxydated. A mixture of three parts of this salt, and one of bismuth, produces a flash and a loud detonation, if laid on an anvil and struck smartly with a hammer.

§ 9. *Bismuth with combustible Bodies.*

If one part of sulphur, and four of bismuth, are triturated together, and afterwards exposed to a full red heat in a covered crucible, a brilliant striated metallic mass of sulphuret of bismuth is obtained, similar in its properties to the native sulphuret mentioned in § 1. It may be made to crystallize, by allowing it to cool very gradually, and pouring off the fluid part as soon as the surface is crufted over. The cavity thus formed will be found to be lined with long tetrahedral prisms crossing each other, and occasionally of a deep iridescent blue and red colour, forming groupes of exquisite beauty. The sulphuret of bismuth is much less fusible than the pure metal; it parts with nearly the whole of its sulphur by long roasting, and is decomposable by nitric acid, which dissolves the bismuth without touching the sulphur.

Sulphuretted hydrogen converts the white oxyd of bismuth into a black mass, of which neither the properties nor proportions have been ascertained.

Phosphorus has very little affinity for this metal. Pelletier tried in vain by several methods to prepare phosphuret of bismuth. In some of his experiments, the metallic globule, when red hot, gave out a faint lambent flame, but exhibited no other proof of combination with phosphorus. Fat oils, by the assistance of heat, dissolve the oxyd of bismuth, and form with it a thick tenacious plaister.

§ 10. *Alloys of Bismuth.*

Bismuth appears to increase remarkably the fusibility of all the metallic compounds into which it enters; but it is to be lamented, that we are greatly in want of accurate experiments on this interesting branch of inquiry.

1. *Bismuth and Gold.* See GOLD.
2. *Bismuth and Silver.* See SILVER.
3. *Bismuth and Iron.* See IRON.
4. *Bismuth and Copper.* See COPPER.
5. *Bismuth and lead.* Equal parts of these two metals unite easily by simple fusion, forming an alloy of a brilliant white colour, considerably harder than lead, and, though not ductile, more malleable than pure bismuth. By diminishing the proportion of bismuth, the malleability of the mass is increased, without sensibly impairing its fusibility, hardness, and lustre.

6. *Bismuth and tin.* A small quantity of bismuth increases the hardness and brilliancy of tin, without rendering it less ductile; hence the best foils for glass mirrors are made of this alloy, as also are some kinds of pewter.

Bismuth with lead and tin. Fusible metal. Plumbers' solder. The fusibility of the alloys of bismuth is in no instance so remarkable as in that discovered by Newton, and thence commonly called Newton's fusible metal. It is made by melting together eight parts of bismuth, five of lead, and three of tin. The mass is very brittle, and when broken exhibits a porcellaneous appearance, with little or no lustre; it is so fusible as to become liquid when held on a piece of stiff paper over a candle, without scorching the paper; and becomes as fluid as quicksilver in boiling water. If the bis-

mut is reduced to one part, the proportions of lead and tin remaining the same, the alloy is plumbers' solder; and it differs from the preceding in being somewhat less fusible and considerably malleable.

7. *Bismuth and Mercury.* See MERCURY.

8. *Bismuth and Iron.* See IRON.

§ 11. *Medical Use of Bismuth.*

The magistery, or white oxyd, is the only form of bismuth which is employed medicinally. It is prescribed with success in spasmodic affections of the stomach. *Gen. System. Handbuch*, v. iii. p. 292. Leonhardi's *Macquer. art. Wisnuth.* Fourcroy *Syst. des Connaiss. Chimiques*, vol. v. *Beaumé Chem. expérimentale*, vol. ii.

BISNAGUR, in *Geography*, an ancient kingdom of Hindoostan, called Narfinga, from the name of one of its rajahs, or sovereigns, was formerly the most extensive, powerful, and rich monarchy in the Indies, and comprehended almost all the countries in the peninsula south of the 16th parallel, or the whole of the Carnatic and some other kingdoms. Some have distinguished between the kingdoms of Bifnagur and Narfinga, but it is not easy to determine, whether they were two successive, or two co-existing kingdoms. It appears, probable, however, that in the 16th century Bifnagur included the greatest part of the peninsula. The inhabitants of this ancient empire, which is said to have continued 800 years, were Pagans, and denominated Badagus; and spoke the Tamul, or Damul language, which is the same with the Malabaric; but the Badagan was used at court. According to the Portuguese writers, the kingdom of Charuataka had no sovereign prince till the year 1200, and the first was Boka, a shepherd, who styled himself rau or rajah, that is emperor; which title has descended to his successors. Boka, it is said, in memory of a victory which he obtained over the king of Delhi, built the famous city of Visfanagur, corruptly called Bifnagur. The crown continued in his line till it was usurped by Narfinga, from whom this kingdom took its name, as it did that of Bifnagur from the city. The king of Bifnagur was a powerful prince about the year 1520; and about the year 1565 the capital was resorted to by merchants from all parts, as being the greatest, if not the only mart for diamonds in the east; and its riches were equal to its extent. At this time it was invaded by the king of Visapour, and other northern princes of the Deccan; and in 1567 the rajah, or king, retired, with his court, first to Penuconda, and at a subsequent period, or about 1597, its existing sovereign removed to Kandegheri, or Chandegheri, an inland city, strong by nature and fortified by art, so as to be deemed impregnable. About the middle of the 17th century, this large monarchy was again invaded and utterly destroyed, by Adel Shah, king of Visapour, who formed a league with the king of Golconda for this purpose. The unfortunate rajah fled into the mountains, where he remained in 1667. About 20 years after, the kingdom of Bifnagur fell under the power of the Moguls, by the conquest which Aurungzebe made of the kingdoms of Visapour and Golconda.

BISNAGUR, rather BIFNAGUR, sometimes written BEEJANUGGUR, the capital of the above kingdom, is situated on the south bank of the Toombuddra river, and according to M. Buffin's map, distant about 30 miles S. E. or S. S. E. from Bancapour. Ferishta says, that it was founded by Belaldeo, king of the Carnatic in 1344, and was then placed in order to guard the northern frontier of his empire. See the preceding article. This city was visited by Cæsar Frederick in 1565, and was then a very large city; its circuit, as he says, being 24 miles, and containing within it a number of hills and pagodas. He reckons it 8 days' journey,

journey, or about 140 geographical miles, from Goa. Its ruins are extensive, several rugged hills and rocks being covered with temples that still appear beautiful; the circumference seems to be about eight miles. N. lat. $15^{\circ} 15'$. E. long. $76^{\circ} 34'$. Bejanuggur lies directly opposite to Annagoandy, seated about 2 miles from the north bank of the river Toombuddra, which is at present the principal town of a small district of the same name; one being the Jaghira, or estate, the other the place of residence of the descendant of the ancient kings of Bejanuggur, who, about 2 $\frac{3}{4}$ centuries ago, ruled the greatest part, if not the whole, of the peninsula, under the title of the empire, or kingdom of Canhara. Lieutenant Emmitt, an English officer, who examined the ruins of Bejanuggur, traced between immense piles of rocks, crowned with pagodas, several streets from 30 to 45 yards wide, some of which now produce fine rice. One street extends about N. E. and S. W. half a mile, and is about 35 yards broad, having colonnades of stone on each side, and a very large pagoda at the S. W. end, in perfect repair. On the west side of the street is a large mango grove, which is bounded by the Toombuddra. Many streams flow through these veins, which have been formerly employed to fill a great number of canals. Comlapour fort is distant about half a mile, and surrounded with hills through which the road winds in ascents and descents, paved with large stones.

BISNEE, a town of Asia, in the country of Bootan, 116 miles S. E. of Tassafudon, and 188 N. E. of Moorshedabad.

BISNOW, or ΒΙΣΗΝΟΥ, a sect among the Indian banians, or cast of merchants. The banian sect consists of two lesser ones; that of *bisnow*, and that of *samarath*. The followers of the former hold one God, whom they call *ram-ram*, and allow of no lieutenants, or deputy-gods, as is done by those of the sect *samarath*; but they allow their god a wife, and have idols, which they dress up with gold chains, and collars of pearl and precious stones, and pay them worship, by singing hymns in their temples, and dancing before them to the sound of flageolets and kettle-drums.

In this sect, the wives do not burn themselves after their husbands' death, as is practised by those of the *samarath* sect; but content themselves with a perpetual widowhood.

BISOMUM, ΔΙΣΟΜΟΝ, compounded of *bis*, twice, and the Greek σῶμα, *body*, or *ashes of a body*, in *Antiquity*, a tomb for two bodies, or the ashes of two. The ancients frequently buried two, three, or four bodies in the same sepulchre, disposed a-side of each other; for it was held an impiety to lay one a-top of another. Hence the sepulchres of the primitive Christians had the words *bisomi*, *trisomi*, *quadrifomi*, &c. inscribed on them, to indicate the number of bodies deposited in them. Du-Cange.

BISON, in *Entomology*, a species of SCARABÆUS, with the anterior part of the thorax pointed; and two lunated horns on the head. Inhabits Spain, and the southern parts of France. Colour black. The female has on the anterior margin of the thorax an elevated or carinated edge.

BISON, in *Zoology*. See BOS FERUS, or *Wild-ox*.

BISPINOSA, in *Entomology*, a species of MANTIS, with a roundish thorax, bidentated in front; wing-cases very short, and bordered with yellow. Fabricius.

BISPINOSA, a species of CICADA (*Mannifera*, *Tettigonia*,) It is of a large size, and inhabits the island of Sumatra. The colour is brown, with a single spine on each side of the thorax; wings dusky, with a streak of black spots. Fabricius Mantif.

BISPINOSUS, a species of CERAMBYX (*Stenocorus*) that inhabits South America. Thorax unarmed, and slightly tuberculated; wing-cases bidentated; joints of the antennæ armed with two spines; and the body testaceous. Fabricius.

BISPINOSUS, a species of CARABUS that inhabits Europe. This is of a black colour; posterior part of the thorax truncated; anterior flanks with two spines. Linnaeus. Mus.

BISPINOSUS, a species of TABANUS, found about Goettingen, and described by Fabricius. The colour is brown; abdomen ferruginous, and black at the base, with two spines on the scutellum.

BISQUET. See BISKET.

BISSA, in *Geography*, a town of Servia on the Danube, 16 miles S. S. E. of Orlova.

BISSACRAMENTALES, in *Ecclesiastical History*, a denomination given by some Romish writers to Protestants, on account of their only holding two sacraments, viz. baptism and the supper.

BISSAG, in *Geography*, a town of Croatia, 16 miles N. E. of Agram.

BISSAGOS, the name of a cluster of islands and shoals, lying off the west coast of Africa, between the mouths of the rivers Rio Grande and Cacheo, and between about $10^{\circ} 30'$ and $11^{\circ} 30'$ N. lat. and $15^{\circ} 10'$ and 17° W. long. The principal of these islands, and that which lies nearest the coast is Boolam, or Bulam, which see. Each of the inhabited islands is governed by a chief, who assumes the title and power of a king. All these petty monarchs are independent, and frequently at war with each other, which they carry on by means of canoes, capable of containing from 25 to 40 men, with their provisions, and also their arms, which are sabres, and bows and arrows. The negroes of these islands are tall, strong, and healthy, though they live only on fish, nuts, and palm-oil; chusing rather to sell the rice, millet, and other produce of the earth to the Europeans, than to restrain their passion for trinkets and ornaments. They are idolaters, and are said to be savage in their disposition, not only to strangers, but to one another, when they happen to quarrel, which is frequently the case; and if they are disappointed in gratifying their revenge, they will drown, or ferociously stab themselves.

BISSAO, an island on the west coast of Africa, separated from the continent by a channel, which connects two bays of the sea, within the Bissagos islands, between $11^{\circ} 15'$ and $11^{\circ} 39'$ N. lat. and $15^{\circ} 11'$ and $16^{\circ} 30'$ W. long. Both the Portuguese and French began to trade at an early period with this island; the former have a fort upon it, and the latter a factory. The Dutch have in vain attempted to obtain a settlement. The island is 35 or 40 miles in circumference, and rises from the sea, of which it has an agreeable prospect, by an easy ascent to an eminence in the centre of the island. Its surface is hilly, and the hills are separated by beautiful and fertile vales, which are watered by small rivulets. The whole, a few groves of palm-trees excepted, is in a state of cultivation, and produces, besides oranges, mangoes, and bananas, and other fruits afforded by the warm climates, wheat and maize, which grow luxuriantly, and resemble, by the size to which the items rise, reeds or lamboos. Their cattle are likewise of an extraordinary size; and are amply supplied with both milk and wine. The importation of swine is prohibited, and the soil does not suit the rearing of horses. The inhabitants, who are in a state of almost perpetual contest with those of the neighbouring islands and continent, live in cottages dispersed over the island, which bears no trace of a town, except where the

French

French and Portuguese have established themselves. The dress of the married women consists of a cotton girdle, and bracelets of glass, coral, and copper; but the virgins are altogether naked; and those of high quality mark their bodies with hideous figures of snakes and other reptiles. The princess of the island is only distinguished from other females by the elegance of these paintings, and the richness of her bracelets. The dress of the men of all ranks is merely a skin fixed before and behind to their girdle. One singular ornament is a large iron ring, upon which they ring changes with a piece of iron, so as to converse as freely with their castanets as if they used the most polished language. This artificial language is used only by persons of rank and fashion. All the Bissans are idolaters, but their system of religion is very confused and unintelligible. Besides their chief idol, called "China," every one creates a divinity according to his own fancy; trees are held sacred by them, and, if they do not adore them as gods, they worship them as the residence of some divinity. Their government is despotic, the will of the emperor being the law to his people; at his death all his women and slaves are sacrificed and buried near their master, in order to attend him in the other world. Although they are at almost perpetual war with some of their neighbours, they have among themselves no civil discord. Before the emperor resolves to invade any adjacent territories, he orders the "bonibalon" to be sounded, which is the general signal to arms, on which all persons in the pay of government assemble at a fixed place, and embark on board their canoes, each of which carries about thirty men, and the whole fleet consists of about 30 canoes. Before the fleet sails, they offer sacrifices in great number to their gods, which are made of wood, and the favourable answer of the priests, when they consult these deities, ensures their success. When they attack any towns or villages, they carry off the inhabitants, and every article of value, and divide the booty between the emperor and those that have been engaged. The slaves are sold to the Europeans, except such as are of quality or fortune, who are restored to their friends on condition of their sending a number of slaves in their room. The emperor is said to allow free commercial intercourse with all strangers. The Portuguese demolished their fort on the island in 1703. See BALONTES, BISSAGOS, and BULAM.

BISSECTION, in *Geometry*, the division of any quantity into two equal parts, otherwise called *bipartition*, which see. See also **DIVISION**, &c.

BISENDORF, in *Geography*, a town of Germany, in the circle of Westphalia, and bishopric of Osnabruck, 5 miles S. E. of Osnabruck.

BISENPOUR, a small district of Bengal in the East Indies, which is governed by a Bramin family of the tribe of Rajpoots, and which has uniformly preserved its independence. In this district, it is said, the purity and equity of the political system of the Indians are found unadulterated. By the singular situation of this country, its inhabitants have been enabled to maintain their primitive happiness, and the gentleness of their character; and they have been secured from the danger of being conquered, or of imbruing their hands in the blood of their fellow-creatures. Nature has surrounded them with water, and they only need to open the sluices of their rivers in order to inundate the whole country. The armies that have been sent to subdue them have been so frequently drowned, that the plan of enslaving them has been laid aside; and the projectors have thought proper to content themselves with an appearance of submission. In Bissenpour, liberty and property are sacred; robbery is unknown; and every stranger, who enters this ter-

ritory is under the protection of the laws, which provide for his security. The guides, to whose conduct he is committed, become responsible for his person and effects; whilst he remains, he is maintained and conveyed with his merchandise at the expence of the state, unless he expresses his desire to stay longer than three days in the same place; and should this be the case, he is obliged to live at his own charge. In this state it is said, probity and honesty are so prevalent, that if any one find a purse, or any other article of value, he hangs it upon the first tree he finds, and informs the nearest guard, who gives notice of it to the public by beat of drum. Out of about 330,000l. annually received at an average by the government, without injury to agriculture or trade, what is not wanted to defray the unavoidable expences of the state, is laid out in improvements. The rajah is enabled to engage in these liberal employments, as he pays the Moguls only such tribute, and at such times, as he thinks proper. Raynal's Hist. Sett. East and West Ind. vol. i. p. 415.

BISENPRAGG, a town of Asia in the country of Siringagur, situated near the base of a mountain, on which stands the famous temple of Buddreenaar. It is a place of some importance, as being the residence of the pundits and principal Hindoos of Buddreenaar. Here they hold their durbahs, exercise their laws and the duties of their religion, in the greatest state of security from foreign intruders, and can at any time seclude themselves from the rest of the world, by a removal of the "joalabs," or rope bridges, which form the communication across the Aluknundra. This river receives at Bissenpraag another river, proceeding from the eastward as large as itself, called "Dood Ganga," or the Milk river, and also "Dhoulee." Near its junction with the Aluknundra, it runs between two villages, called "Gurra" and "Nitty." The town consists of about 800 houses, and is a place of some trade; the inhabitants are all Hindoos. Asiatick. Ref. vol. vi. p. 346.

BISSET, CHARLES, in *Biography*, studied medicine several years at Edinburgh, as he informs us in his Essay on the Medical Constitution of Great Britain, published in 1762, and was then promoted to be second surgeon to the hospital in Jamaica, where he continued from 1740 to 1745, when he returned to England, and purchasing a commission in the army, he served as lieutenant and engineer in Flanders until the peace in 1748. He now resumed the practice of surgery, and settled at Skelton in Cleveland, Yorkshire, and soon after published "A Treatise on the Scurvy," 1755, 8vo. He had before, viz. in 1751, published "An Essay on the Theory and Construction of Fortifications." In 1765 he obtained a diploma from the university of St. Andrew's, constituting him doctor in medicine. He died at Knayton near Thirsk, in May 1791, in the 75th year of his age. New Gen. Biog. Dict.

BISSEXTIALIS, or **BISSEXTIALIS ulla**, an ancient measure or vessel, containing twelve ounces, or two **SEX-TARIES**.

BISSEXTILE, or **LEAP-YEAR**, in *Chronology*, a year consisting of 366 days, happening once each four years, by reason of the addition of a day in the month of February, to recover the six hours which the sun spends in his course each year, beyond the 365 days ordinarily allowed for it.

The day thus added, is also called *bissextile*; Cæsar having appointed it to be introduced by reckoning the 24th of February twice; and as this day, in the old account, was the same as the sixth of the calends of March, which had been long celebrated among the Romans on account of the expulsion of Tarquin, it was called "bis sextas calendas Martii;"

Martii;" and from hence we have derived the name *biflex-*
tile.

By the statute *de anno biflextile*, 21 Hen. III. to prevent misunderstandings, the intercalary day, and that next before it, are to be accounted as one day.

The astronomers concerned in reforming the calendar, by order of pope Gregory XIII. in 1582, observing, that the *biflextile* in four years added 44 minutes more than the sun spent in returning to the same point of the zodiac; and computing that these supernumerary minutes in 133 years would form a day; to prevent any changes being thus insensibly introduced into the seasons, directed, that, in the course of 400 years, there should be three *biflextiles* retrenched; so that every centesimal year, which, according to the Julian account, is *biflextile*, or leap-year, is a common year in the Gregorian account, unless the number of centuries can be divided by 4, without a remainder. Thus 1600 and 2000 are *biflextile*; but 1700, 1800, and 1900 are common.

The Gregorian computation was received in most foreign countries ever since the reforming of the calendar; and by act of parliament, passed anno 1751, it commenced in all the dominions under the crown of Great Britain, in the year following, ordering that the natural day following the second of September, should be accounted the fourteenth; omitting the intermediate eleven days of the common calendar. See *CALENDAR*.

BISSINGEN, in *Geography*, a town of Germany, in the circle of Swabia, and county of Pattingen Wallerstein, 4 miles S. S. W. of Haaburg.

BISSOOLY, a principal fort of Hindoostan, lying at or near the entrance of the hills, 42 cosses S. E. from Jummo. Major Rennell places it in his map on the north bank of the Rauvee, 6 or 7 cosses above Kullanore, or $41\frac{1}{2}$ above Lahore, or, in other words, about 59 geographical miles E. 30° N. from Lahore. N. lat. $32^{\circ} 3'$. E. long. 75° .

BISSOWIE, a town of Hindoostan, in the country of Oude, and circar of Rohilcund, 25 miles west of Bereilly, and 85 E. S. E. of Delhi.

BISTAM, a small city of Persia, in the province of Comis, on the north of the Great Salt Desert, rarely visited by travellers. N. lat. $35^{\circ} 30'$. E. long. $54^{\circ} 30'$.

BISTER, a town of Switzerland, in the Upper Vallais, near the south bank of the Rhone. N. lat. $46^{\circ} 19'$. E. long. $7^{\circ} 52'$.

BISTI, a species of Persian money, valued at sixteen or eighteen French *deniers*. Some represent the *bisti* as an ancient silver coin; others, as Chardin, make it only a money of account, and call it *dinar bisti*.

BISTONES, in *Ancient Geography*, the name of a people who inhabited that part of Thrace, which was bounded on the north by mount Rhodope, on the east by the Hebrus, on the west by the Nessus, and on the south by the Ægean sea. Its capital was Tinda. These people were subdued first by the Macedonians, and at length by the Romans. Xerxes, according to Herodotus, traversed their country in marching against Greece. Hence "*Bistonius tyrannus*" is used by Lucan to denote Diomedes, king of Thrace, who fed his horses with human flesh; and "*Bistonius turbo*;" expressing a wind blowing from Thrace.

BISTONIS, a lake on the southern coast of Thrace, N. E. of Abdera.

BISTORT, or *SNAKEWEED*, in *Botany*. See *POLYCONUM*.

BISTORY, or *BISTOURY*, in *Surgery*, is a cutting instrument, formed like a small knife. It may be either straight or curved, double-edged or with a single edge, sharp

pointed, round pointed, or with a probe point, &c. Sometimes it is made to shut within a handle; at other times the blade is fixed and immoveable. For particular purposes, the blade is concealed, so as to project only at the moment when the instrument is used by the surgeon; on which account it is called by the French *biflouri caché*. On some occasions, it is found convenient to employ a director, or a canule, at the same time we introduce the *bistory*: for example, when it is intended to pass the cutting instrument along a narrow sinus, or under the præpucè, up to a certain spot before we make any incision, (see the articles *PÆRISTOSIS*, and *SINUS*); but wherever there is room for the introduction of a fore-finger, that mode is preferred by modern surgeons as a guide to the *bistory*, being much more convenient and secure than any artificial director. The precise form of a *bistory* must be regulated according to the nature of the operation required, and the end to be obtained. See the article *SCALPEL*, and consult the engravings of chirurgical instruments attached to this Cyclopædia.

BISTRA, in *Geography*, a town of Bohemia, in the circle of Chrudim, 6 miles S. S. E. of Politzka.

BISTRAIA, a town of Russian Tartary, on the west side of the Donetz, 70 miles N. N. E. of Azof.—Also, a river of Russian Tartary, which runs into the Donetz, 64 miles N. E. of Azof.

BISTRE, among *Painters*, a composition made of the most glossy and highest burnt foot, pulverized, and passed through a fine sieve, then baked in a little gum-water, and made into cakes: or it is the burnt oil, extracted from the foot of wood. It is a brown transparent colour, and has much the same effect in water-painting, where alone it is used, as brown pink in oil.

The *bistre* is prepared from the foot of dry beech wood, by grinding it with urine or water, into a smooth paste, and then diluting it with more water; after the grosser substance has subsided, the liquor is poured off into another vessel, and left to settle three or four days; the fine matter that remains is *bistre*.

That the *bistre* of our colour shops has been prepared by a process of this kind, and not, as some have suspected, by evaporating the infusion of foot to an extract, may be presumed, says Dr. Lewis (*Com. Epist. Phil. Techn. p. 340.*), both from its appearance and its qualities. He observes, that different parcels of *bistre* differ considerably in their colour, on account, probably, of the different qualities of the foots from which they were made.

In the *Handmaid to the Arts*, vol. i. p. 126. we have the following recipe for preparing it. Put the foot of dry wood (of beech when it can be procured) into water, in the proportion of 2 pounds, to a gallon, and boil them half an hour. Then, after the fluid has stood some time to settle, but while yet hot, pour off the clearer part from the earthy sediment at the bottom; and if on standing longer it form another earthy sediment, repeat the same method; but this should be done only while the fluid remains hot. Evaporate the fluid to dryness; and what remains will be good *bistre*, if the foot was of the proper kind. That which is good is transparent, when moistened with water, and of a warm, deep brown colour.

Instead of this, some use the latches of a pen, with a little Indian ink, others red chalk, others black lead, &c. See *WASHING*.

BISTRIANKA, in *Geography*, a town of Russian Tartary, on the south side of the Don, 100 miles E. N. E. of Azof.

BISTRIATA, in *Entomology*, a species of *CICADA* (*D-*
fena)

flexa) that inhabits France. This is yellow, with two transverse bands of brown. Geoffroy.

BISTRICZ, or BISTRITZ, in *Geography*, a town of Transylvania, and capital of a county, to which it gives name, situate on the river Bistricz, which runs into the Samos. 4 miles S.W. of Kezovar. The town is 42 miles N.N.E. of Clausenburg, and 256 E. of Vienna. N. lat. 47° 33'. E. long. 25° 3'.

BISTRIGALIS, in *Entomology*, a species of PHALÆNA (*Pyralis*), with cinereous wings, with two ferruginous streaks, and a black dot. Inhabits Europe. Linnæus.

BISTRIGARIA, a species of PHALÆNA (*Geometra*), with cinereous wings, undulated, with two linear streaks. A native of Europe. Linn. &c.

BISTRIGATA, a species of PHALÆNA (*Geometra*). It is griseous, with two whitish streaks. Inhabits Europe.

BISTRITZA, in *Geography*, a town of European Turkey, in Moldavia, on a river of the same name, which runs into the Siret, 6 miles S.E. of Bakeu. The town is 20 miles S.W. of Jassy.—Also, a town of Walachia, 16 miles W.S.W. of Kimmik.

BISTRIZ, a town of Moravia, in the circle of Brunn, 6 miles W.S.W. of Els.

BISTROFF, a town of France, in the department of the Moselle, and chief place of a canton in the district of Morhange, 4 miles N.N.E. of Morhange.

BISTRY, a town of Bohemia, in the circle of Konigin-gratz, 10 miles from Gitschin.

BISUGA, a river of Russian Tartary, which runs into the sea of Azof, 48 miles S.W. of Eiskoi.

BISULCATUS, in *Entomology*, a species of CURCULIO that inhabits Italy. This is black, with a cinereous border all round, and two furrows on the beak. Fabricius.

BISULCUS, a species of ICHNEUMON, of a black colour, with two inflexed lines before; legs rufous; sting short. Linn. Mus. Lesk.

BITS, or BITTS for *Horses*, in the *Manege*, are pieces of iron of various figure and construction which, being placed in the horse's mouth, serve, by the assistance of the reins, to restrain or guide his motions.

The term *bits*, or *bits*, is considered by some as originating from the horse's biting or champing them between the teeth when placed in his mouth; in the French language is used a term also of similar signification, *les mors*, which would seem to corroborate the above etymology of it:—another however, equally natural, presents itself in the common word *bit*, or *bits*, that is *pieces* of iron; this apparatus being always made of one or more pieces of this metal.

The art of biting horses may be said to consist in furnishing the mouth with the most proper mouth-pieces, &c. for obtaining from them an obedience to the will of the rider, and exacting a due performance of all the movements and restraints which may be desired, or at least which are dependent upon the operation of the reins. Rightly understood, and well administered, this art affords the power of communicating to the horse support and confidence, with greater ease and security to the rider. The misapplication of its rules, on the contrary, or an inattention to them, where the mouth is not totally insensible, will produce painful sensations to the horse, with disgust and rebellion, and to the rider uneasiness and perhaps danger.

It is to be lamented that the presumptuous opinions of the uninformed have been too much the guide of the public in their estimation and choice of the proper bits for horses, as also in too many other things respecting these useful animals, tending often to accumulate unnecessary suffering

and misery upon them. The writers on this subject are few and unsatisfactory; we shall, however, except Mr. Berenger, whose work is a noble effort to emancipate this branch of science from barbarity and ignorance; and from him we shall take occasion to make some extracts in the sequel of this article. Here it will be proper to observe, that this author, by the term *bit*, has designated the curbed bit only, but we have ventured, for the sake of pursuing a more connected view of the subject, to include in this term any piece or pieces of metal placed in the horse's mouth, for the purposes of guidance or restraint.

In our account of the different kinds of bits, and their effects, we shall begin, for the sake of order, with the description of a bit of the most easy and simple construction possible, and then proceed to the most complicated.

A short iron rod, made rather wider than the mouth of the horse, and provided with a hook or ring at each extremity for fastening the reins to, affords us an instance perhaps of the greatest possible simplicity in the construction of a bit; and such a one only slightly curved forwards, to allow more liberty for the tongue, is at present in general use for the heavier kind of draft horses, the bearing rein being usually attached to it, passing over the hames of the collar.

A similar rod to the former, broken in two pieces, and connected by a joint in the middle, is the next in point of simplicity, and is in common use for horses of light draft; as in those employed for the curricule, coach, &c. and is attached by the bearing rein to the hook of the saddle, and this kind of bit is mostly termed with us a *bridon*.

The next in point of farther complication of parts, and which scarcely can be said to differ from the former, is the *common snaffle*. This is provided with two cross pieces, which rest against the lips or sides of the mouth; for as the snaffle is intended for the saddle horse, and the reins go to the hands, so the cross pieces are useful in preventing the bits from being drawn through the mouth, which precaution is not so necessary where the bits are affixed to the bearing rein. The *bridon* we may observe, is also made in general smaller than the snaffle, as well as without cross pieces.

The distinction, however, between a *bridon* and snaffle is insignificant and of little consequence; for on all occasions cross pieces are the most convenient; and it will be easily seen that the *bridon* is merely an imperfect snaffle, possessing no peculiar characters which can form a real distinction.

The term, also, when confined to this object is misapplied; for the French, from whom we have borrowed it, by *le bridon* understand the snaffle and its rein, in opposition to *le bride*, by which they denote the *curbed bit* and reins.

In war, and on other occasions, the *bridon* was used as a lesser bridle, or bridle of reserve, in case of the failure of the former from any accident; and hence the origin of its name.

The number of parts of which the mouth-piece of the snaffle is composed, may be increased to any extent, as it may be made with one, two, or several joints; but as it is evident these additions will not essentially alter its properties or effects, it would be useless to pursue a distinct consideration of them.

But the condition of the snaffle admits of being so altered and changed by the variation of its figure, its substance, and its surface, as to acquire new properties and effects which will require particular attention; its gentleness or rigour will depend almost wholly on these conditions. A mouth-piece made of two entirely straight pieces will be more severe than when these are somewhat curved, as the curved bit is more apt to embrace and include the lips between it and the bars than

the straight one. A thin and slender bit or snaffle, it will be easily perceived, will rest with more severity and sharpness upon the bars than a thick and obtuse one; the former, therefore, or the sharp bit, is employed more particularly for restraining such horses as are hard mouthed, and too eager, while the latter is used for such as have a proper feeling of the bars, and especially for breaking in young colts.

The surface may be varied as to roughness or smoothness, producing also different effects. To give the greatest ease possible, a large and highly polished bit is necessary. This is sometimes provided with moveable rollers on the axis of the bit, which turning with every movement of the reins, diminish the friction of the bits, and render them less irritating. These rollers, however, in reality can have but little effect in the snaffle, though of pleasant effect in the mouth-piece of the curb; for this reason, that the snaffle being jointed in the middle, is drawn by the reins to a sharp angle in the mouth, so that these rollers are presented to the bars in an oblique direction, under which position it will be obvious they can have very little or no motion, but, on the contrary, they will tend to render the bits more severe by their irregularity; so that a well polished snaffle is in fact preferable to one of these with rollers of the ordinary construction.

On the other hand, to give the greatest degree of severity to the mouth-piece of the snaffle, it is twisted while hot into a spiral form, and is made to present by this means a sharp, rough, and unequal surface to the jaw, being capable, according to the degree of sharpness to which the edges are wrought, of punishing the bars and lips with greater or less severity. The different degrees of punishment which this kind of bit is capable of inflicting, will perhaps be found sufficient for all the purposes of correction, where recourse may properly be had to actual force and punishment. For it should be always kept in view, that gentle means will produce a good mouth; while harshness and too great severity will tend to destroy it altogether.

Thus far the ancients of the most remote ages of the world, almost as far back as any history extends, were well acquainted with the use of bits. Xenophon, more than 400 years before Christ, had described similar bits as being in common use in his time among the Grecian states. He speaks of a smooth and a sharp kind of bit, the latter, if more severity was requisite, to be armed with points or teeth. In its use, however, he enjoins the greatest tenderness, and observes "that when you would wish to slacken the pace of an eager horse, which hurries on too fast, and to pacify his fury, so as to make him go more temperately, or even oblige him to stop, you should not attempt to do it at once, and with violence, but artfully, and by degrees, gently pulling him in, then yielding the bridle, and playing with his mouth, in such a manner as if you intended rather to win his consent than force his obedience." Chap. 9, 10.

Beyond the changes above described, the snaffle itself does not appear to admit of any alterations worthy of notice. It may, however, be justly observed, that some horse men add a chain to it, extending from cheek to cheek, which resting loosely on the tongue produces irritation and slavering, and, as they imagine, freshens the mouth. Such a bit is known by the name of the *Rockingham snaffle*.

The reins, however, it must be remarked, admit of some alterations in their disposition, which will influence the effects of the bit on the mouth; as whether they are carried higher or lower. At this present time there is a practice more especially in horses of light draft, as in those for carriages, curricles, and chairs, &c. to distort and alter the bearing

reins from their natural direction, and to dispose them more perpendicularly and in a line with the head; so that instead of passing straight from the mouth to the horse's back, they are directed up the sides of the face, as high nearly as the parotid gland, or base of the ear, where they are passed through a ring hanging from the head stall, and from thence to the hook of the saddle. The appearance is ornamental and elegant, and the reins so disposed are considered as more forcibly elevating the head than if they proceeded to the back in the usual direction.

As the disposition of the reins, so the figure of the bits themselves, and the ornamental appendages attached to them, admit of almost endless variety. The manufacturers of these articles, availing themselves of this licence, render their business more lucrative by as frequent changes as possible. These are successively introduced as fashionable novelties, till again for novelty they return to the simplest practice; and this takes place without any alteration in the principal circumstances of their construction, properties, or use.

The next kind of bits in use for horses is the curbed bit; which, as it is an instrument of much greater complication of parts than the snaffle, so it appears to have been of comparatively recent date.

In some of the sculptured equestrian figures of the ancients something like the branches of the curb may be found; but in no instance does there appear any thing resembling the chain, which is absolutely necessary to its effect. Their writings also appear to be silent on this subject. It was probably the invention of Italy or France, which for some centuries past have taken the lead of the other nations of Europe in teaching the arts of the manege. It was first introduced into the English army by a proclamation made in the third year of king Charles I. since which time it has got into universal use for the army, the field, and the road, so that no horseman deems himself perfectly equipped without it. Most of those writers who have treated of it in the last, and in the century preceding that, and who wrote probably soon after the commencement of its use, have been very profuse in their various proposals for the structure of it, especially in rendering it more complicated, severe, and cruel; though it is probable their clumsy figures and representations were never imitated in actual practice. They appear to have been much satisfied with their new invention, imagining it a sure means of reducing horses to immediate obedience, in spite of every obstacle; and true it is, it can punish with extreme severity: but is such a measure most likely to create vice, or to overcome it? Indeed, according to the opinion of one of the ablest writers that has ever considered this subject, and whose opinion we shall take an opportunity of quoting more fully hereafter, little or nothing has been really gained by its adoption; on the contrary, the snaffle possesses more simplicity, power, and perfection.

Stripped of all unnecessary trappings, this instrument consists of the following essential parts: a mouth-piece with two side branches, or inflexible rods of iron, firmly fixed to the former, and a chain passing from side to side, behind the chin, including the jaw; two eyes or rings at the upper extremity of these branches, serve to fasten it to the head stall, and to stay it in the mouth; two other rings at the lower extremity of the above branches receive the reins, passing to the hand, or sometimes in draft horses to the hook of the saddle, as a bearing rein. These are all the parts really necessary to constitute the curb.

The bits thus formed being placed in the mouth, and the chain passed round the lower jaw, the branches, it will be

readily seen, become powerful levers when drawn backwards, acting upon the mouth-piece as a centre, and squeezing, by means of the chain, whatever interposes between it and the mouth-piece, with a force equal to the length of lever afforded by the lower branch.

This force, it will be perceived, is influenced and regulated not only by the length of the lever below the mouth-piece, but also by the greater or lesser distance at which the chain is placed from it. The chain is usually fixed to the eye of the cheek-piece, where the head-stall is fastened; if, therefore, this part is very long, it is evident it must moderate or counteract the power and effect of the lower end of the branch, and render it less severe by bringing the centre of motion nearer to the middle of the lever.

It appears manifest, from the construction of this instrument, that its whole force is exerted upon the jaw itself, and that it has power to pinch the bars with cruel violence, even to the fracture of the bone, and this with very powerful branches has sometimes happened. It can also crush and bruise, and totally destroy the tender covering of the inside of the mouth, and the skin beneath the jaw.

From considering its mode of operating, it might reasonably be doubted whether it does in reality stop the horse by its power and opposed force, as is generally conceived at present, or rather by the severity of the pain it inflicts; as should the horse arm himself against this, it is totally insufficient to arrest his course; of which instances occur in runaway horses every day. And we shall venture to suggest, though contrary to the general opinion, that the snaffle, even in this respect, if the mouth has not been previously hardened and spoiled by the use of the curb, is the most powerful instrument of the two.

The *mouth-piece* of the curb is usually provided with an upset or arch in the middle of it, as it would, if perfectly straight, rest on the tongue, and occasion an unpleasant restraint. This passage for the tongue is often made so narrow and small by the bit makers, that one should apprehend they scarcely had a right idea of its use. From the circumstance of its allowing a passage for the tongue, it has been called by some, the *liberty*; and, for the same reason, by others, the *porte*: hence we have the *porte-mouth* bit, vulgarly called among the bit makers and grooms the *Portsmouth* bit; and by a supposed counter expression to this term, we probably get the *Weymouth-bit*.

In draft horses, especially for the coach, it is a frequent custom to have affixed to the upper part of the upset small chains or polished drops of iron, which hanging loose in the mouth, and falling on the tongue, occasion the horse to champ the bits, and create a copious flow of saliva, so as to slaver the lips with its white froth; and when this happens, it is considered by some a good sign of health and gaiety, and that the horse is well bitted; for, if the bits are disagreeable to him, he never plays with them, or exhibits any froth, say they. These small appendages are termed by the French *les chainettes*, and by the English *players*.

It is farther to be observed, respecting the mouth-piece of the curb, that the straight part which rests upon the bars of the jaw, is termed by the French *le canon*, and by the old English writers the *jeive*; and though a highly convenient and useful word, it is to be regretted it is at present out of use; the French term, which is not so expressive, having superseded it. This part should be well polished, and may be made of any proper figure, as that of a cylinder, cone, oval, globular, pear-shaped, &c.

It is obvious that the effect of the curb, as far as it res-

pects the bars, will be correspondent to the thickness or thinness, smoothness or roughness, of this part; the larger and broader it is, the more surface it covers; and thus the pressure, by being distributed over more points, becomes less felt. This enlargement, however, of the canon or jeive should not be carried to an excess, by making it too heavy, or filling the horse's mouth with more iron than it can conveniently receive, and thus create pain, instead of greater ease.

To render these irons less irritating to the mouth, and to avoid their friction upon the bars, the jeives are provided with loose, moveable rollers of well polished iron, which readily turning on the axis of the bits, very considerably diminish their severity. These moveable pieces are also particularly useful in preventing the horse from catching and holding the bit in his teeth; as the curb, under these circumstances, can still move and act with the same freedom as before.

The jeives are sometimes composed of three or four flat-tish knobs, united by a joint to each other, and with a joint to the upset, which is intended to render it very severe; it is obvious, however, that such an alteration must bring it nearer to the condition of the snaffle: the knobs, however, if they can be drawn transversely across the bars, might produce considerable irritation, but not so much as they would do if not jointed. This bit is not unfrequently used, and is called with us the *Hessian-bit*.

To the curb is often fixed a ring opposite the mouth-piece, which, as it is directly in a line with the axis of the bit, has no other effect when the reins are affixed to it, than a snaffle would have provided with a similar mouth-piece. This is termed putting "the reins to the cheek," and for horses of light draft, whose mouths are not ruined, it is by much the best, as the mouth is less annoyed, and the horse obeys with more alacrity the guidance of the hand from this point, than from the extremity of the branches, which are particularly ill calculated for this purpose: this kind of construction is generally distinguished by the name of the *Pelham* bit.

In the older English writers, as well as those on the continent, on the subject of bits, we find an appendage described, which is not at all, at present, in use; and as it enters the mouth with the mouth-piece, it may, with propriety, be described along with it. It consisted of a chain extending from branch to branch of the banquet, or cheek piece, being placed rather above the mouth-piece, and parallel to it, and was stretched across perfectly straight and tight. This part was called the *water-chain*, and by the French *Trenche-file*: its use is not very evident. Mr. Berenger takes notice of it, and observes "that it might be useful to horses that are apt to drink or swallow the bits, as the expression is, or bury it so deep in their mouths, as to hinder it from having a due and just effect;" from its being laid aside so generally, we presume it has at least been thought useless.

It is a common belief with the grooms, that a great power resides in the upset of the mouth-piece, and that the bits are more powerful as this is longer or shorter; nothing, however, can be more fallacious than this reasoning. In the works of Laurence Reefe, also a French writer, we find, in consonance with this idea, a curb, with an upset of unusual length, being destined to correct the vices "*d'un Rouffin qui à la bouche d'une diable*;" it will be obvious, however, on a moment's reflection, that this part, from being made very lofty, and coming forcibly against the palate, would compel the horse to open his mouth, when it would cease farther to act in any way; with more reason, the same writer proposes, on the other hand, "*pour donner*

grand plait;" to have a bit constructed with a low upset, and sufficiently wide, with large, conical, smooth jeives for the bars.

Of the chain. The chain is the part most essentially necessary to give effect to all the other parts of the curb, and may be placed, as we have already noticed, at any given distance above the mouth-piece; its operation being more powerful, as this distance is exceeded by the length of the branches. This position, though true as a general principle of reasoning, appears to be subject to the operation of other causes in actual practice, which it will be necessary to consider; for, in direct contradiction to this is the assertion of Mr. Berenger, who appears to be almost the only writer who has truly investigated the merits of this particular object. He observes, in regard to this, that the nearer the chain, and the longer the branches, the softer and more indulgent its operation. This, on a first view, would appear to be in direct variance with the rules above laid down, and irreconcilable to the well known laws of the operation of the lever, and even at variance with his own preceding assertions; when, however, we remember the experience and practical knowledge of him who asserts it, it deserves a more particular consideration; let us first admit the truth of the position, as it seems founded on the sure test of actual experience, and then we should venture the following as the most natural explanation of it.

In proportion as the branches are longer, the more extensive is the circuit their extremities perform in their operation; and therefore, the hand that guides them must pass through a greater space to produce the same effect: and now if the chain be placed very near to, or upon the outside of the mouth-piece, and be applied not very tight about the chin, yet, in reality, though there would be an apparent increase of power by the length of the branches, they would have little or no effect, as they would arrive at the utmost extent to which they can be drawn, before the chain would begin to pinch. On this account, the most lively effects would be produced by the chain having more sweep and extent of action, and by the branches being not quite so long, as great length also adds something to their flexibility, though not to a degree to be worth taking into the account. Still, however, the branches must ever obey the common laws of the lever, acting with force proportioned to their length; while shorter branches act with greater quickness, and are more lively in their impression.

The chain is fastened on one side to the eye of the banquet, where the head-stall is fastened; on the other, to a hook hanging from the same part. This chain, as it is at present used, is composed of iron links or rings, so bent or indented, as to form, when put together, one uniform nearly flat surface; and these links, by twisting or untwisting, may be made to present a surface with any degree of roughness to the chin.

When great tenderness is required, this chain may be covered with leather or cloth; or where a still greater delicacy is desirable, the curb may be made wholly of leather, without any chain.

The larger and thicker the rings are, provided they are smooth and well polished, the easier the effect of the chain. In old English, this chain was called the *kirble*; and hence, by contraction, *kirb*; and finally, by an easy transition of the *ki* into *cu*, we apprehend that the modern appellation of this instrument is obtained.

Of the branches. The proportion which the cheek part bears to the lower extremity of the branches, or rather the position of the eye, to which the chain is fixed, determines the degree of power of the bit upon the principle before advanced,

that is, if the chain is fixed to the upper extremity of it as it usually is to the transverse opening or eye of the head-stall.

For the elementary view we are taking of the construction of the bits, it has been only considered as a straight, plain lever of indeterminate length; it is, however, in practice, often varied, as in the army, it is used of enormous length, and frequently curved like the letter S, by which it is conceived to be rendered more powerful, as well as ornamental; at other times the branch of the bit, with a view of increasing its force, is carried forward with a sharp elbow, giving nearly the figure of the letter Z; while by others, with more reason, to prevent the horse from catching the bit in his mouth, it is made with an arch, or semicircle, in the middle of the branch, like the letter C, turned backwards for the same purpose; it will, however, in fact, whether bent into that or any other shape, it is the length of the lever, and its strength, which alone give the power; it is true, however, that a long curved branch, though more powerful, will render the effect somewhat softer, as coming from a greater distance, especially if the branch is at all flexible and yielding, than it would be by the quick and rigid effect of a shorter lever, made perfectly straight and inflexible: these branches may also be turned or bent, not only backward or forward, but also outwards and inwards. At their extremities, those turned outwards, are said to be strongest of any in their operation.

As to the cheek-piece, or banquet, as it is called by the French, for an appropriate name is wanting to this part in the English language; the eye of the banquet, say the horsemen, commands and gives efficiency to the rest of the bit; or, in other words, decides the distance of the chain from the mouth-piece, or centre of motion; as however, in speaking of the other parts, we have had occasion to introduce a sufficient account of this, it will not be necessary farther to give it a separate consideration; nor will it be useful to describe the numerous mongrel herd of bits engendered of the snaffle and curb, which are reducible to the properties of one or the other, or partaking of both.

The most useful bit of the curbed kind, appears to be the *Weymouth-bit*, which is at present in common use for draft horses of light work, as for carriages, coaches, &c. It consists of a strong, plain mouth-piece, of uniform thickness throughout, without any upset or jeives, but is simply curved forwards, to give liberty to the tongue: this kind of construction is the simplest perhaps that the curb admits of.

In concluding, it remains for us to notice the proper application and adjustment of these bits to the horse's mouth, and to treat of their real effects.

By the management of the head-stall, the snaffle bits should be so adjusted as to fall in the middle space between the tushes and grinders, resting upon the bars: the mouth-piece of the curb should also occupy the same situation when, however, it is used along with the snaffle, the bits of the snaffle should be placed highest in the mouth.

If the bits are placed too high in the mouth, the horse carries his head aloft; if too low, he stoops the head, and tries to catch them in his teeth.

The thicker and more fleshy, and the wider or broader the bars of the horse, the rougher may be the mouth-piece for the leaner and more delicate; consequently, the bits should be less severe. Care should also be taken that the mouth-piece be well suited to the size and width of the mouth, and be not too narrow, as this would give pain by squeezing the bars together: if, on the contrary, it is very wide, it rests with more force on the bars, without the interposition

of the lips, as is most usually the case. Where the tongue is large and prominent, the upper should also be in proportion, otherwise the bits could not rest upon the bars, but would press upon the tongue.

In regard to biting the horse, and the consideration of its effects, we can not desire to see any thing more consonant to truth and reason, than what has been given us by Mr. Beenger, and with some useful extracts from his valuable performance, we shall conclude this article.

Of biting horses with the curb. "In the beginning of an undertaking, whose aim is to subdue and reclaim nature, and that at a time when she is wild, ignorant, and even astonished at the attempts which are made upon her, it is evident that she must not be treated but with lenity, instructed with patience, and by small degrees, and that nothing should be offered that may hurt, surprize, or occasion any disgust.

The horseman, therefore, should not act the part of a tyrant, but of a lover; not endeavour to force her to submission, but strive to gain her consent and good will by assiduity, perseverance, and the gentlest attentions; for what prospect of success would rougher manners afford? To what purpose would it be to compel a colt to go forward, or turn from fear of the whip or spur, and to trot and gallop so freely as to supple his limbs, and form his paces; if the novelty of the bit, and the unaccustomed restraint to which it subjects him, should vex and confound him, so as to make him not know what to do, or how to behave in these extremes? It cannot be expected, that he will be guided, and go with ease to himself, or pleasure to the rider, if the instrument, by which he is to be conducted, offends or gives him pain: all habits and acquirements should be attained gradually, and almost imperceptibly: rigour and precipitation would ruin all; and, instead of forming the horse to the execution of what is required, may plunge him into vice and rebellion, so as to occasion much trouble and loss of time before he can be reduced.

He should not therefore, at first, be considered as if he was designed to be formed to all the delicacy and exactness of the bit; and the horseman should be content, if he will endure it in his mouth, so as to grow, by little and little, accustomed to it, till the restraint becomes by habit so familiar and easy, that he not only is not offended, but begins even to delight in it; for this purpose, great care should be taken that the bit be easy and gentle in all its parts; that the mouth-piece be larger than it need be for an horse already bitten; that it in no wise incommodes the bars, squeezes the lips, or galls the tongue.

The mouth-piece, called a cannon, with a joint in the middle, will be the most suitable; the ends of it should be as large and full as the size of the mouth will permit, for the thicker and more blunted they are, the easier they will be for the horse, and the *appui* less strict and severe.

The links of the curb should be big, smooth, and well polished; the curb somewhat long. The branches should be exactly even with a line of the banquet, to make the *appui* moderate and equal; they should likewise be long; nor does it signify of what shape they are, for with most horses they ought to be so weak, as scarcely to have any effect: so requisite it is to guard against every thing that may annoy or disturb the horse in these first trials. In order to reconcile him to this new constraint, the reins should be held in both hands; and the horse, for some time, should only walk under the rider. Above all, upon this, and all other occasions, a firm, a light, and diligent hand, is necessary.

Such are the outlines and general principles upon which

the art of biting horses is established; which art, as far as it reaches, is sure and constant; but which, in spite of all the merits and praise of which it has so long been in possession, will, upon a serious and strict trial, never, I doubt, be found adequate to the views of a sound and intelligent horseman, nor capable of bringing a horse to that degree of suppleness and exactness of carriage, which the truth and perfection of the art require, these attainments seeming to have been reserved for a more simple but powerful machine, called the *snaffle*."

"To perform his business justly and gracefully, the animal must first be made supple in his fore parts, and his head and neck so managed, that one may be raised, and the other arched or bent, more or less to the hand to which he is to turn. The bridle, called the bit, is so impotent in its endeavours to raise the head, that it even produces the opposite effect; nor from the confinement in which it keeps the horse, and the small compass it affords for the action of the rein, does it allow the rider sufficient room to bend him, without pulling down his head, and putting him upon his shoulders, both of which are incompatible with the true and sound principles of the art. The frequent use of cavecons and bridons, fully evinces the want of power in the bit to supple the horse, or raise the fore part.

The figures and representations of horses working upon different lessons, may be appealed to for the confirmation of this assertion; the books of past times abound with them, especially that boasted work of that king of horsemen, the duke of Newcastle, whose horses are all drawn with their heads between their knees; and yet are exhibited to the equestrian world as standards of truth, and models of perfection. The successors of this duke, and of other great masters, as imitators, are generally a blind and servile herd, ran headlong into the errors, and adopted the faults of their predecessors; and always made use of bits, without reflecting upon their effects, or perceiving that they could operate to make the horse carry low, or to put him upon his shoulders, while they thought that he was all the time upon his haunches."

"If ever there was a panacea, or universal medicine, the snaffle is one for the mouths of horses: it suits all, and accommodates itself to all; and either finds them good, or very speedily makes them so; and the mouth once made, will be always faithful to the hand, let it act with what agent it will. This bridle can at once subject the horse to great restraint, or indulge it in ease and freedom: it can place the head exactly as the horseman likes to have it, and work and bend the neck and shoulders to what degree he pleases. He can raise the head, by holding up his hand; by lowering it, it can be brought down; and if he chuses to fix and confine it to a certain degree he must use for this, as well as for the purpose of *bending, double reins*; that is, two on each side, the ends of which must be fastened in a staple near the pommel of the saddle, or to the girths, higher or lower, as the mouth, proportions of the horse, and his manner of going require; and if properly measured and adjusted, they will form and command the horse so effectually, as, in a great degree, to palliate many imperfections of the mouth, and many faults in the mould and figure."

"The reins thus fastened, or even one only, for the sake of working one jaw and one side, will operate more or less, as the branches of a bit: and the snaffle will almost be a bit, a bridon, a cavecon, and martingal, in one. When the horseman would bend the horse, he must pull the rein on that side to which he is going, and lengthen that of the opposite; that they may not counteract each other. No-
thing

thing will awaken a dull mouth, and bring it to life and feeling, so soon as this bridle. If the mouth be hard and callous, the iron should be so twisted as to have a sort of edge, which will search the lips, and when they will permit, the bars also; and if gently moved, or drawn from side to side, keep the mouth fresh and cool. If the twisted, or rough snaffle, be thought too harsh, and the hand not skilful enough to moderate its effects, a smooth snaffle may be used; or if a bit of linen be wrapt round the twisted snaffle, it will make it easy and smooth; and the mouth, once made fine and delicate, will be true to its feelings, will obey the snaffle, and follow the hand with as much exactness and precision as the bit knows to demand, but with more freedom and boldness than it ever can allow."

Such are the properties and merits of the snaffle, which long observation, and not a little experience, have taught the writer of this article to think preferable (generally speaking) to those of the bit; and which he has been therefore induced to point out and recommend with due deference to others, but with a greater deference to truth and justice.

"—Detrahere aufus,

Hærentem capiti multa cum laude coronam."

Brenger's Hist. and Art of Horsemanship, vol. ii. p. 221, &c.

BIT is also used for a little tool, fitted to a stock or handle, for the purpose of boring. In this sense, we say, the bit of a piercer, an augre, or the like; meaning that iron part of those tools wherewith the holes are bored.

The bit used by the block-makers, resembles the shank of a gimblet, from six to twelve inches long, and from half an inch to an inch in diameter, and has at its end either a screw, a sharp point, or edge, for the purpose of cutting or boring holes. The *centre-bit* is a bit, having in the middle of its end, a small steel point, with a sharp edge on one side to cut horizontally, and a sharp tooth on the opposite side to cut vertically. Holes bored with this instrument, are not liable to split. The *counterfunk-bit* is a bit having two cutting edges at the end, reversed to each other, which form an angle from the point. *Gouge-bit* is a bit smaller than a centre-bit, with a hollow edge at its end, like a gouge. *Nose-bit* is a bit similar to a gouge-bit, having a cutting edge on one side of the end.

BIT of a Key, is that part fitted at right angles to the shank of the key, wherein the wards are made. See LOCK, &c.

BIT is also used in Commerce, for a piece of coin current in Jamaica, and valued at $7\frac{1}{2}$ d.

BITTS, or *Bitts*, in a ship denote a frame composed of two upright pieces of timber, called the pins, and a cross piece fastened horizontally on the top of them; used for belaying cables and ropes to. *Bowline and brace-bitts* are situated near the masts; the *fore-jeer*, and *top-sail-jeer bitts* are situated in the fore-castle, and round the fore-mast; the *main-jeer*, and *top-sail-jeer bitts* tenon into the fore-mast beam of the quarter-deck; the *riding bitts* are the largest bitts in the ship, and are those to which the cable is bitted, when the vessel rides at anchor. The *cable is bitted*, or confined to the bitts by one turn under the cross-piece, and another turn round the bitt-head. In this position, it may be either kept fixed, or it may be veered away.

BIT-Stoppers, are those stoppers that are used to check the cable. See STOPPER.

BITAZA, in *Ancient Geography*, a town of Asia, in Aria, according to Ptolemy.

BITBOURG, in *Geography*, a town of the Netherlands, in the duchy of Luxemburg before the revolution, but now a principal place of the canton of the same name, in the department of Forêts, containing 1638 inhabitants; the

population of the canton consisting of 7160 persons. Its territorial extent includes 225 kilometres, and 12 communes. N. lat. $50^{\circ} 0'$. E. long. $6^{\circ} 43'$.

BITCH, in *Zoology*, is the female of the canine species, in contradistinction to dog. (See CANIS.) It is sometimes used in a similar sense with respect to foxes, the female being termed a "bitch-fox;" though the more common appellation among sportsmen is a "vixen." Bitches are sometimes spayed, to prevent their farther propagation; the best time for which operation is about after the heat is gone off.

BITCHE, in *Geography*, a town of France, and principal place of a district, in the department of the Moselle, containing 2310 inhabitants; the number of those in the canton being 10,441. Its territorial extent is $312\frac{1}{2}$ kilometres, and it includes 23 communes. It is seated on a river at the foot of the Vosges mountains, on the frontiers of Deux Ponts. It was taken by Lewis XIV. and fortified by Vauban; afterwards dismantled and restored to the duchy of Loraine. In 1740, it was again fortified. Before the revolution, it was the capital of a country, including 50 villages. N. lat. $49^{\circ} 5'$. E. long. $7^{\circ} 44'$.

BITCHU, or BITSU, a province of Nipon, in the islands of Japan, between about $34^{\circ} 30'$ and 35° N. lat. and about $134^{\circ} 30'$ E. long.

BITCHYS, a tribe of Tartars, visited by La Perouse in 1787. and described by him. See OROCHYS.

BITE is defined to be a solution of the continuity of a soft part, caused by the impression of an animal's teeth.

BITE of *Mad-dog*. See HYDROPHOBIA.

BITE of *Serpents*. See POISON.

BITE of *Rattle-snake*. See POISON.

BITE of the *Tiranula*. See TARANTISM.

BITE is also applied, in a less proper sense, to the impression of other sharp or pungent bodies. Thus a file is said to bite the metal; aqua fortis bites, or eats into copper. An anchor is also said to bite, when it holds fast in the ground.

BITERLAGH, or BITHERLAGE, the ancient Danish military or camp law.

The word is compounded from *bithe*, *mult*, and *lagh*, *läw*; q. d. the law of *mults*, or *rites*.

Among the laws of the Danes, there are two peculiarly eminent; viz. the *bird-straa*, or *court law*; and the *bitherlage racti*, made by Canute the Great, about the year 1035; of which an edition has been given by Resenius.

BITETO, in *Geography*. See BIDETTO.

BITHABA, in *Ancient Geography*, called also *Birbama*, a town of Asia, in Assyria, according to Ptolemy.

BITHER, a city of Judæa, called by St. Jerom, Bethoron, which was the place of retreat of the impostor Barchochebas, fortified by him, and made the capital of his new kingdom. It was besieged by the Romans under Julius Severus, A. D. 134, and after an obstinate resistance, compelled to surrender. See BARCHOCHÉBAS, and BETHORON.

BITHEREMAN, a town of Phœnicia, according to Sozomen, situate at the extremity of the territory of Eleutheropolis.

BITHIA, a town of Asia, placed by Ptolemy in Media.

BITHIAS, a town of Asia, in Mesopotamia, according to Ptolemy.—Also, a river of Thrace, according to Appian.

BITHIGA, a town of Asia, in Mesopotamia. Ptolemy.

BITHYÆ, a people of Thrace, who, according to Steph.

Steph. Byz. derived their name from *Bithyus*, a son of Mars; but more probably from the river Bithys, or Bithias, mentioned by Appian, and denominated Bathynius, by Ptolemy.

BITHYLA, a town of Greece, in the interior parts of Laconia. Ptolemy.

BITHYNIA, a province of that part of Asia, which was commonly called Asia Minor. It was anciently known by the names of Myfia, Mygdonia, Bebrycia, and Mariandynia, as well as Bithynia; and extended from Myfia on the west, to Paphlagonia on the east. It was bounded on the west by the Bosphorus Thracius and part of the Propontis, on the south by the river Rhyndacus and mount Olympus, on the north by the Euxine sea, and on the east by the river Parthenius. Ptolemy enlarged the extent of Bithynia, so as to make it comprehend some provinces belonging, according to other geographers, to Galatia and Paphlagonia. The chief cities of Bithynia on the coast were Myrlea, Dascylos, Cius, and Nicomedia the metropolis. On the Bosphorus stood the famous city of Chalcedon. In the Euxine sea were situated the city and ancient republic of Heraclea. The principal inland cities of Bithynia were Prusa, Libyssa, and Nicæa or Nice. Its chief rivers were the Pissis, Calpas, Sangarius or Sagaris, Hipias, Rhebas, and Lycus; all discharging themselves into the Euxine sea between Chalcedon and Heraclea. As Bithynia lies between 41° and 43° of north latitude, and is watered by many rivers, it once abounded with all the necessaries of life. The ancients compare some of the inland provinces to the fruitful and delicious vales of Tempe; but at present it lies in a great degree neglected and unmanured. Bithynia was anciently inhabited by various nations, differing in their manners, customs, and language; namely, the Bebryces, the Mariandyni, the Caucones, the Dollyones, and the Cimerii. These different nations were anciently governed by their own kings; Bithynia being, in the earliest times, divided into as many kingdoms as nations or tribes. However, in process of time, these petty princes were reduced by the more powerful kings of Bithynia. According to Diodorus Siculus, the Bithynians had kings from the time of Ninus; and, according to Appian, they had 49 sovereigns before the Romans obtained possessions in Asia. But this high antiquity is rendered doubtful by the silence of Homer respecting the Bithynians. Strabo (l. xii.) speaks of one Prusias, who reigned in Bithynia in the time of Cræsus, the last king of Lydia, by whom he was conquered. From this period, the Bithynians continued subject first to the Lydians, and afterwards to the Persians, till the reign of Alexander the Great; for we find them mentioned by Herodotus among the many nations that attended Xerxes in his expedition into Greece. While they were subject to the Persians, they seemed to have been still governed by their own princes. Under Nicomedes I. the Gauls, whom he called to his assistance, first passed into Asia, and obtained a settlement in that part of Asia Minor, which was called from them Gallo-Grecia and Galatia. The last king of Bithynia was Nicomedes IV., who, at his death, in the year before Christ 75, bequeathed his kingdom to the Romans, by whom it was reduced to the form of a province.

BITHYNIA, in *Modern Geography*, forms one of the districts of Anatolia, and is the nearest province to Turkey in Europe, being parted from it only by the small strait called the Thracian Bosphorus. Its principal cities are Prusa, Nice, and Nicomedia.

BYTHINIARCHIA, a sort of superior priesthood in the province of Bithynia, to which belonged the superintendency of the sacred games, and which gave an exemption to

him possessed of it, called bithyniarcha, from the care of tutorage.

BITHYNIUM, in *Ancient Geography*, the ancient name of a city of Bithynia, afterwards called Claudiopolis.

BITIS, in *Zoology*, a species of **COLUBER** that inhabits Brasil. Above, this creature is cinereous, yellow, varied with white and red, and transverse brown bands; beneath, yellowish, with a middle row of very minute scales. *Gmel.* &c. *Vipera bitis* of Laurent. Amph.

BITON, in *Conchology*, the name of the Linnæan *cypræa pediculus* in Adanson's Senegal, &c.

BITON, in *Entomology*, a species of **PAPILIO**, so named by Esper. It is *papilio damon* of Gmelin.

BITONTO, in *Geography*, a town of Naples, in the country of Bari, about 8 miles from the Adriatic, the see of a bishop, suffragan of Bari. This is a fine town, containing 16,000 inhabitants, of more easy fortunes, and more polished manners, than those who dwell in the cities along the coast; its markets are well supplied, and it has an air of affluence. The country between it and Bari, at the distance of 9 miles, is very much inclosed; and though stony, fertile in corn, almonds, olives, wine, and fruit of all kinds. Near this city an obelisk was erected by the king of Spain, with some fulsome inscriptions in praise of himself, his father Philip, his soldiers, and the count of Mortemar, who was honoured with the title of duke of Bitonto, for having defeated the Austrians on this spot in 1734. The monument, however, which records a trivial victory, is crumbling to ruin.

BITTACLE, or **BINACLE**, a square box, or frame of timber, placed in the steerage of a ship, wherein the compass is placed. The word is formed, by contraction, from the French *habituacle*, a *small habitation*, which signifies the same.

Large vessels have two bittacles, a lesser placed before the pilot, and a greater before the steersman.

In the smaller vessels, the bittacle is divided into three spaces or apartments; in large vessels into five. One for the hour-glass; another for the lamp or light; another for the compass, &c.

Great care is to be taken in the disposition, framing, &c. of the bittacle, that it stand true, and that it be not fastened together with iron nails, but with wooden pins, because the former would affect the compass. See **COMPASS**.

BITTENDORF, in *Geography*, a town of Silesia, in the principality of Neysze, 2 miles N. of Otmuchan.

BITTER, in *Sea Language*, denotes the turn of the cable round the bitts.

BITTER almonds. See **ALMOND**.

BITTER apple. See **COLOCYNTHIS**.

BITTER end of a cable, that end which remains on board round the bitts, when the ship is at anchor; the other part of the cable being veered.

BITTER gourd. See **COLOCYNTHIS**.

BITTER place, *locus amarus*, a poor barren soil, by Pliny called *terra amara*, *five maera*.

BITTER purging salt, *sal catharticum amarum*. See **EPSOM Salt**.

BITTER sweet, in *Botany*. See **SOLANUM**.

BITTER vetch. See **OROBUS**.

BITTER waters. See **WATER**.

BITTER wine. See **WINE**.

BITTER wood and ash. See **QUASSIA**.

BITTER wort. See **GENTIANA**.

BITTERFELD, in *Geography*, a town of Germany, in the circle of Upper Saxony, and electorate of Saxony, seated

feated on the Moldau, 16 miles S. of Dessau, and 18 S.S.W. of Wittenberg.

BITTERN, **BITTOUR**, in *Ornithology*, the Linnæan *ardea stellaris*: which see.

BITTERS, is also a name given to the brine swimming upon the first concreted salt in the salt-works; this liquor is lided off, that the salt may be taken out of the vessel, and is afterwards put in again, and affords more salt, which is to be separated like the rest, by lading off the liquor a second time, and so on. The bittern, according to Mr. Boyle, is a very saline, bitter, sharp, pungent liquor, which drains off in the making of salt from sea-water; or which remains in the pans, after the coagulation and granulation of the purer and more saline part by boiling. A bittern also runs, or oozes, from the heaps of fossile salt at Lymington, and Portsea in Hampshire. Phil. Trans. N^o 377. p. 348.

Bittern makes the basis of *jal catharticum amarum*, or **ER-SOM-SALT**.

Bittern is the mother-water which remains after the crystallization of common or marine salt in sea-water, or the water of salt springs. It abounds with Epsom salt, or the combination of vitriolic acid with magnesia, to which its bitterness is owing. It is employed in this country for making a purging bitter salt, which proves similar in quality to the salt obtained from the Epsom waters, and is commonly sold under its name. The ley is boiled down to a certain pitch, then filtered and inspissated; the dry matter is calcined, re-dissolved, and crystallized. If the mother-ley be inspissated and distilled with vitriolic additions, a spirit of salt is obtained. Neumann, p. 212.

BITTERS, in the *Materia Medica*. The quality of bitterness (a simple perception familiar to every one, and which cannot be defined) is much more frequently met with in vegetable matter, than in any other order of natural substances; and in this, it mostly resides in a certain soluble matter, with tolerably uniform chemical properties, which has by some been denominated *bitter extract*. This distinction, though not perfectly accurate, is of considerable use in pharmacy; for whenever a bitter taste is perceived in any part of a vegetable, we may conclude, with much probability, that it resides in this specific part of the vegetable, and especially that it gives certain medicinal properties, which experience has shewn to be in the highest degree important.

The bitter principle is found in combination with a variety of other active substances, which modify, alter, correct, or impair its medicinal powers.

A pure, simple bitter vegetable (of which gentian, or quassia are good examples), is entirely void of smell, has neither acerbities nor astringency to the taste, nor does it excite nausea, unless in excessive quantity. The bitterness is readily extracted by almost every menstruum aqueous, as well as spirituous; and in the simple bitters, little, if any difference, is perceived in the sensible properties of what is extracted, whatever be the medium. The bitter extract is not volatile by heat: hence, in the distillation of bitter plants that yield an essential oil (worm-wood, for example), the distilled oil has none of this taste, the whole remaining in the residuum. A watery, or spirituous infusion of a bitter plant, inspissated nearly to dryness, becomes intensely bitter, often with an empyreumatic, or a somewhat altered taste. This, when further dried, becomes solid and pulverulent. The extract is a convenient form for these substances, but the flavour is not so acceptable to the palate as the simple infusions.

The bitter extract is considerably antiseptic. Experiments have proved that the putridity of animal matters is much retarded by immersion in bitter infusions, even the watery;

and substances already putrid, in some degree, lose their fetor by this addition. The watery infusions of bitter vegetables mould by long keeping, and become sour. This change takes place in summer, in five or six days, when the infusion is not very strong. The newly acquired acid taste in some degree masks the bitterness; but this latter quality remains extremely long, and is hardly ever lost by spontaneous decomposition.

The effect of the simple bitter on the human body, is generally considered as purely TONIC. It does not raise the pulse; nor does it directly, or constantly produce any change in the secretions or excretions of the body. Its chief and most obvious operation is to increase the appetite, and promote the digestive powers; and hence it is with reason supposed, that its virtues depend on stimulating the fibres of the stomach. From this single effect may be derived the well known use of bitters, in giving general tone and vigour to the system, in a vast variety of cases of debility, unconnected with organic disease, in checking acescency of the stomach, heartburn, flatulence, and other symptoms indicating a deficiency of the digestive powers, and in extending its salutary operation through the whole of the alimentary canal, restoring the regular and natural action of the bowels impaired by the original defect of the digestive organ.

Bitters have been supposed by some to increase the intoxicating powers of spirituous liquors. This however, appears to apply only to the narcotic bitters, and to be attributable to the narcotic, and not the bitter principle. On the contrary, the salutary action of bitters on the digestive powers, is well calculated to correct the extreme and peculiar debility of the stomach, induced by habitual drinking.

An anthelmintic virtue (or power of expelling worms from the human body) has been attributed very generally to all bitters indiscriminately. There does not, however, appear to be much foundation for this opinion, unless the bitterness be combined with a purgative property, as in aloes, or possibly a narcotic. The contents of the intestines being always intensely bitter by the natural admixture of bile, it does not appear probable that animals, which live and grow in such a medium, can be much molested by a small addition of this principle, though from a vegetable matter.

An excessive habit of taking bitters, may finally prove detrimental to the stomach, by over-excitement, or by inducing a kind of artificial demand for food in greater quantity than is salutary to the general health. A remarkable example of the danger of these medicines, long persisted in by persons of gouty habits, is afforded by the operation of the *Portland powder* in this disease.

The chief combinations of the bitter principle used in medicine are *Narcotic bitters*, such as opium, fava Sancti Ignatii, bitter almonds, and the kernels of many fruits: *Aromatic bitters*, as orange-peel, cascarilla, and wormwood: *Astringent bitters*, a very large class, and generally combined both with tannin and the gallic acid, of which cinchona, and many other barks are striking examples: *Acid and purgative bitters*; the squill, colocynth, aloe, and some other combinations of less frequency.

For medicinal use, the aromatic is always an useful addition to the bitter, and is generally employed.

The most important of the animal bitters is the bile, the properties of which have been mentioned under that article. In tonic power, it closely resembles the vegetable bitters. Late experiments make it probable, that the *Prussic acid*, a very peculiar animal bitter, possesses properties similar to the vegetable narcotic bitters.

A few of the mineral, or common saline combinations, are distinguished by bitterness of taste; but it is doubtful how

far this principle modifies their medicinal powers. The nitrated silver is of this kind, a salt esteemed to be a very powerful tonic, taken internally in small doses. Some of the saline combinations of magnesia have the same taste, and it is possibly on this account, that the sulphat of magnesia will often be retained by very irritable stomachs, when other saline medicines are rejected. For the pharmaceutical preparations of the several bitters, see the respective articles; as *Gentian*, *Quassia*, *Colombo*, &c. and that of *Bitter Extra*.

BITTOUR, in *Ornithology*. See BITTERN.

BITUBERCULATA, in *Entomology*, a species of *CASSIDA*, of a brown colour, with a white margin; wing-cases spotted with black, and a single tubercle at the base of each. A native of Cayenne. Fabricius.

BITUBERCULATUS, a species of *CURCULIO*, that inhabits New Zealand. This is of a ferruginous colour; thorax length of the wing cases, and dotted, with two tubercles on the back. Fabricius.

BITUBERCULATUS, a species of *CRYPTOCEPHALUS* (*Crisceris*), that inhabits Africa. It is fulvous; wing-cases pale, entirely bordered with fulvous. Fabricius.

BITUMEN, *Bitumén*, Fr. The bitumens, properly so called, form a species of compound mineral inflammables, of which the following are the characters. 1. By exposure to the air, and the application of heat, they burn with a flame more or less vivid, and leave scarcely any residue. 2. By destructive distillation, they yield a liquid acid, but no ammonia, a variable but small proportion of charcoal being left behind in the retort. 3. They are either liquid, or capable of being rendered so by a moderate degree of heat.

Bitumens may be divided into two families, the non-elastic and elastic. To the former belong naphtha, petroleum, mineral tar, mineral pitch, and asphaltum; to the latter belong mineral caoutchou, and suberiform mineral caoutchou.

§ 1. *Non-Elastic Bitumens.*

NAPHTHA, *Bergnaphtha*, *Napthe*, *Bitume liquide blanche*, is a substance of a light brown, or wine yellow colour, perfectly fluid and transparent. It is the lightest of all liquids, its specific gravity being = 0.708 to 0.732: it has a strong penetrating bituminous smell; it takes fire with great readiness, and burns with a bluish yellow flame and copious black smoke, leaving no residue. It may be rectified by distillation with water, in the same manner as the essential oils, and then becomes colourless, and weaker in its odour. It does not combine in any considerable degree with either water or alcohol, but unites easily with ether, with turpentine, with caoutchou, and the essential oils. When rubbed with the caustic fixed alkalies, it forms a kind of Starkey's soap. The concentrated sulphuric and nitric acids are decomposed with vehemence upon it, converting it into a solid resinous substance soluble in alcohol. Even the purest naphtha, when exposed to the air, becomes first of a yellow, and then of a brownish colour, acquires a somewhat viscid consistence, and thus passes into petroleum. Naphtha is procured for the most part from very copious springs of this substance at Baku on the shore of the Caspian sea, where it is burnt in lamps instead of oil, and is used medicinally both externally and internally in rheumatic and other complaints. It is also met with in Calabria and some parts of Italy.

PETROLEUM, or *Rock-oil*. *Erdohl*, *Stein-ohl*. *Petrole*. The colour of petroleum is a blackish or reddish brown; it is fluid, though somewhat viscid; it is almost opaque, is unctuous to the touch, and exhales a strong bituminous odour; its taste is pungent and acid. Sp. gr. 0.747, 0.854. Petroleum may be rectified by distillation with water, in which process, the carbon, which thickens and colours it, is left behind in the

retort, and a colourless fluid comes over, possessed of all the properties of naphtha. When petroleum is distilled *per se*, there first arises some naphtha, then a watery empyreumatic acid, and lastly a thick dark-coloured oil, a spongy coal remaining in the retort. In its combinations with, and chemical actions on other substances, it perfectly resembles the preceding species. It is found wherever naphtha is, and in many other places among stratified mountains, in the vicinity of coal. In England, Coalbrookdale, and Pitchford in Shropshire, are the principal places where petroleum is found; at the latter place extensive strata of sandstone are saturated with petroleum, and the naphtha, procured by distillation of the stone, is sold under the name of Betton's British oil, and is esteemed an active remedy in strains and rheumatism.

MINERAL TAR, BARBADOES TAR, *Bergthier*, *Goudron mineral*. This substance differs from the preceding only in degree; it is more viscid, more opaque, of a darker colour, and, when distilled, leaves a larger carbonaceous residue. It is found native together with petroleum, and may also be procured by the distillation of coal.

MINERAL PITCH, *Maltha*. The external characters of maltha are extremely similar to those of common pitch; when heated, it emits a strong unpleasant odour. In cold weather it may be broken, and exhibits a vitreous lustre; but when warm it is soft and tenacious.

ASPHALTUM, *Schlackiges Erdpech*, *Asphalte*. The colour of this substance is black or brownish black; it is light and brittle; when broken, it displays a conchoidal fracture and vitreous lustre; it has little or no odour, unless it is rubbed or heated. It is considerably inflammable, melts easily, and burns away without leaving any residue. It is principally found on the shores of the Dead Sea, in Syria, and in the Isle of Trinidad in the West Indies.

The principal use of asphaltum is an ingredient in certain varnishes, especially that used by the copper-plate engravers.

§ 2. *Elastic Bitumens.*

MINERAL CAOUTCHOU, *Elastisches Erdpech*, *Poix minérale elastique*. The colour of this substance varies from yellowish brown to olive brown and blackish or reddish brown. The light coloured is often in a semifluid state, and adheres to the fingers; the olive brown is solid and elastic; the blackish and reddish brown are hard and little elastic. It occurs italcritical, or invelting, or in masses. Its sp. grav. in the soft varieties is about = 0.9, and in the hardest and least elastic is = 1.2. It passes into asphaltum.

It is partly soluble in sulphuric ether; but the residue of the solution, after evaporation of the ether, is not elastic; thus forming an essential difference between the vegetable and mineral caoutchou.

This singular mineral has been hitherto only found in the cavities of a lead mine, near Castleton, in Derbyshire, called the Odin mine, accompanied by asphaltum.

SUBERIFORM MINERAL CAOUTCHOU. This substance, when recently cut, exactly resembles fine close cork in its colour and texture; but by exposure for a few days to the air, it becomes of a pale reddish brown colour. It is also sometimes found friable, and passing by decomposition into an ochraceous powder. It has only been found in a rivulet near the Odin mine, whence the preceding is obtained, and appears to differ from it, merely by being penetrated with water. It occurs in nodules of various sizes, some weighing upwards of 13 pounds, the nucleus of which is very commonly the brown perfectly elastic mineral caoutchou. Fourcroy Syst. vol. viii. Brochant. Mineralog. vol. ii. p. 58. D. & D. Hist. Nat. art. *Bitumes*. Gren. Syst. Handbuch. vol. iii. p. i. Hatchet on Bitumens in Linnæan Trans.

BITURIGES CUBI, in *Ancient Geography*, the name of a people who occupied a considerable part of Aquitania Prima, and who had been much more powerful before Cæsar's conquest of Gaul, than they were afterwards. Livy says, that, in the time of Tarquin, they commanded the whole portion of Gaul called Celtic. Their capital was denominated *Avaricum*, which see. In the time of Cæsar, these people lost their power, and became subject to the Ædui, or at least were reduced to the necessity of putting themselves under their protection.

BITURIGES VIVISCI, a people who inhabited the southern part of Aquitania Secunda, and are supposed to have derived their origin from the Bituriges Cubi. Their capital was *Burdigala*; which see.

BITURIS, a town of Hispania Tarragonensis, in the country of the Vaiconcs. Ptolemy.

BITYLA, a town of the Peloponnensus, not far from the Messenian gulf, S.W. of Sparta.

BITZLEER, *Litwa*, in *Biography*, a celebrated Jewish rabbi, who flourished in Bohemia about the close of the sixteenth century. He conversed with the emperor Rodolphus, and he was so famous, that the Jews said of him, that all Israel drank of his waters, and walked by his light. He founded the academy, called *Klaufe*, in 1592, which acquired such reputation in his time, that it drew a vast concourse of disciples to him. He was chosen at last superintendent of all the synagogues in Poland.

BIVALVE, *bivalvæ vel*, in *Conchology*, bivalvix conchæ, one of the three principal sections, into which all testaceous animals are divided. The Linnæan genera of bivalve shells are *mya*, *solen*, *tellina*, *cardium*, *mastra*, *donax*, *venus*, *spondylus*, *chama*, *arca*, *ostrea*, *anomia*, *mytilus*, and *pinna*. The arrangement of bivalves by Cuvier, Lamarck, and other late naturalists differs materially from that of Linnæus and Gmelin. See CONCHOLOGY.

BIVALVE, is also applied, in *Botany*, to the *siliquæ*, or seed-pods, of such plants as open their whole length to discharge their seeds. Such are pea, beans, &c. which the botanists say, have bivalve or bivalvular siliquæ.

BIVAT, in *Conchology*, the name given by Adanson to the shell called by Linnæus (*Syll. Nat. edit. 10.*) *murex scabrifusculus*; and *voluta cancellata*. Gmelin.

BIVENTER, from *bis* and *venter*, in *Anatomy*, a name given to muscles that have two fleshy portions, which were called bellies, and one tendon. Such muscles are also called *digastric*. The term biventer has been applied to a muscle of the lower jaw and os hyoides, which is described under its more common title of *digastricus*. Albinus also denominates a portion of the musculus complexus of the neck, biventer cervicis. See COMPLEXUS.

BIVERI, in *Geography*, a lake of Sicily, near Lentini, which in summer and autumn, renders the situation of this town very unwholesome. The waters of this lake, and of the neighbouring marshes and ponds, abound with eels and tench, of the roes of which the fishermen make a large quantity of botarga, a species of caviar; it is very salt, and has the taste of tar, but is much relished by the Sicilians.

BIVINCO, the principal place of a canton, in the department of Golo, a id island of Corsica, the population of which consists of 1573 persons.

BIVIO. See BÉVIO.

BIVITTATUS, in *Entomology*, a species of *SCARABÆVS* (*Melolontha*), that inhabits Brasil. It is yellow and very glossy; on the head and thorax two common stripes, and many abbreviated green striæ on the wing-cases. Swederus Nov. Act. Stockh.

BIVITTATUS, a species of *CURCULIO*, found in St. Tho-

mas's island. It is black; wing-cases striated with dots; marginal and dorsal interrupted stripe of yellow. Fabricius.

BIUMBRES, from *bir*, *double*, and *umbra*, *shadow*, in *Geography*, an appellation given to the inhabitants of the torrid zone, because at two different seasons of the year, their shadows are projected two different ways.

The biumbres are the same with those otherwise denominated *amphiscii*.

BIUMI, **PAUL JEROM**, in *Biography*, born at Milan in 1663, studied medicine at Padua, where he was admitted to the degree of doctor in 1685. Returning thence to Milan, he soon acquired so much fame for his learning and skill in his profession, that in 1699 he was made professor of anatomy there, in which situation he continued to the time of his death, in 1731. He was author of several works, of which the following are most known: "Encomiasticon lucis, seu lucis encomia in physiologicis medicinæ novæ fundamentis e veterum tenetibus erutis, atque cultro anatomico, antropiæque caractere confirmatis," Mediol. 1701, 4to. "Scrutinio di Notomia e di Chirurgia," Milan, 1712, 8vo. Haller. Bib. Anat. et Méd. Eloy. Dict. Hist.

BIVONA, in *Geography*, a town in the kingdom of Naples, and province of Calabria Ultra, 10 miles N. E. of Nicotera.

BIXA, in *Botany*. Lin. gen. 654. Reich. 710. Schreb. 887. Juss. 293. Gært. t. 6. Class and order, *Polyandria Monogynia*. Nat. Ord. *Columniferae; Tiliaceæ*, Juss. Gen. Char. *Cal.* perianth five-toothed, very small, obtuse, flat, permanent. *Cor.* double; outer with petals five, oblong, equal, large, more rude; inner with five petals like the outer, but thinner. *Stam.* filaments numerous, setaceous, shorter by half than the corolla; anthers erect. *Pist.* germ ovate; style filiform, the length of the stamens; stigma parallelly bifid, compressed. *Per.* capsule ovate-cordate, compressed, fenced with bristles, bivalve, gaping at the angles, one-celled, with an inner bivalve membrane. *Seeds* numerous, turbinate, with a truncated navel, berried. *Rec.* linear, longitudinal, fastened to the middle of the valves.

Ess. Char. *Cor.* ten-petalled. *Cal.* five-toothed. *Capf.* bispid, bivalve.

Species, 1. *B. Orellana*, arnotto, or anotta. Lin. Spec. 74. Reich. 2. 580. Hort. Cliff. 211. Mat. Med. 135. Gært. fruct. 1. 292. Brown. jam. 254. B. Ovioidi, l. 8. c. 6. Bauh. Hist. 1. 44. Cluf. exot. 74. Orleansa f. Orellana. Pluk. phyt. t. 209. f. 4. Comin. Hort. 1. 65. t. 33. Rocu. Merian. furin. t. 44. Urucu. Piso 133. Sloan. jam. 2. 52. t. 181. f. 1. Pigmentaria. Rumph. Amb. 2. 79. t. 19. Arbor Mexiocana, fructu castaneæ, coccifera. Bauh. pin. 419. Raii hist. 1771. Achiotl. Hernandez. Mexic. 74. This shrub rises with an upright stem to the height of eight or ten feet, sending out many branches at top, which form a regular head. These are garnished with heart-shaped leaves, ending in a point, which have long footstalks, and come out without any order. The flowers are produced in loose panicles at the end of the branches, of a pale peach colour, having large petals. A native both of the East and West Indies. Introduced here in 1699 by Mr. Bentick.

Linnæus has adopted the South American vernacular name of *bixa* from Oviedo; and it is known by the same name in Holland, Denmark, and other northern countries. In Holland it is likewise called Orleansa; in German, Anotta, &c. In England this name is adopted, but its orthography is various, as Arnotto, Anotta, Anotta, Anato, Anoto, and Annoto. The French have adopted the Brazilian name. Urubu, or Urucu, spelling it Roucouyer, Roucou, or Rocurier des Indes. The Portuguese have also the same

appellation *Uracu*, or *Urucueira*. In Spanish it is *Anato*, or *Atolle*. In the Mexican language, *Achiotl*. Scaliger calls it *arbor finium reguandorem*, because the Mexicans made plans, and marked the boundaries of their lands on tablets, with the colour prepared from the berries. Tournefort named it *Mitella*, from the resemblance of the capsule, when open, to a mitre. For the preparation of the drug, and its uses, see *Аннотто*. The bark of the *bixa* makes good ropes for common use in the West Indies; and pieces of the wood are used by the Indians to procure fire by friction.

Propagation and Culture. This plant is propagated by seeds, may be easily cultivated, and is planted in many parts of Jamaica, Barbadoes, Cayenne, &c. in rich soils, and shady situations, shooting luxuriantly near rivulets. It is also propagated with us by seeds, which are annually brought in great plenty from the West Indies. These should be sown in a small pot filled with light rich earth, and plunged into a hot-bed of tanners' bark, where, with proper temperature, the plants will appear in about a month; when they are about an inch high, they should be taken out and separated without injuring their roots, and each planted in a pot of light rich earth, and plunged into a fresh hot bed of tanners' bark, shading them every day till they have taken root; afterwards they should be treated like other plants of the same country, by admitting fresh air to them in proportion to the warmth of the season; and when the heat of the tan declines, it should be turned up to the bottom, and, if necessary, fresh tan be added to renew the heat. The plants must be refreshed with water three times a week in summer, but not in great quantities, as with much wet their roots would rot. Plants that are raised early in spring, and properly managed, will be a foot and a half high in autumn, when they should be removed into the bark stove, and plunged into the tan-bed. During the winter, they must have but little water, and while the plants are young, they should be kept warm; otherwise they will cast their leaves, lose their tops, and appear unightly. They must be kept constantly in the bark stove; some of them rise seven or eight feet high, with strong stems and large heads; but seldom produce flowers in Europe. Martyn's Miller.

BIXÆ, in *Entomology*, a species of *PAPILIO* (*Pleb. Urb.*), with roundish, brown wings, greenish at the base, and a milky band on the under side of the posterior wings. Linn. Fabr. &c. Inhabits America.

BIZACIUM, in *Ancient Geography*. See *BYZACIUM*.

BIZAM, *CHAT-BIZAM*, in *Zoology*, the French name of the Linnæan *viverra tigrina*, which see.

BIZAMO, in *Geography*, a kingdom of Abyssinia, situate between the branches of the Nile, called the White and the Blue rivers, about N. lat. 10° 15'. and between 35° and 36° E. long.

BIZANTIA, a town of European Turkey, in the province of Moldavia, 40 miles south-west of Buhah.

BIZARRE, Fr. denoting *capricious*, &c. a term used among *Florists* for a particular kind of carnation, which has its flowers striped or variegated with three or four colours.

BIZE, in *Geography*, a town of France, in the department of the Aude, and district of Narbonne, 10 miles N. W. of Narbonne.

BIZERTA. See *BISERTA*.

BIZES, in *Ancient Geography*, a river of Bithynia, between Pissis and Rhebas. Ammian. Marcell.

BIZOCHI, or *BISOCHI*, in *Ecclesiastical History*, a sect or branch of religious minorites, condemned by several popes.

The *Bizochi* were also called *fratricelli*, or *fratres de pauperum vita*: sometimes *Bichini* or *Biechini*, and *Begvins*. The name is formed from *bisacess*, on account of a double bud-

get, or wallet, wherewith they begged their living. See *BEGHARDI*, and *TERTIARIES*.

BIZONE, in *Ancient Geography*, a city of Lower Mæsia, 80 stadia north of Dionysopolis, mentioned by Pliny (l. iv, c. 12.) as having been destroyed by an earthquake.

BIZONNES, in *Geography*, a town of France in the department of the Here, and chief place of a canton; in the district of La Tour du Pin, 12 miles north-west of Moirans.

BIZU, a town of Africa, in the kingdom of Morocco, seated on a mountain in a fertile country, 25 leagues north of Morocco.

BIZYA, in *Ancient Geography*, a town of Thrace, and capital of the country called *Ætica*, at some distance from the sea, N.W. of Salmydessus.

BIZYA, in *Geography*, a town of European Turkey, in Romania, 50 miles east of Adrianople.

BLACK, something opaque and porous, that imbibes the greatest part of the light that falls on it, reflects little or none, and therefore exhibits no colour. See *BLACKNESS*.

Bodies of a black colour are found more inflammable, because the rays of light falling on them are not reflected outwards, but enter the body, and are often reflected and refracted within it, till they be stifled and lost. They are also found lighter, *cæteris paribus*, than white bodies, being more porous. It may be added, that clothes dyed of this colour wear out faster than those of any other, because their substance is more penetrated and corroded by the vitriol necessary to strike their dye, than other bodies are by the galls and alum which suffice for them.

The inflammability of black bodies, and their disposition to acquire heat, beyond those of other colours, are easily evinced. Some appeal to the experiment of a white and black glove worn in the same sun; the consequence will be a very sensibly greater degree of heat in the one hand than the other. Others allege the phenomena of burning-glasses, by which black bodies are always found to kindle sooner; thus, a burning-glass, too weak to have any visible effect at all upon white paper, will readily kindle the same paper rubbed over with ink. Mr. Boyle gives other proofs still more obvious: he took a large tile, and having whited over one half of its superficies, and blacked the other, exposed it to the sun; where having let it lie a convenient time, he found, that whilst the whited part remained still cool, the black part was grown very hot. For farther satisfaction the same author has sometimes left on the surface of the tile a part retaining its native red, and exposing all to the sun, has found the latter to have contracted a heat in comparison of the white part, but inferior to that of the black. So also on his exposing two pieces of silk, one white, the other black, in the same window to the sun, he often found the latter considerably heated, when the former has remained cool. It is observable likewise, that rooms hung with black are not only darker, but warmer than others. Boyle's Works abridg. tom. i. p. 144. and tom. ii. p. 36. To all which may be added, that a virtuoso of unsuspected credit assured Mr. Boyle, that, in a hot climate, he had, by carefully blackening the shells of eggs, and exposing them to the sun, seen them thereby well roasted in a short time.

Dr. Watson, the present bishop of Landaff, covered the bulb of a thermometer with a black coating of Indian ink, in consequence of which the mercury rose ten degrees. Phil. Trans. vol. lxxiii. part 1. p. 40.

Black clothes heat more, and dry sooner in the sun, than white clothes. Black is therefore a bad colour for clothes in hot climates; but a fit colour for the linings

of ladies' summer hats. Dr. Franklin's Experiments, Observations, &c. 5th edit. p. 483, & seq. He observes also, *ibid.* p. 382, that a chimney painted black, when exposed to the sun, will draw more strongly. We may add, that black mould is a hotter soil for vegetables; and garden-walls, painted black, answer better for the ripening of wall-fruit, than those of lighter colours.

BLACK, in matters of dress, is the distinguishing habit of claustrals and mourners. Some will have it, that the common people among the Romans were clothed in black; whence the denomination given them of *turba pulata*.

BLACK, JOSEPH, in *Biography*, a celebrated teacher of chemistry, was born at Bourdeaux, in France, in the year 1728. His father, who was a native of Belfast, in Ireland, but of a Scotch family, carried on the wine trade at Bourdeaux, and lived in intimacy with the famed baron Montefquieu, who expressed his regret in strong terms on Mr. Black's quitting Bourdeaux, when he retired from business, as appears by several of his letters which are preserved by the family. By his mother, Dr. Black was nearly related to the wives of Dr. Adam Ferguson, and Mr. James Ruffel, professor in natural philosophy at the university of Edinburgh, and owed probably much of his knowledge to the instruction or information he obtained from them. In the year 1740, his father sent him to Belfast, that he might have the education of a British subject; and from his letters, he appears to have been satisfied with the progress he made there. In 1746, he went to Glasgow, where he applied to the study of medicine, but particularly to chemistry, into the knowledge of which he was initiated by Dr. Cullen, who then gave lectures there on that branch of science. Under his direction he made such progress, that, in 1756, when Dr. Cullen removed to Edinburgh, Black, who had previously taken his degree of doctor, succeeded him as professor in medicine, and lecturer in chemistry. That he was qualified to fill this office, he had shewn by an ingenious essay, containing experiments to investigate the nature of magnesia, quicklime, and some other alkaline substances, recommended as solvents of the stone in the bladder. In the course of these experiments he demonstrated the existence of an aerial fluid, which he called fixed air, the presence of which gave mildness, and its absence causticity, to alkalis and calcareous earth; a discovery which laid the foundation of the improvements since made in our knowledge of gases, or aerial bodies, by Priestley, Cavendish, Lavoisier, and other chemists. The essay, containing the account of these experiments, was published in the second volume of "Essays physical and literary," in 1756. The following year he further enriched his favourite science with his experiments on latent heat, which is found to exist in all bodies; explaining in a satisfactory manner the connection of heat and fluidity, by which he so established his reputation, that on Dr. Cullen's being promoted from the chemical to the medical chair at Edinburgh, in 1765, he was unanimously chosen to succeed him as professor in chemistry there. His time was now dedicated, and with increased ardour, to imparting the knowledge he had acquired to his numerous pupils; and as he was perfectly master of the subjects on which he lectured, his doctrines were so clearly explained, as to be easily understood by his auditors, many of whom took complete copies of his lectures. By this means the knowledge of the discoveries he had made, became widely diffused, and his claim to them secured to him, which might otherwise have been assigned to those who improved and extended them. Having thus laid the ground-work for the improvement of the art, he seems to have been contented, without attempting to push his discoveries further. Satisfied with the attention paid

him by his pupils, and the gradual extension of his fame, of which he received daily proofs, he took little notice of what Priestley, Lavoisier, and other philosophical chemists, were doing, or only noticed them when they had neglected making those acknowledgments to him he knew to be his due. Dr. Robison, who had been his pupil, and has lately published his lectures, with an account of his life, attributes this apparent apathy to the ill state of his health, which, for several years before his death, did not permit that degree of application and study, which the farther extension of his discoveries would have required. "The slightest cold," he says (Preface to the Lectures, p. lx.), "the most trifling approach to repletion, immediately affected his breath, occasioned feverishness, and, if continued two or three days, brought on a spitting of blood. In this situation nothing restored him but relaxation from thought, and gentle exercise. The sedentary life, to which study confined him, was manifestly hurtful; and he never allowed himself to indulge in any intense thinking, or puzzling research, without finding these complaints sensibly increased." Hence, though he had the honour of being elected one of the foreign associates of the royal academy of sciences at Paris, and member of the imperial academy at Petersburg, he sent no communications to either of those learned societies. As he ranked high among the teachers of chemistry, and his name and character were extended over Europe, his pupils were numerous, and continued increasing for the whole time he lectured, more than thirty years. In the year 1774, he sent to the Royal Society in London, his observations on the effect of boiling upon water, in disposing it to freeze; and, in 1791, the Royal Society at Edinburgh published his analysis of the waters of some hot springs in Iceland, in the third volume of their Transactions. In this paper, which is drawn up with great accuracy, he treats of the formation of the silicious stone, which is deposited by these springs. His constitution becoming more and more feeble, from the frequent returns of his complaint, he was first obliged to make use of an assistant in his lectures, and at length, to give them up altogether; the smallest exertion bringing on a fit of hæmoptoe. "But he seemed," Dr. Robison says (Preface, p. 73.), "to have his complaint almost under command, so that he never allowed it to proceed far, or to occasion any distressing illness, and so spun his thread of life to the last fibre, guarding against illness by restricting himself to a moderate diet, and meeting his increasing infirmities with a proportional increase of attention and care." On the 26th of November 1799, and in the 71st year of his age, he died suddenly, without any previous warning. Being at table, with his usual fare before him, some bread, a few prunes, with milk and water for his drink, having the cup in his hand, resting on his knees, he expired suddenly in that posture, the cup remaining in his hand, and his countenance so composed and placid, that his servant at first imagined he was fallen asleep. He was of a cheerful and sociable disposition, and, as his mind was well stored with knowledge, an entertaining companion. His company was therefore much courted; and, as his circumstances were affluent, he dedicated as much of his time to the pleasures of society, as was consistent with his avocations. He was never married; he therefore left the principal part of his fortune, which is said to have been considerable, among the children of his brothers and sisters. Gen. Biog. Dict. Lectures of the Elements of Chemistry.

BLACK, in *Heraldic Engravings*, is expressed by cross lines, and in emblazoning, is termed for commoners *sable*, for peers *diamond*, and for sovereigns and princes *saturn*.

BLACK, in the *Manege*. A horse of a deep, shining, and

and lively black is called a *black-more*, or *coal-black*. Horses black all over are commonly reckoned dull and melancholy; but a white foot, or star in the forehead, gives them a degree of sprightliness. The Spanish gravity is said to be best pleased with those entirely black.

BLACK, *blue*, in the *Manufactures and Arts*, is the coal of some kind of wood, or other vegetable matter, burnt in a close heat, where the air can have no access: the best sort is said to be made of vine-stalks and tendrils. The goodness of blue-black consists in the cleanness and blue cast of its black colour, and the perfect degree of its levigation.

That this preparation, which is sold in the colour-shops, is no other than a vegetable coal, appeared from the following experiment of Dr. Lewis. (Comm. Phil. Techn. p. 358.) Laid on a red hot iron, it burned and glowed like powdered charcoal, and turned into white ashes; which ashes, thrown into oil of vitriol diluted with water, very readily dissolved into a bitterish liquor, the characteristic by which the vegetable earth is distinguished. From what particular vegetable matter this blue-black is procured, experiments, he says, cannot discover: but it appears from those which he recites, that it may be obtained from many, and that the choice of the vegetable subject affects rather the softness or hardness than the colour of the coal. Blue-black, perfectly good, may be prepared in the manner directed for *ivory black*, from the vine stalks, or tendrils, or any other twigs of wood, of an acid taste and tough texture; but the soaking in the oil, prescribed for the ivory, must be omitted.

The painters have *blue-blacks*, *brown-blacks*, &c. which may be made by mixing pigments of the respective colours, with simple black ones, in greater or less quantity, according to the shade required. The dyers also have different blacks, and often darken other colours by slightly passing them though the black dyeing liquor; but the term brown-black is in this business unknown, brown and black being here looked upon as opposite to one another. In effect, the colour called brown-black is no other than that which all dyed black clothes change to in wearing; and therefore it is no wonder that it should be excluded from the catalogue of the dyers' colours. The true or simple blacks, mixed with white, form different shades of grey, lighter or darker, according as the white or black ingredient prevails in the mixt. The black pigments, spread thin upon a white ground, have a like effect. Hence the painter, with one true black pigment, can produce on white paper, or on other white bodies, all the shades of grey and black, from the slightest discolouration of the paper up to a full black; and the dyer produces the same effect on white wool, silk, or cloth, by continuing the subjects for a shorter or longer time in the black bath, or making the bath itself weaker or stronger.

M. le Blon, in his "Harmony of Colours," forms black by mixing together the three primitive colours, blue, red, and yellow; and Mr. Castel, in his "Optique des couleurs," published in 1740, says, that this compound black has an advantage in painting above the simple ones, of answering better for the darkening of other colours. Thus if blue, by the addition of black, is to be darkened into a *blue-black*, the simple blacks, if used in sufficient quantity to produce the requisite deepness, conceal the blue, while the compound blacks leave it distinguishable. Le Blon has not mentioned the proportions of the three primitive colours necessary for producing black. Castel directs 15 parts of blue, five of red, and three of yellow; and he observes, that the colours should be the deepest and darkest of their respective kinds, and that a combination should be made to several pigments for each colour; for the greater the contrast

of heterogeneous and discordant drugs, the more true and beautiful will be the black, and the more capable of uniting with all other colours, without suppressing them, and even without making them tawney. Dr. Lewis, in his experiments, has not so far succeeded as to obtain a perfect black by mixing different blue, red, and yellow powders; but he procured very dark colours, such as brown-blacks and grey-blacks.

BLACK, *bone*, is made of the bones of bullocks, cows, &c. well burnt and ground. To be good, it must be soft and friable, of a glossy cast. It is in considerable use, though inferior in goodness to ivory-black.

The invention of bone, or ivory-black, is attributed to Apelles. Plin. Hist. Nat. lib. xxxv. cap. 5.

BLACK *chalk*. See CHALK, and KILLOW.

BLACK *charcoal*. See CHARCOAL, and CRAYONS.

BLACK, *curriers*, signifies a teint or dye laid on tanned leather. Tanned leather is so much impregnated with the astringent parts of oak bark, or with that matter which strikes a black colour with green vitriol, that rubbing it over three or four times with a solution of the vitriol, or with a solution of iron made in vegetable acids, is sufficient for staining it black. Of this we may be convinced by dropping a little of the solution on the unblacked side of common shoe-leather. This operation is performed by the currier, who, after the colouring, gives a gloss to the leather with a solution of gum-arabic and size made in vinegar. Where the previous astringent impregnation is insufficient to give a due colour, and for those sorts of leather which have not been tanned, some galls or other astringents are added to the solution of iron; and in many cases, particularly for the finer sorts of leather, and for renewing the blackness, ivory or lamp-black is used. A mixture of either of these with linseed oil, makes the common oil-blackening. See CURRYING.

BLACK, *dyers*, is one of the five simple and mother colours used in dyeing: and given differently, according to the different quality and value of the stuffs to be dyed. See DYEING.

Green vitriol strikes a black colour with vegetable astringents, and hence it is the basis of the black dye for cloth, leather, hats, &c. And as solutions of iron with galls, &c. produce the same colour, a method is derived from hence of distinguishing the minutest portions of iron in mineral waters, &c. Neumann.

The substances chiefly employed for producing black colour with vitriol are galls. When a decoction or infusion of the galls is dropped into a solution of the vitriol largely diluted with water, the first drops produce bluish or purplish red clouds, which mingling with the liquor tinge it uniformly of their own bluish or reddish colour. This difference of the colour, says Dr. Lewis (Com. Ph. Tech. p. 346.), seems to depend on the quality of the water. With distilled water, or the common spring waters, the mixture is always blue. A minute quantity of alkaline salt previously dissolved in the water, or a small degree of putridity in it, will render the colour of the mixture purple or reddish. Rain-water received from the clouds, in clean glass vessels, gives a blue, but if it be collected from the tops of houses, gives purple with the vitriol and galls. Both the blue and purple liquors, when more of the astringent infusion is added, deepen to a black, more or less intense, according to the degree of dilution; and if the mixture be a deep opaque black, it again becomes bluish or purplish when further diluted. If it be suffered to stand in this dilute state for two or three days, the colouring matter settles to the bottom in form of a fine black mud, which, by slightly shaking

BLACK.

Shaking the vessel, is diffused again through the liquor, and tinges it of its former colour. When the mixture is of a full blackness, this separation does not happen, or in a far less degree, for though a part of the black matter precipitates in standing, yet so much remains dissolved, that the liquor continues black. This suspension of the colouring substance in the black liquid may be attributed in part to the gummy matter of the astringent infusion increasing the consistence of the watery fluid, for the separation is retarded in the diluted mixture by a small addition of gum arabic. If the mixture, either in its black or diluted state, be poured into a filter, the liquor passes through coloured, only a part of the black matter remaining on the paper. The filtered liquor, on standing for some time, becomes turbid, and full of fine black flakes; but being freed from these by a second filtration, it again contracts the same appearance, and thus repeatedly, till all the colouring parts are separated, and the liquor has become colourless. The colouring matter, thus separated from the liquor, being drained on a filter and dried, appeared of a deep black, which did not seem to have suffered any change on being exposed to the air for upwards of four months. When it was made red hot, it glowed and burnt, though without flaming, and became a rusty brown powder, which was readily attracted by a magnetic bar; though in its black state, the magnet had no action upon it. The vitriolic acid, diluted with water, and digested on the black powder, dissolved the greatest part of it, leaving only a very little quantity of whitish matter. Solution of pure fixt alkaline salt dissolved very little of it; the liquor received a reddish brown colour, and the powder became blackish brown. This residuum was attracted by the magnet after being made red-hot, though not before; the alkaline tincture, passed through a filter, and mixed with solution of gum vitriol, struck a deep brownish black colour, nearly the same with that which results from mixing with the vitriolic solution an alkaline tincture of galls. For an account of the result of these experiments, see Lewis, *ubi supra*. See also IRON.

For broad-cloths, ne ratines, and druggets, &c. the dyers use woad and indigo; the goodness of the colour consists in there not being above six pounds of indigo to a ball of woad, when the latter begins to cast its blue flower; and, in its not being heated for use above twice. Thus bleued, the stuff is boiled with alum, or tartar, then maddered; and lastly, the black given with galls, copperas, and sumac. To bind it, and prevent its smearing in use, the stuffs are to be well scoured in the fulling mill, when white, and well washed afterwards.

For stuffs of less value, it is sufficient they be well bleued with woad, and blacked with galls and copperas; but no stuff can be regularly dyed from white into black, without passing through the intermediate blue.

Yet there is a colour called *coal black*, or *Jesuit's black*, prepared of the same ingredients as the former, and sufficient of itself without the blue dye. Here the drugs are dissolved in water that had boiled four hours, and stood to cool till the hand would bear it; then the stuff is dipped in it, and again taken out six or eight times. Some even prefer this black to the other. This method of dyeing black is said to have been invented by the Jesuits, and to have been practised in their houses, where they retained numbers of dyers.

By 23 El. c. 9. nothing of the nature of cloth shall be maddered for a black, except it be first grounded with woad only, or with woad and anele [blue ind.], unless the madder be put in with sumac or galls; on pain of forfeiting the value of the thing dyed; provided it shall be lawful to dye

any manner of gall-black, and sumac-black [*plain black*], wherein no madder shall be used.

Logwood strikes a black with chalybeate solutions and is employed with those liquors for staining wood black, as picture frames, &c. With the addition of galls, it is used for dyeing cloth and hats black. (Neumann's Works, p. 385.) This black colour is not permanent, though beautiful, any more than the natural violet dye of the *logwood*.

Black may be also obtained by a solution of silver in aqua fortis, when the previous matter stained with this liquor is exposed for some time to the sun and air; and also from solutions of lead in acids, when the subjects to which they are applied are exposed to sulphureous vapours, or washed over with alkaline solutions of sulphur. Calces of lead, melted with sulphur, form a bluish or blackish mass, useful in taking casts from medals. (See CASTS.) Besides, when a solution of silver in aqua fortis is added to a solution of sulphur made in alkaline ley, the silver and sulphur unite and precipitate together in the form of a black powder. See DYEING, and STAINING.

BLACK, *earth*, is a kind of coal found in the ground, which, well pounded, is used by painters in fresco. See Pit-COAL, and FRESCO.

There is also a kind of black made of silver and lead, used to fill up the strokes and cavities of things engraved.

BLACK, *German*, or *Frankfort*, is made of the lees of wise burnt, then washed in water, and ground in mills for that purpose, together with ivory or peach stones burnt. Some suppose, that it is the coal of vine-twigs; but this, says Dr. Lewis (Com. Phil. Techn. p. 377.), does not appear to differ, in any great degree, from that of the small branches of other kinds of trees; but the kernels of fruits yield a coal considerably more soft and mellow, easily crumbling between the fingers into a fine meal. That the Frankfort black is no other than a vegetable coal, appeared, from its burning on a red-hot iron, like charcoal powder, into white ashes, and from the ashes, like common vegetable ashes, being plentifully dissoluble by the vitriolic acid into a bitterish liquor, while the ashes of animal substances are very sparingly affected by that acid, and form with it a compound of a different kind of taste.

This black makes the principal ingredient in the roiling-press printers' ink, which see. It is ordinarily brought from Frankfort, Mentz, or Strasbourg, either in lumps or powder. That made in France is more valued than that of Germany.

BLACK *glass*. See GLASS.

BLACK, *harts*, that which remains in the retort after extracting the spirit, salt, and oil of hartshorn. This residuum being ground up with water, makes a black not much inferior to that of ivory.

BLACK, *Indian*. See INDIAN INK.

BLACK, *ivory*, is made of ivory burnt or charred, ordinarily between two crucibles well luted; which, being thus rendered perfectly black, and in scales, is ground in water, and made into troches, or little cakes, used by the painters; as also by the jewellers to blacken the bottom or ground of the collets, wherein they set diamonds to give them their teint or foil. Some recommend soaking the chips or shavings of ivory in hot linseed oil, before it is charred.

There are particular machines and contrivances for burning the ivory for these purposes, by which the colour is rendered more beautiful than that of the coal which remains in the distillation. Neumann.

The goodness of ivory-black, which is the finest of all the charcoal blacks, may be perceived by its fulness, without a blue cast; and by the fineness of the powder.

BLACK.

In the manufacture of this black much imposition is practised, so that what is generally sold under this name is no other than the coal of common bones. Being applied to coarse purposes, and sold at a low price, it is very grossly levigated by the hand or horse-mills which are employed in grinding the bones, and so much adulterated with charcoal dust, which gives it a blue cast, that it is wholly exploded from delicate uses, and lamp-black, though inferior with regard to the purity and clearness of the black colour, substituted for it.

The following recipe is given in the *Handmaid to the Arts* (vol. i. p. 140.) for preparing it in perfection. Take plates, chips, or shavings of ivory, and soak them in hot linseed oil; or, if filings are more easily procured, they may be used moistened with the hot oil. Put them into a vessel, which will bear the fire, covering them with a sort of lid made of clay and sand; which should be dried, and the cracks repaired before the vessel be put into the fire. Let this vessel be placed in a tobacco-pipe maker's or potter's furnace, or any other such fire; and let it remain there during one of their heats. When it is taken out, the ivory will be properly burnt; and must be afterwards thoroughly well levigated on the stone with water, or to have it perfectly good, be also washed over. The ivory may be conveniently burnt in a calcining or subliming furnace.

An opaque deep black for water colours is made by grinding ivory-black with gum-water, or with the liquor which settles from the whites of eggs after they have been suffered to stand a little. Some use gum water and the whites of eggs together, and they say, that a small addition of the latter makes the mixture flow more freely from the pencil, and improves its glossiness. It may be observed, however, that though ivory-black makes the deepest colour in water, as well as in oil-painting, yet it is not on this account always to be preferred to other black pigments. A deep jet-black colour is seldom wanted in painting; and in the lighter shades, whether obtained by diluting the black with white bodies, or by applying it thin on a white ground, the particular beauty of the ivory-black is in a great measure lost.

BLACK, lamp, or lam BLACK, originally perhaps the foot collected from lamps, is generally prepared by melting and purifying resin or pitch in iron vessels; then setting fire to it under a chimney, or other place made for the purpose, lined a-top with sheep-skins, or thick linen cloth, to receive the vapour or smoke, which is the black: in which manner they prepare vast quantities of it at Paris. In England considerable quantities are prepared, particularly at the turpentine-houses, from the dregs and refuse parts of the resinous matters which are there manufactured; but the greatest part is brought from Germany, Sweden, and Norway. Its preparation is described in the *Swedish Transactions* for 1754, as a process dependent on the manufacture of common resin.—The impure resinous juice, collected from incisions made in pines and fir-trees, is boiled down, with a little water, and strained, whilst hot, through a bag; the dregs and pieces of bark, left in the strainer, are burnt in a low oven, from which the smoke is conveyed, through a long passage, into a square chamber, having an opening in the top, in which is fastened a large sack, made of fleasy or thin-woven woolly stuff; the foot, or lamp-black, concretes partly in the chamber, from which it is swept out once in two or three days, and partly in the sack, which is now and then gently struck upon, both for shaking down the foot, and for clearing the interstices between the threads, so as to procure a sufficient draught of air through it. The more curious artists prepare lamp-black for the nicer purposes, by hanging

a large copper pan over the flame of a lamp with a long wick, supplied with more oil than can be perfectly consumed, so as to receive its smoke. Soot collected in like manner from fir and other woods, by burning small pieces of them slowly under a copper pan, is of a deeper black colour than such as is obtained from the same kinds of wood in a common chimney, and little inferior to that of oils. The foot of mineral bitumens, in this close way of burning, appears to be of the same qualities with those of woods, oils, and resins. In some parts of Germany, it is said, great quantities of good lamp-black are prepared from a sort of pit-coal.

The goodness of lamp-black lies in the fulness of the colour, and in its being free from dust or other impurities. The lightness of the substance furnishes the means of discovering any adulteration, if to a great degree; as the bodies with which lamp-black is subject to be sophisticated, are all heavier in a considerable proportion.

This substance is used on various occasions, particularly in the printers' ink; for which it is mixed with oils of turpentine and linseed, all boiled together.

It must be observed, that this black takes fire very readily, and when on fire is very difficultly extinguished: the best method of putting it out is with wet linen, hay, or straw; for water alone will not do it.

A glass tube closely filled with lamp-black has been found to conduct a considerable charge of electricity instantaneously, and with scarce any explosion. But a coating of this substance, mixed with tar or oil, is a perfect non-conductor, and has proved a preservative from lightning, by repelling the electric matter from those parts of the masts of ships which have been covered with it.

Russian lamp-black is prepared from the foot of fir, and is collected at Oclta near St. Petersburg, Moscow, Archangel, and other places, in little wooden huts, from resinous fir wood, and the unctuous bark of birch, by means of an apparatus uncommonly simple, consisting of pots without bottoms, set one upon another, and is sold very cheap. It is three or four times more heavy, thick, and unctuous, than that kind of painters' black which the Germans call "kienrahm," and which is called in Russia "Holland's black." For an account of the spontaneous accension of Russian fir-black, impregnated with hemp-oil, see *Spontaneous INFLAMMATION*.

A mineral lamp-black may be procured from pit-coal, or any kind of mineral or fossil coal, by preserving the blackest particles of the smoke arising from it in ignition. Mr. Wm. Row of Newcastle-upon-Tyne obtained a patent in 1798 for his method of manufacturing this kind of lamp-black. See the specification in the *Repertory of the Arts*, &c. vol. x. p. 81.

BLACK paint. See **PAINT**.

BLACK sand. See **SAND**.

BLACK sealing wax. See **WAX**.

BLACK, foot, or chimney, is a poor colour; but ready for painting black draperies in oil. The foot blacks are in general much softer and of a more yielding texture than those of the charcoal kind, and require much less grinding, for uniting them with oily, watery, or spirituous liquors, into a smooth mass; of some of them a part is dissolved by water, or spirits of wine, while none of the charcoal blacks have been found to contain any thing dissoluble. This soluble matter of foots, however, is not black like the indissoluble parts; and in this particular, as well as in the colour of the entire mass, different sorts of foot differ from one another. Thus the foot of pit-coal collected in common chimneys, of itself rather greyish black than of a full black,
being

being infused separately in rectified spirit of wine, and in water, tinged the former of a transparent reddish colour, and the latter of a paler reddish; while the deeper black font of wood gave, both to spirit and to water, an opaque, dark brown. See SOOT.

BLACK, *Spanish*, so called, because first invented by the Spaniards, and most of it bought from them, is no other than burnt cork used in various works, particularly among painters.

BLACK stains. See STAINING.

BLACK varnish. See VARNISH.

BLACK vegetable juice. See ANACARDIUM.

BLACK *Act Waltham*, in *Laws*, a name commonly distinguishing the statute of 9 Geo. I. c. 22. because it was occasioned by the devastations committed near Waltham in Essex, by persons in disguise, or with their faces *blackened*. By this statute it is enacted, that persons hunting, armed and disguised, and killing or stealing deer, or robbing warrens, or stealing fish out of any river, &c. or any persons unlawfully hunting in his majesty's forests, &c. or breaking down the head of any fish-pond, or killing, &c. of cattle, or cutting down trees, or setting fire to house, barn, or wood, or shooting at any person, or sending letters, either anonymous, or signed with a fictitious name, demanding money, &c. or rescuing such offenders, are guilty of felony, without benefit of clergy. This act is made perpetual by 31 Geo. II. c. 42. See farther 6 Geo. II. c. 37. and 27 Geo. II. c. 15. Blackstone's Comm. vol. iv. p. 144. 208. 232. 244. The milder punishment inflicted by stat. 16 Geo. III. c. 30. against deer-stealers, has been thought a virtual repeal of the punishment of the black act above-recited. Leach's Hawk. P. C. i. c. 49. § 7.

BLACK bay, in *Geography*. a bay on the south-east coast of Labrador. N. lat. 51° 30'. W. long. 56° 20'.

BLACK bear, in *Zoology*. See URSUS ARCTOS.

BLACK-bellied darter, and BLACK-bellied anbinga of Latham, in *Ornithology*, is *Plotos Melanogaster* of Gmelin.

BLACK-bellied grosbeak of Browne's Illustrations, is *Loxia aspera* of Gmelin.

BLACK-bellied green humming-bird of Edwards; BLACK-bellied American humming-bird of Bancroft; and BLACK-bellied humming-bird of Latham, are all the same bird; namely, *Trochilus holosericeus* of Linn. and Gmelin.

BLACK-berry, in *Botany*. See RUEUS.

BLACK billed auk of most English writers, in *Ornithology*, is *Alca pica* of Linn. Syst. Nat. and Fabricius.

BLACK-billed tropic bird, so named in Latham's Synopsis, is *Phaeton melanorhynchus* of Gmelin.

BLACK-billed whistling duck of Sloane and Brown's Jamaica, is called *Anas arborea* by Gmelin.

BLACK-bird. The proper acceptance of this word among the English writers of the present time, is very clearly understood; the *Turdus merula* of Linnæus and other naturalists being alone implied. The earlier ornithologists of this country are much less precise in the application of this word: with them, birds of the same natural order were sometimes called black-birds, because they bear a remote resemblance to the common species most familiarly known by that name, as we find, for instance, in the two kinds of *turdus*, *torquatus*, and *roseus*, both of which are called, in a general manner, black-birds, white-ringed black-birds, rose-coloured black-birds and the like. Thus far, indeed, there existed a striking natural affinity between the species, because they all belong to the same natural order, and were, in reality, of the family they called

merula, which seems to have been considered in certain instances synonymous with black-bird. But all the early writers did not confine themselves to such minute distinctions as the generic character afforded: the *black-bird* (razor-billed) of Catesby, being, for example, of a very dissimilar genus to that of our common black-bird; namely, the *crotophaga* of modern writers. Again, the *black-bird* (red-breasted Indian) of Willughby, is one of the *oriolus*; the *black-bird* (red-breasted) of Edwards, belongs to the *tanagra*; and the *black-bird*, or *Chinese starling* of the same author, is a *gracula*. Birds of the sparrow, titmouse, and other kinds, altogether remote from the former, were also called occasionally black-birds. We may, therefore, easily perceive that the word black-bird was an indefinite term, applied, for the most part, to those birds whose plumage is of a black colour, without regard to the natural order to which they ought to have been referred, although sometimes employed to express only that which we still distinguish by the name of black-bird. See TURDUS MERULA.

BLACK-book of the *Exchequer*, *Eagle*, *Hellebore*, *Money*, *Order*, *Star*. See the several articles.

BLACK-books, a name given to those which treat of necromancy, or, as some call it, nigromancy.

The black-book of the English monasteries, was a detail of the scandalous enormities practised in religious houses, compiled by order of the visitors under king Henry VIII. to blacken them, and thus hasten their dissolution.

BLACK-breasted grebe of Latham, in *Ornithology*, is *Colymbus thomensis* of Gmelin.

BLACK-breasted grosbeak of Latham, is *Loxia Americana* of Gmelin.

BLACK-breasted humming-bird of Latham, is spoken of by Buffon under the name of *Huiffe col vert*; Gmelin calls it *Trochilus gramineus*.

BLACK-breasted Indian plover of Edwards, is a variety of CHARADRIUS SPINOSUS of Gmelin. The female of this bird is called by Edwards the *spur-winged plover*, a name retained by Latham for both sexes. In Ruffell's Aleppo it is called the *lapwing*.

BLACK-breasted thrush. Latham describes *Turdus cinnamomeus* of Gmelin, under this name in the synopsis of birds.

BLACK-breasted titmouse of Latham, is *Parus aser* of Gmelin.

BLACK-breasted wood-pecker of Latham, is *Picus multicolor* of Gmelin.

BLACK-bulfinch of Albin, like *Pyrrhula nigra* of Brisson, and *Bouvreuil noir* of Buffon, is nothing more than an accidental variety of the common bulfinch, or *Loxia pyrrhula* of Latin writers. The bulfinch occurs sometimes of a white colour, as well as black or dusky.

BLACK-bulfinch, (Little) of Catesby and Albin, and BLACK grosbeak of Latham, is *Loxia nigra* of Gmelin.

BLACK-canker, in *Agriculture*, a disease in turnip and other crops, produced by a species of caterpillar destroying their leaves.

It is observed by Mr. Young, in the second volume of the Annals of Agriculture, that "these insects were effectually destroyed by Mr. Coke, at Holkham, in Norfolk, by turning a number of ducks among the turnips when injured by insects. On the 16th of July, says he, they were turned into thirty-three acres, having water at one corner of the field, and, in five days, they cleared the whole most completely, marching at last through the field on the hunt, eyeing the leaves on both sides with great care to devour

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every one they could see, and filling their crops several times in the day. The ducks, after having saved about sixty pounds' worth of turnips, were sent to the poultry yard." With this view, it has been suggested by Mr. Middleton in his "Survey of the county of Middlesex," that this sort of poultry may often be kept with advantage by the farmer.

BLACK-canons, in *Ecclesiastical History*, a name given to the regular canons of St. Augustine, who wore a black mantle over their surplice, by way of distinction from the *Præmonstratenses*.

BLACK-cap of the English, in *Ornithology*, the *Motacilla atricapilla* of Linnæus. The same name is given likewise to the *marsh titmouse*. *Parus palustris* of Linn. and the *black-headed gull*, *Larus atricilla* of Gmelin.

BLACK-cap of Ceylon, or *Ceylon black-cap*, the name of *Motacilla zeylonica* of Gmelin, in Brown's *Illustration of Nat. Hist.*

BLACK capped humming-bird of Latham, and *Long-tailed black-cap humming-bird* of Edwards and Bancroft, are *Trochilus polytmus* of Gmelin.

BLACK-capped king's-fisher of Latham, is *Alcedo atricapilla* of Linn.

BLACK-capped lory, the English name given by Latham to the *Gmelinian psittacus lory*. This is the first black-cap lory of Edwards.

BLACK-capped manakin of Edwards and Latham, is *Pipra manacus* of Gmelin.

BLACK-cape, in *Geography*, lies on the east coast of Newfoundland, S. E. from cape St. Francis.

BLACK-cattle, in *Agriculture*, a small, hardy breed of cattle, mostly of a black colour, occupying the high or more mountainous districts in the northern parts of the island. They are covered with a long close coat of hair, of much the same kind as the polled and long horned breeds. They feed readily in the rich pastures in the southern parts of the kingdom, where large quantities of them are annually driven and fed for sale in the London and other markets. Their beef is generally of a fine grain, well marbled, and of a good flavour; but sometimes not so fine and bright in its external appearance as that of other sorts of cattle, being occasionally, except when made very fat, spotted with black, even upon the choicest parts. From their property of becoming quickly fat, and not being of great weight, they seem well adapted to the low, rich, grazing districts in the southern counties, where the lands are liable to be poached and injured by the heavier breeds of cattle. They seldom weigh more than from twenty to thirty stone each, though some particular ones have become considerably heavier. See **CATTLE** and **LIVE-STOCK**.

BLACK-checked eagle, of Latham's Synopsis, in *Ornithology*, is *Falco Americanus* of Gmelin.

BLACK-checked thrush of Latham, is *Turdus nigerimus* of Gmelin.

BLACK-chin grebe of Pennant, &c. *Colymbus lebrideus* of Gmelin.

BLACK-cock of Pennant, Latham, Donovan, &c. is *Tetrao tetrax* of Linnæus. The same bird is also well known by the name of *black-game*, or *black-grouse*.

BLACK-cockatoo of Latham, and *Great black cockatoo* of Edwards, is called by Buffon *Kakatoë noir*, and by Gmelin *Psittacus aterimus*.

BLACK-collared finch of Latham, is *Fringilla Abyssinica* of Gmelin.

BLACK-crowned bunting of Latham, is *Emberiza atricapilla* of Gmelin.

BLACK-crowned manakin of Latham, is *Pipra atricapilla* of Gmelin.

BLACK-crowned oriole, the English name of *Oriolus Mexicanus* of Linn. in Latham's "Synopsis of Birds."

BLACK-crowned plover of Arct. Zool. is *Charadrius atricapillus* of Gmelin.

BLACK-crowned shrike of South America is *Lanius Americanus* of Gmelin.

BLACK-crowned tanager of Latham, is *Tanagra melaniotera* of Gmelin.

BLACK-Indian-cuckoo of Edwards, is *Cuculus niger* of Linn.

BLACK-diver, or *scoter*, of English ornithologists, is *Anas nigra* of Linn. Fn. Suec.

BLACK-dolphin, in *Agriculture*, a small insect which is frequently very destructive to bean, turnip, and some other crops. Where beans are attacked with these insects, the best remedy probably is, as soon as they are first perceived, to cut off the tops by means of a scythe, as they are found to make their first lodgments, principally in those parts of the plants. See **FLY** and **TURNIPS**.

BLACK duck of Latham and other writers, in *Ornithology*, is called by Edwards the *great black duck* from Hudson's bay. This is a very distinct species from the *black duck* of Ray and Willughby, and *velvet duck* of modern naturalists. Gmelin calls it *Anas perspicillata*.

BLACK-duck, or *Great black duck* of Ray and Willughby, is the *velvet duck* of later English authors, and *Anas fusca* of the Linnæan Fauna Suecica.

BLACK eagle, in *Heraldry*, an order of knighthood instituted in Prussia, by Frederic I. 14th Jan. 1701. The ensign of the order is a gold cross of eight points, enamelled blue; in the centre whereof are the letters F. R. in cypher, and in the four angles the eagle of Prussia, enamelled black. On collar days, it is worn pendant to a rich collar of gold, composed of round pieces of gold, each enamelled with four cyphers of the letters F. R.; in the centre of the piece is set a large diamond, and over each cypher a regal crown, all richly chased, intermixed with eagles displayed, enamelled black alternately, and holding in their claws thunderbolts of gold.

The cross of the order is worn, on ordinary days, pendant to a broad, orange-coloured ribbon, across the left shoulder. The knights have embroidered on the left breast of their coats a star of silver, like that of the ensign of the order, in the centre of which is an eagle displayed black, holding in his dexter claw, a chaplet of laurel, and in the other a thunderbolt, with the motto *Suum cuique* round it. See **PLATE of Heraldry**.

BLACK-eagle of Willughby, in *Ornithology*, is *P. Aigle commune* of Buffon, and *Falco melanætos* of Gmelin.

BLACK-ears, or **BLACK-eared lynx**, in *Zoology*, called also the *Persian lynx*, and *Black-eared cat*, is the *Sigah gush* or *Siyah gush* of Charleton, and *Caracal* of Buffon. Gmelin mentions this animal under the name of *Felis caracal*. See **CARACAL**, and **SIGAH GUSH**.

BLACK-earth, in *Agriculture*, that kind of earth or mould which contains a large portion of carbonaceous or vegetable matter in its composition. Soils of this sort are capable of producing most sorts of grain and other vegetable crops in abundance. See **SOIL**, &c.

BLACK-eunuchs, in the *Custom of Eastern Nations*, are Ethiopians castrated, to whom their princes commonly commit the care of their women. See **EUNUCH**.

BLACK-eye, in *Botany*, a name given to the germ in beans, which the Romans called hilum. See **GERM**.

BLACK-eye, hypsophagma, in *Medicine*, a suffusion of blood on the *tunica adnata*, turning livid, occasioned by a blow. See ECCHYMOISIS.

BLACK-faced bunting of Latham, in *Ornithology*, is *Emberiza quelea* of Gmelin.

BLACK-faced finch of the Arctic Zoology is *Fringilla cristata* of Gmelin.

BLACK-faced ibis of Latham, is *Tantalus melanopsis* of Gmelin.

BLACK-fish, in *Ichthyology*, the name under which *Silurus anguillaris* is described in Russel's "Hist. of Aleppo." This fish has a single dorsal fin containing seventy rays, and eight beards at the mouth, namely, two on the upper lip, four on the lower one, and two on each side of the mouth. There is likewise a kind of perch mentioned by Borlase as being found in the rivers of Cornwall, which he calls the black fish. Pennant speaks of it on the authority of that writer; and Gmelin, after him, gives it as a species with some doubt. This species meant by Borlase is certainly ambiguous. See PERCA NIGRA.

BLACK-fly, in *Agriculture*, an insect of the beetle tribe, that often commits great devastation among turnip and other crops, destroying the young plants, by feeding upon their feed-leaves the moment they are protruded and appear above ground. Different remedies have been proposed for the prevention of the destructive ravages of this insect on turnips, but few of them have been attended with much success. The best method is probably, that of sowing the seed at such a season, and under such circumstances, as that its early vegetation may be quick and uninterrupted, and thereby allow little time for the insects to feed upon the plants, before they become in broad leaf, and capable of resisting its injurious attacks. See FLY and TURNIPS.

BLACK-fly-catcher of Latham, in *Ornithology*, is *Muscicapa luzonienfis* of Gmelin.

BLACK-forest, mountains of, in *Geography*, called in German Schwartzwald, extend from near Neuenburg, in the territories of Wurtemberg, south to the four forest towns on the Rhine. The southern part is called the high, and the northern the lower forest; the length being about 80 British miles. To the east the Necker may be considered as a boundary, and the breadth may be computed at about 20 British miles. The eastern part presents a gradual elevation, while the western exhibits precipitous summits to the inhabitants of Baden and Alsace. The appellation seems to be derived from the thick dark forests with which the ascents are clothed. Besides pasturage, the inhabitants, partly subject to Austria, and partly to Wurtemberg, derive advantage from the resin of the pines, and the timber, of which they make all kinds of utensils. Some parts are cultivated by spreading branches of pine, covered with sod, which, being burnt, affords an excellent manure, that prepares the ground for four abundant harvests. A branch of the black mountains spreads east from near Sulz, on the Necker, towards the county of Oettingen, being more than 60 miles in length. This chain is called the Alb, and sometimes the Suabian Alps. Busching traces this ridge from the north-east, the source of the Brenz, to the west of the Neresheim, by Wisenst-ig, where the mountains are highest. Thence they turn north-west to Guttenberg, and west to Neissen, whence they pass by Hohenzollern to the Necker, then bend south and west between that river and the Danube. Busching adds, that as this chain rises insensibly at Konigsbrown north-east, so it gradually terminates at Ebingen south-west. The principal summits are in the north and west of the ridge; and the forests are

chiefly beech; while the open spaces supply pasturage for numerous flocks of sheep. Of these two extensive ridges of mountains, the Black Forest and the Alb, a considerable portion pervades the duchy of Wurtemberg; and near Stuttgart, the capital, are the mountains of Boyseisteig, Weinsteig, and Hasensteig. The constituent parts of these extensive ridges have been little detailed; but a great part is calcareous, as they supply excellent marbles. Near Frudenstadt, in the black mountains, are mines of silver and copper.

BLACK-footed penguin, or *penguin, lesser penguin, cape penguin*, &c. in *Ornithology*, are different English names of an individual species of APHENODYTA in the works of Edwards, Latham, &c. Gmelin names this bird specifically *demersa*.

BLACK-fox, in *Zoology*. See CANIS LYCAON.

BLACK-fronted fly catcher of Latham, in *Ornithology*, is *Muscicapa nigrifrons* of Gmelin.

BLACK-fryers, in *Ecclesiastical History*, a name given to the Dominican order, called also *Predicants* and *Preaching fryers*; in France, *Jacobins*.

BLACK-game, in *Ornithology*. See BLACK-COCK.

BLACK-grass, in *Agriculture*, a species of American grass, growing in meadows which border on tide-rivers, well supplied also with fresh water; for a mixture both of fresh and salt water seems to be necessary for its prolific vegetation. Its seeds are small, like those of tobacco; its colour a deep green; and it affords from three to four tons of hay by the acre. This kind of grass thrives best on a clay or strong loam; nor is the vicinity of salt water absolutely necessary. The seeds have been lately brought over into England, and distributed for trial in proper soils.

BLACK-grosbeak of Edwards, in *Ornithology*, and the *Angola grosbeak* of Latham are the same; *Loxia augotensis* of Gmelin.—*Obs.* The *black grosbeak* of Latham is another bird; *Loxia nigra* of Gmelin.

BLACK-guillemot of Pennant and other English writers of the present times, is the *Greenland dove*, or *sea-turtle* of Albin, Ray, Willughby, and *Colymbus grylle* of Linnæus.

BLACK-headed bunting of Latham, is *Emberiza melanocephala* of Scopoli.

BLACK-headed creeper of Latham, and the *Green black-cap fly-catcher* of Bancroft, are of the same species, the latter being only a variety of the first. Linnæus calls this kind *Motacilla spiza*.

BLACK-headed duck of Shaw's travels, has been since named the *Damiatta duck* by Latham, and *Anas Damiatina* by Gmelin in the Linn. Syst. Nat.—The variety of *Anas boschas*, or *wild duck*, called *nigra*, from having the head and collar black, might be also called the *black-headed duck*.

BLACK-headed finch of Latham, is *Fringilla melanocephala* of Gmelin.

BLACK-headed fly-catcher, of Arctic Zoology: and *black-cap fly-catcher* of Catelby, is the *Muscicapa fusca* of Gmelin.

BLACK-headed grosbeak of Latham, is *Loxia erythromelas* of Gmelin.

BLACK-headed gull, the English name of *Larus rubicundus*. The same bird is also called the *peewee black-cap*, or *sea crow*, by Ray and Willughby.

BLACK-headed Indian iherus of Albin and Edwards, is *Sturnus luteolus* of the tenth edition of the Linn. Syst. Nat. and *oriolus melanocephalus* of Gmelin.

BLACK-headed nut-hatch, a variety of the common nut-hatch found in Carolina and Jamaica. Buffon and Arct. Zool. *Sitta Europea* of Gmelin.

BLACK-headed plover of Latham, is *Charadrius melanocephalus* of Gmelin.

BLACK.

BLACK-headed strike, a species of *lanius*, so called by Latham: it is the *lanius melanocephalus* of Gmelin.

BLACK and **spotted heath-cock** of Edwards, and **spotted grouse** of Pennant and Latham, are *tetrax canadensis* of Gmelin.

—*Olf.* There is another black and spotted heath-cock figured also by Edwards, pl. 71, which, in the 12th edition of the Linnæan Syst. Nat. is called *tetrax canace*.

BLACK heron of Latham, is the *ardea atra* of Gmelin.

BLACK-headed wheatear of Latham, is *motacilla pileata* of Gmelin.

BLACK-humming-bird; the Linnæan; *trochilus niger* is so named in the Synopsis of Latham.

BLACK jacana; the *jacana armata nigra* of Brisson, and *parra nigra* of Gmelin, bears this name in Latham's Synopsis.

BLACK-jack, or *Blend*, is a mineral, called also false galena and blinde, &c.

BLACK-jawed warbler of Latham, in *Ornithology*, is *motacilla nigrirostris* of Gmelin.

BLACK-Island, in *Geography*, an island near the coast of America, belonging to the state of Rhode island. N. lat. 41° 7'. W. long. 71° 35'.

BLACK islands, islands near the east coast of Labrador. N. lat. 41° 8'. W. long. 56° 30'.

BLACK kite, or *black-gled* of Sibba'd, is *falco ater* of Gmelin, and *milvus niger* of Brisson.—*Olf.* Gmelin mentions a black variety of *falco communis* under the specific name of *ater*; it was previously described by Edwards under the name of *black hawk* or *falcon*.

BLACK land, in *Agriculture*, a name given to a sort of soil which has a greyish black cast. This sort of soil, though pale when dry, always blackens by means of rain; and when ploughed up at such times, it sticks to the plough share; and the more it is wrought the muddier and darker-coloured it appears. These sorts of land, when somewhat rich, yet porous, light but sufficiently tenacious, are good both for corn and grass; but as they are mostly situated in bottoms, the wetness often spoils them for corn; but when they are dry, they are extraordinarily fruitful, especially for barley; they also bear good wheat crops. When they are very rich, they may, if a deep mould, be planted with liquorice, or sown with hemp, woad, cole, or rape, madder, and other similar plants, that best suit such lands; and afterwards with corn, when some of their fertility is expended. They are capable of bearing excellent clover crops. The best manure for these soils is chalk or lime, where it can be procured.

BLACK lark, in *Ornithology*. Albin describes an accidental variety of the common lark, *alauda arvensis*, under this name, in the third volume of his History of Birds.

BLACK lead, in *Mineralogy* &c. See LEAD and PLUMBAGO.

BLACK leather, in the *Manufactures*, is that which has passed the curriers' hands, where from the russet as it was left by the tanners, it is become black, by having been scowered and rubbed three times on the grain-side with copperas-water.

BLACK legs, a name given in Leicestershire to a disease frequent among calves and sheep. It is a kind of jelly, which settles in their legs, and often in the neck, between the skin and flesh.

BLACK legs, an appellation given to those gamblers and sharpers who prey upon the ignorance and credulity of inexperienced and unsuspecting persons of property, with whom they contrive to associate, and who submit in dissipation and luxury on the spoils acquired by deception and fraud, in a variety of games and sports which they frequent for this purpose. They are justly denominated the pest of civilized society, and should be shunned by those who have

any concern for their property or reputation, as the most dangerous and destructive enemies.

BLACK lick, in *Geography*, lies in Westmorland county, Pennsylvania, about 36 miles east of Pittsburg.

BLACK lory, of Latham, in *Ornithology*, is *psittacus novæ Guince* of Gmelin.

BLACK mail, in *English Antiquity*, a certain rate of money, corn, cattle, or other matter, anciently paid by the inhabitants of towns in Westmorland, Cumberland, Northumberland, and Durham, to diverse persons inhabiting on or near the borders, being men of name, and allied with others in those parts, known to be great robbers and spoiltakers; in order to be by them freed and protected from any pillage. Prohibited as felony, by 43 El. c. 13.

The origin of this word is much contested, yet there is ground to hold the word *black* to be here a corruption of *blank* or white, and consequently to signify a rent paid in a small copper coin called *blanks*. This may receive some light from a phrase still used in Picardy, where, speaking of a person who has not a single halfpenny, they say, *il n' a pas une blanche maille*. The term is also used for rents reserved in work, grain, or base money, which were called "reditus nigra" in contradistinction to the blanch farms, "reditus albi."

BLACK martin, or *swift* of the English, in *Ornithology*, is the *hirundo apus* of Latin writers.

BLACK monks, in *Ecclesiastical History*, a denomination given to the Benedictines, called in Latin *nigri monachi*, or *nigromonachi*; sometimes *ordo nigrorum*, the order of *blacks*.

BLACK mountains, in *Geography*. See **BLACK-Forest**. This is also a denomination given to an extensive ridge of mountains in South-Wales, separating the boundaries of the counties of Glamorgan and Brecknock; covered in summer with black-cattle and sheep.

BLACK-necked quail of Latham, in *Ornithology*, is *tetrao nigricollis* of Gmelin.

BLACK-necked swan of Pennant and Latham, stands under the name of *anas nigricollis* in the Gmelinian edition of Syst. Nat.

BLACK-necked thrush of Latham, is *turdus nigricollis* of Gmelin.

BLACK ness, in *Geography*, a foul point on the coast of France, and in the English channel, four leagues W. from Calais.

BLACK oats, in *Agriculture*, a species of oats much cultivated in the northern parts of England, and esteemed a very hearty food for horses. See **OATS**.

BLACK oriole, of the Arctic Zoology, and Latham's Synopsis, in *Ornithology*, is the *iæterus niger* of Brisson, and *oriolus niger* of Linn. and Gmel.

BLACK oriole (Lesser), the English name of *oriolus minor*, in Latham's Synopsis.

BLACK ostrich of Brown's Illustrations, &c. is *struthio camelus* of Scopoli. Gmelin, &c.

BLACK parrot of Latham, and *black parrot* of Madagascar, and of Edwards, are the same; the *psittacus niger* of Gmelin.

BLACK petrel of Latham, and *great black petrel* of Edwards, stands under the name of *procellaria equinoctialis* in Gmelin's edition of the Linn. Syst. Nat.

BLACK poll warbler of Latham, is *motacilla striata* of Gmelin.

BLACK point, and *blue point*, in *Geography*, capes of America, within those of Elizabeth and Porpoise, in the district of Maine.

BLACK point, is also a point on the west coast of Africa, between cape Cavallos, and cape Palmas.—Also, a point

BLACK.

S. E. from cape Chidley, the north point of the Labrador coast. N. lat. about $59^{\circ} 20'$.—Also, a point on the coast of Spitzbergen, or East Greenland. N. lat. $78^{\circ} 30'$. E. long. $11^{\circ} 10'$. Variation $10^{\circ} 42'$. W.

Black pool lies on the coast of Lancashire, about 25 miles S. from Lancaster. The beach is a beautiful level sand, with an extended sea before it. This place is frequented for summer bathing.

Black procession, in *Ecclesiastical Writers*, that which is made in black habits, and with black ensigns and ornaments. See **PROCESSION**.

Antiently at Malta, there was a *black procession* every Friday, where the whole clergy walked with their faces covered with a black veil.

Black rail of Latham, in *Ornithology*, is the *rallus niger* of Gmelin.

Black rat, in *Zoology*. See **MUS RATTUS**, or *Common rat*.

Black red-tail of Latham, in *Ornithology*, is the *motacilla atrata* of Gmelin.

Black vents See **BLACK MAIL**.

Black River, in *Geography*, an appellation applied to two small rivers, in Vermont, America; one falling into Connecticut river, at Springfield, and the other running north into lake Memphremagog.—Also a river in New York, which interlocks with Canada creek, and runs northwest into Iroquois river, navigable with boats 60 miles.—Also, a long river, which rises in Virginia, and passes south-easterly into Nottaway river, in North Carolina.

Black River, a British settlement at the mouth of the Tinto river, 20 leagues to the east of cape Honduras, the only harbour on the coast of Terra Firma, from the island of Rattan to cape Gracias a Dio; and for more than sixty years it was the refuge of the logwood cutters, when the Spaniards drove them from the forest of East Yucatan. This occasioned adventurers of different descriptions to settle here, where the coast is sandy, low, and swampy; but higher up, near the rivers and lagoons, which are full of fish, the soil is more fertile, and produces plantanes, cocoa-trees, maize, yams, potatoes and a variety of vegetables; and the passion for drinking induced them to plant sugar-canes. The forests are full of deer, swine, and game. The shores abound with turtle, and the woods with mahogany, zebra-wood, sarsaparilla, &c.; and the whole settlement flourishes spontaneously without cultivation.

Black River, a river of Jamaica, which passes through a level country, and is the deepest and largest in the island, so as to admit flat-bottomed boats and canoes for about 30 miles.

Black Rock, a rock in the mouth of Sligo harbour, in Ireland, which is covered about high water only, and has a conspicuous tower built on it that serves as a beacon.

Black Rock, a Rock in the bay of Galway, in Ireland, about three miles westward of Galway, which dries with spring-tide only, and requires attention in navigating that bay. M'Kenzie.

Black Rocks, rocks in the Atlantic ocean, near the west coast of Ireland, about six miles N. W. from Saddlehead, in Achil isle, and seven miles W. by S. from Blackford point.—There are rocks called by the same name in Killibeg's bay and Mulroy haven, but they are less objects of attention to the navigator. M'Kenzie.

Black Rock, a rock near the south coast of Wexford, in Ireland, about four miles W. by S. of Carnfore point, which is always above water, and may be sailed round without danger. M'Kenzie. Boate.

Black Rock, a populous village, situate on the river Tawe, about a mile above Swansea, in Glamorganshire, South Wales, where are considerable smelting-houses, and whence are exported coals, &c.

Black Rock lies also near the extreme north point of the island of Antigua, between Humphrey's bay and Boon point. N. lat. $17^{\circ} 5'$. W. long. $61^{\circ} 58'$.

Black-rod. See **GENTLEMAN USHER** *cf.*

Black-row grains, in *Minerology*, a species of iron-stone, or ore, found in the mines about Dudley, in Staffordshire.

Black Sea, in *Geography*. See **EUXINE SEA**.

Black sheep, in *Oriental History*, the ensign or standard of a race of Turkmans settled in Armenia and Mesopotamia, hence called the *dynasty of the black sheep*.

Black strike of Latham, in *Ornithology*, is *lanius niger* of Gmelin.

Black Mexican siskin of Latham, is *fringilla catotol* of Gmelin.

Black skimmer of Latham, *cut-water* of Arct. Zool., *sea crow* of Edwards, are all names of the same bird; the *Rynchops nigra* of Gmelin.

Black squirrel of Catelby, is the *sciurus niger* of Erxleben and Gmelin.

Black stones and *gems*, according to Dr. Woodward, owe their colour to a mixture of tin in their composition.

Black strakes, a range of planks immediately above the wales in a ship's side: they are always covered with a mixture of tar and lamp-black.

Black swallow of Latham, in *Ornithology*, is the *hirundo apus dominicensis* of Brisson, and *hirundo nigra* of Gmelin.

Black swan. A bird of this description inhabits Botany Bay. Its form resembles that of the common white swan; but the prevailing colour of the plumage is black, instead of white; the wings are edged with white; and the bill is red. This species is described by Dr. Shaw (*Nat. Miscel.*) under the name of *anas atrata*. It is the *black swan* of several writers who have lately treated on the history of Botany Bay.

Black tail, a beacon about 3 leagues distant from the Nore in the river Thames.

Black Tanager of Latham, in *Ornithology*, is the *emberiza atra* of the 10th edition of the Linn. Syst. Nat. and *tanagra atrata* of Gmelin.

Black tern of modern writers, is the *searocrow* of the old English ornithologists, and *cloven-footed gull* of Willughby. *Sterna fiffipes* of Brünnich and Gmelin.

Black thorn, in *Botany*, a species of the *prunus*, which see.

Black-thorn, in *Agriculture*, a species of thorn well known, and frequently used in making fences, especially in exposed situations. It is not, however, reckoned so good for fences as the white-thorn, because it is apt to run more into the ground, and is not so certain of growing; but when cut, the bushes are much the best, and most lasting of any, for dead hedges, or to mend gaps with. Cattle are not so apt to crop fences of this kind as those of the white-thorn sort. See **HEDGES**.

Black-throated barbet of Latham, in *Ornithology*, is *bucco niger* of Gmelin.

Black-throated bunting of the Arct. Zool. is *emberiza Americana* of Gmelin.

Black-throated diver of Pennant and others, is the same bird as Edwards calls the *speckled loon*, and Willughby *Wormius's northern duck*; *Colymbus arcticus* of Linnæus.

Black-throated green fly-catcher, of Edwards's Gleanings, and *green warbler* of Latham; the *motacilla virens* of Gmelin.

BLACK.

B L A C K.

BLACK-throated tanager, of Latham, the *tanagra nigricollis* of Gmelin.

BLACK-throated manakin of Latham, the *pipra nigricollis* of Gmelin.

BLACK throated thrush of Latham, is *turdus ater* of Gmelin.

BLACK throated warbler, of the Asiatic Zoology, is *motacilla Canadensis*, of Gmelin.

BLACK tiger, in Zoology. See FELIS DISCOLOR.

BLACK-tin, in Mineralogy, a denomination given to the tin-ore when dressed, stamped, and washed ready for the blowing-house, or to be melted into metal. Phil. Trans. No. 69. p. 2110.

It is prepared into this state by means of beating and washing; and when it has passed through several buddies or washing-troughs, it is taken up in form of a black powder, like fine sand, called *black tin*.

BLACK-toed gull of Pennant, Latham, Walcot, &c. in Ornithology, is the *larus crepidatus* of Hawkesworth and Gmelin.

BLACK-toed petrel. The Gmelinian *procellaria melanopus* is described under this name in Latham's Synopsis of Birds.

BLACK town, in Geography, a settlement of 1200 free negroes, erected in 1783, about a mile from the town of Shelburne, in Nova Scotia.

BLACK twitch, in Agriculture, a noxious weed, probably the *polygonum convolvulus*, which flourishes even in extremely dry seasons, and is very injurious to many crops.

BLACK vomit, in Medicine, a disease to which the inhabitants of Spanish North America are subject, said to be allied to the yellow fever of the United States, and which, at intervals, ravages the country like a pestilence. See FEVER.

BLACK vulture of Willughby and Latham, in Ornithology, is *vultur niger* of Ray, Brisson, and Gmelin.

BLACK vulture (crested) of Edwards, the *vultur monachus* of Gmelin.

BLACK woodpecker, (greatest), Albin, Donovan, &c. the *picus martius* of Linn. Fn. Suec.

BLACK wadd. See WADD.

BLACK-winged parakeet of Brown's Illustrations, in Ornithology, is called by Gmelin *psittacus melanopterus*.

BLACK-winged thrush of Latham, is *turdus lambla* of Gmelin.

BLACK and white butcher-bird. Under this title the Linnæan *lanius doctatus* is described and figured by Edwards in his History of Birds. Latham calls it the *pie'd shrike*.

BLACK and blue creeper of Edwards's Gleanings, the *certhia cyanea* of Gmelin.

BLACK and violet creeper of Latham, is *certhia Brasiliiana* of Gmelin.

BLACK and white creeper of Edwards, and *small black and white bird* of Ray and Sloane, are *motacilla varia* of Gmelin.

BLACK and white king's fisher of Edwards and Latham, is the *alcedo rudis* of Gmelin.

BLACK and white wagtail of Ray, is the *pie'd wagtail* of Latham, *motacilla maderaspatana* of Brisson, and *motacilla maderaspatensis* of Gmelin.

BLACK, white, and red Indian creeper of Edwards, is the *certhia cruentata* of Linn. and Gmel.

BLACK and yellow creeper. *Certhia flaveola* of Gmelin is described under this name both by Edwards and Latham.

BLACK and yellow dove of Brasil. Edwards under this title describes a variety of *oriolus Perficus*. Linn.

BLACK and white diver (small) of Willughby and Edwards, is *alca alca* of Linnæus. This bird is likewise called

the *Greenland dove*, or *sea turtle*, by Albin; and is known among later writers by the name of the *little auk*. Pennant. Donov. Brit. Birds. &c.

BLACK and white dobchick of Edwards, is the *duffy grebe* of later writers; *Colymbus obscurus* of Gmelin.

BLACK and white duck (little) of Edwards, and *spirit of Arct. Zool.*, are *anas albeola* of Gmelin.

BLACK and white Indian falcon, the English name of *falco melanoleucus* (Gmel.) in Pennant's Indian Zoology, and Latham's Birds.

BLACK and orange finch of Latham, and *small black and orange bird* of Sloane and Ray, is *fringilla melaniœra* of Gmelin.

BLACK and white fly-catcher of Edwards's Gleanings, is *muscipapa bicolor* of Gmelin.

BLACK and white gull of Ray, Willughby, and Albin, is the *black-backed gull* of modern ornithologists. Linnæus calls it *larus marinus*.

BLACK and blue humming-bird of Bancroft, is called by Gmelin *trochilus cyanomelas*.

BLACK and yellow manakin of Edwards, is the variety β of the Gmelinian *pipra aureola*.

BLACK and orange-coloured bird (small) of Ray and Sloane, is *motacilla ruticilla* of Linnæus, and *muscipapa ruticilla* of Gmelin. This is likewise the *black-beaded warbler* of Latham, *small American redstart* of Edwards, and *yellow-tailed fly-catcher* of Edwards's Gleanings.

BLACK and white Chinese pheasant of Edwards. This is *phasianus nycthemerus* of Scopoli and Gmelin. It is likewise called the *penicilled pheasant* by Latham and other late writers.

BLACK and yellow frizzled sparrow of Edwards's Gleanings, is the *frizzled finch* of Latham, and *fringilla crispa* of Gmelin.

BLACK and white starling of Willughby, is *sternus leucomelas* of Brisson, which Gmelin gives as a variety of the common stare, or starling, *sternus vulgaris* of Linnæus.

BLACK and white Indian starling of Edwards. This is *sternus contra* of Gmelin.

BLACK and blue tanager of Latham, is the *black and blue tinnoufe* of Edwards, and *tanagra Mexicana* of Gmelin.

BLACK whytlof, in our *Old Writers*, bread of a middle fineness betwixt white and brown, called in some parts *ravel-bread*.

In religious houses, it was the bread made for ordinary guests, and distinguished from their household loaf, or *panis conventualis*, which was pure manchet, or white bread.

BLACK-work, iron wrought by the blacksmith; thus called by way of opposition to that wrought by white-smiths.

BLACKALL, OFFSPRING, in Biography, an English prelate, was born at London, in 1654, and educated at Catherine hall, in the university of Cambridge. Besides several promotions in London, he was appointed one of the chaplains in ordinary to king William, though his principles were adverse to the revolution government, and he refused for two years to take the requisite oaths to king William and queen Mary. On the 30th of January 1699, he preached a sermon before the house of commons, in which he animadverted on a passage in Mr. Toland's life of Milton, who, after stating the proofs that Dr. Gauden, afterwards bishop of Exeter, was the true author of the book entitled "Icon Basilike," and ascribed to Charles I., observes, that many supposititious pieces, under the name of Christ, his apostles, and other great persons, were published and approved in the primitive times. But as Mr. Toland, in his Amyntor, published in the same year, avowed his belief of

the genuineness of the books of the New Testament, Mr. Blackall closed the dispute by the publication of a small pamphlet in 12mo. entitled "Reasons for not replying to a book lately published, entitled *Amyntor*." In 1700 he preached a course of sermons at Boyle's Lecture, published in the first volume of the collection of those sermons. In 1707, he was promoted to the see of Exeter; and in 1709, he was engaged in a controversy with Hoadly, concerning the institution of civil government, and the measures of submission. With respect to this controversy it is sufficient to observe, that the bishop defends the high-church, tory principles, as they are usually called, of the divine institution of magistracy, and unlimited passive obedience, and non-resistance, which Hoadly opposes. This prelate, whose private character, and style of preaching, are highly extolled by sir William Dawes, archbishop of York, in the preface to his Sermons, died at Exeter, Nov. 29th, 1716. His sermons were collected and published in 2 vols. folio, Lond. 1723. Gen. Dict. Biog. Brit.

BLACKAMOR'S HEAD, in *Chemistry*, consists of a conical vessel, surrounded with another of a cylindrical form, filed with cold water, and having a cock to draw it off, when it is become too warm. Both vessels are made of copper. In the figure, one half is left open to shew the cone; the inclination of the sides of which, according to Chaptal, is most proper, when forming an angle of 75 degrees with the base. See *Plate of Chemistry*.

BLACKBALL HEAD, in *Geography*, a cape on the S.W. coast of Ireland, at the north side of the entrance into Bantry bay in the county of Cork. N. lat. 51° 32'. W. long. 9° 55'. M. Kenzie and Beaufort.

BLACKBURN, WILLIAM, in *Biography*, an eminent surveyor and architect, was born in Southwark, Dec. 20, 1750, and having acquired some knowledge of his profession, in the ordinary course of education, he was admitted a student at the Royal academy. By this academy he was presented in 1773, with the medal for the best drawing of the inside of St. Stephen's church in Walbrook; and the delivery of it by the president, sir Joshua Reynolds, was accompanied by a distinguished tribute of respect to his abilities. About this time he entered into business in the place of his nativity; but a circumstance occurred in a few years which served to establish his reputation, and to introduce him into very general notice. In 1779 an act of parliament was passed for the erection of places of confinement, under the denomination of 'penitentiary houses.' Two edifices of this kind were proposed to be constructed; one for the confinement and employment of 600 males, and the other for the accommodation of 300 females. The three supervisors first authorized by his majesty for carrying into effect the provisions of this act, were John Howard esq., George Whatley esq., and Dr. John Fothergill. The death of Dr. Fothergill, and the resignation of Mr. Howard, dissolved this commission; and the charge was devolved, in 1781, on sir Gilbert Elliot, sir Charles Bunbury, and Thomas Bowdler esq. The principal object of the plan proposed was to combine, in the buildings to be erected, solitary confinement, with useful labour and moral reformation. Accordingly premiums were announced to those who should produce the best plans. The highest premium of 100 guineas was unanimously assigned, in 1782, to Mr. Blackburn. In consequence of this distinction, he was appointed by the supervisors to the office of architect and surveyor of the projected buildings. The designs of government, after several preparatory steps had been taken, were never accomplished. However schemes of a similar kind were projected in various parts of the country, and the execution of them was en-

trusted to Mr. Blackburn. Whilst he was busily employed in the completion of various designs of this kind, and whilst he was prosecuting a journey to Scotland, for the purpose of erecting a new gaol at Glasgow, he died suddenly, Oct. 28th, 1790, at Preston in Lancashire; and his remains were removed to London, and interred in the burying ground of Bunhill-fields.

Mr. Blackburn's skill as a draughtsman and an architect, was not confined to prisons and penitentiary houses; but he was occupied, as far as his time would allow, in preparing various designs for churches, houses, villas, &c.; and in his drawings and designs he always manifested a correct taste, and a thorough knowledge of the science to which he was practically devoted. His friends, and the public in general, very justly lamented, that by the corpulence to which he was inclined from his early youth, and the increase, of which no abstinence, nor any mode of regimen, would restrain, he was removed from a scene of usefulness and reputation, at so early a period as the 40th year of his age. As to his religious profession, he was a protestant dissenter of the presbyterian denomination; but he combined with an undisguised and laudable avowal of his own sentiments, the most liberal and candid opinion and conduct with respect to all who differed from him. In his natural temper he was cheerful and lively; in his conversation agreeable, animated, and instructive; in his private character amiable and respectable; and in all the relations and intercourses of domestic and social life, esteemed and honoured. In 1783, he married the daughter of Mr. Joshua Hobson, an eminent builder, of the denomination of quakers, by whom he left four children.

BLACKBURN, in *Geography*, a town of Lancashire, England, is seated in a valley surrounded with hills. It consists of several streets, irregularly laid out, but intermixed with good houses. Besides the parish church, here are a newly erected chapel of the establishment, and five places of worship for as many different sects of dissenters. A free-school was founded by queen Elizabeth, and the necessitous poor of the town are comfortably provided with a poor-house, which has land attached to it for the pasturage of cattle.

The market, on Mondays, is chiefly supplied with provisions from Preston. Besides this, here are a fortnight market for cattle, &c. and an annual fair. The town is approached by four stone bridges crossing the river Derwent, whose water, being of rather a blackish hue, is said, by some writers, to have given name to the town. Blackburn has been noted for its manufactures, particularly for an article called *Blackburn-greys*, which were plains of linen-warp shot with cotton. The prosperity of Manchester, and the great influx of manufacturers to that town and its neighbourhood, have deprived Blackburn of its usual trade; yet some cottons, calicoes, and muslins are still made here, and the fields around the town are frequently covered with materials to bleach.

The church of Blackburn, previous to the reformation, was attached to the abbey of Whalley. It is now a rectory, possessed by the archbishop of Canterbury, who also owns half of the town, which he lets on leases of 21 years. The parish of Blackburn includes 24 townships, and embraces about half the hundred of the same name. The land round the town is mostly a sandy soil, and consequently unpropitious to agriculture. Coal is found in the southern part of the parish, and in great plenty at Darwen, about four miles south of the town. An alum mine was found, and much worked here, in the time of Fuller, but from the depth of the strata, and consequent expence, it was afterwards neglected. Sir George Colebrook, wishing to monopolize all the

alum of the country, purchased this, with other mines; but failing in his unjust speculations, was obliged to relinquish the works at Blackburn. (See ALUM.) Blackburn contains 2352 houses, 11,980 inhabitants, and is 211 miles N.W. from London. Aikin's description of the country round Manchester, 4to. 1795.

BLACKBURN, the name of a river in Scotland celebrated for its romantic cascades, for the bold and picturesque scenery adorning its banks, and for a singular natural bridge which stretches across the stream, in the parish of Caskletown. The latter is deemed one of the greatest curiosities in Scotland. "It is 55 feet long, 10 feet wide, and the thickness of the arch is two feet four inches of solid stone. It is not composed of one entire rock, but has the appearance of many stones of about one foot and a half square, set neatly together. The bridge slopes a little downwards, and the water rushes under the arch, through an opening of 31 feet. Among the cascades, which ornament and enliven this stream, is one of above 37 feet in height, and 20 feet in width; another 31 feet high, and 36 feet broad; and a third 27 feet in height. These waterfalls, combining with the romantic character of the rocks, and the constant roar of the dashing stream, present a great number of highly picturesque and interesting scenes. In this wild and romantic vale, nature appears in various forms, now beautiful, then awful, sometimes sublime, and frequently terrible." Sir John Sinclair's statistical account of Scotland, vol. xvi. communicated by the Rev. Mr. Arkle.

BLACKBURNE, FRANCIS, in *Biography*, a clergyman of the church of England, distinguished by his firm attachment to the cause of civil and religious liberty, and by his zealous exertions in the promotion of it, was born of respectable parents at Richmond, in Yorkshire, on the 9th of June 1705. Having pursued a course of classical education, first at Kendal in Westmorland, and afterwards at the free schools of Hawkshead in Lancashire, and of Sedbergh in Yorkshire, he was admitted, in May 1722, pensioner of Catherine hall, in the university of Cambridge; where he took the degree of bachelor of arts, and was chosen conductor or chaplain-fellow of the society; and on this title he was ordained deacon in March 1728. At this time he flattered himself with the expectation of a foundation-fellowship; but his avowal of sentiments with regard to ecclesiastical and civil liberty, which he had acquired by the perusal of the writings of Locke, Hoadly, &c. rendered him obnoxious to a majority of the fellows, who, being high royalists on the principle of hereditary right, set aside his just claims as the only qualified candidate, and precluded his election, by indulging Mr. Addenbroke with an extraordinary year of grace, and thus keeping the fellowship full. This disappointment induced him to resign his conductship, to quit the university, and to live in retirement with his uncle, Thomas Comber, esq. of East Newton, near Helmsley in Yorkshire, till some church preferment might occur. His views, indeed, were particularly directed to the living of Richmond, the place of his nativity; to which he was inducted upon the death of the incumbent in 1739, having previously qualified himself for it by taking priest's orders. During the interval of his retirement at East Newton, he casually found some old books that had formerly belonged to his great grandfather, an Oliverian justice; and by the perusal of these he was led to entertain favourable sentiments of the manners and principles of many excellent old puritans, to admire their unaffected and disinterested piety, and their zeal for the spiritual good of mankind, and to cherish that moderation and liberality of temper, and that ardent concern for liberty, which distinguished his future conduct. As soon as

he was invested with a parochial cure, he devoted himself with exemplary diligence to the studies and duties appropriate to his pastoral office, which he discharged, during a residence among his parishioners of 48 years, no less to their satisfaction and improvement than to his own honour. His first appearance as an author was in the year 1742, when he published an "Affize Sermon," preached at York. About the same time he wrote two pamphlets concerning the illegal removal of the consistory court and its records from Richmond to Lancaster, which, in consequence of a petition from the mayor and corporation to the bishop of Chester, were restored. In 1748, he employed a young person, who was his curate, to translate Erasmus's preface to his paraphrase on the gospel of St. Matthew; and having written "A Preliminary Discourse addressed to the Roman Catholic gentry and laity of Great Britain," he circulated a cheap edition of it, recommending it to the public, partly as an antidote against popery, but chiefly as an encouragement to the common people to be diligent in reading the scriptures, for the information and improvement of themselves and families in Christian knowledge and Christian piety. It was not, however, till the year 1750, that Mr. Blackburne began to distinguish himself as a writer in defence of Christian liberty. A work had been published in the preceding year, intitled "Free and Candid Disquisitions relating to the Church of England." This work contained many pertinent observations on existing defects and improprieties in the established forms of the church, and proposals for revising the liturgy, and amending such passages, as were liable to reasonable objections. Mr. Blackburne was suspected by many, who were acquainted with his sentiments on the subject of an ecclesiastical reform, to have had a concern in this publication. But though he had corresponded with the compiler and editor of it, and had seen the greatest part of the work in manuscript, he had neither written nor suggested a single line or word. Indeed, he disapproved the style and spirit of it; and thought them by no means adapted to the occasion, nor likely to produce effect. "He was rather, perhaps too much (says his biographer), inclined to look upon those who had in their hands the means and the power of reforming the errors, defects, and abuses in the government, forms of worship, faith and discipline of the established church, as guilty of a criminal negligence, from which they should have been roused by sharp and spirited expostulations." Nevertheless, he thought it his duty to repel the attacks of the adversaries of this work; and accordingly, he published, without the knowledge of its editor, or any of his more confidential associates, an "Apology for the Authors of the Free and Candid Disquisitions," 1750. But though he engaged in this controversy, his attention was not diverted from parochial duties; for his next publication was "A short Discourse on the Nature, Obligation, and Benefits of Family Religion," which he published at his own expence, and distributed among his parishioners. In this same year 1750, notwithstanding the publication of his "Apology," he was collated to the archdeaconry of Cleveland, and also to the prebend of Bilton, by Dr. Matthew Hutton, then archbishop of York, to whom he had been for some years titular chaplain. Towards the close of the year 1752, he had an opportunity of perusing the charge delivered by Dr. Butler, bishop of Durham, to the clergy of his diocese at his primary visitation in 1751; and he found in it some doctrines which were, in his opinion, so diametrically opposite to the principles on which the protestant reformation was founded and supported, as to deserve being exposed and censured, in order to prevent the mischief which they might do under the sanction of his name. Accordingly, he wrote strictures upon them; and, in opposition

to the remonstrances of a friend who dissuaded him from publishing them, lest they might be the means of preventing his further preferment, he committed them to the press under the title of "A serious Enquiry into the Use and Importance of external Religion, &c." This piece, which was afterwards printed by Mr. Laron, in the 4th volume of a collection of tracts, entitled, "The Pillars of Priestcraft, and Orthodoxy shaken," and ascribed to him as its author, gave great offence, particularly to archbishop Secker, and precluded all hopes of preferment in the church, if indeed he had indulged any such hopes, under episcopal patronage. The next subject of importance, which engaged his attention, was the doctrine of an intermediate state. To this he was led by an "Appendix" to Dr. Law's "Considerations on the Theory of Religion," which appeared in 1755, and which inculcated the tenet of the sleep of the soul. This opinion was attacked from several quarters, and particularly by Dr. Goddard, master of Clare-hall, in a sermon preached at St. Edmund's Bury. Mr. Blackburne defended his friend Dr. Law, in a publication entitled "No Proof in the Scriptures of an intermediate state of happiness or misery, between death and the resurrection." He also published several other pieces on the same topic; such as "Remarks on Dr. Warburton's account of the sentiments of the early Jews concerning the soul;" and "A Review of some passages in the last edition of the Divine Legation of Moses demonstrated," which appeared in 1759, and may be considered as a sequel to the "Remarks." He also prepared a reply to Dr. Morton, Mr. John Steffe, and Dr. Caleb Fleming, who had published strictures on Dr. Law's Appendix; and he pursued the discussion of the subject more at large in a work, first published in 1765, and afterwards with considerable additions in 1772, and entitled "A short historical View of the Controversy concerning the intermediate state between death and the resurrection, with a prefatory discourse on the use and importance of theological controversy." In 1756, our author published "Some Sentiments of a country divine concerning the Ordinance of Baptism, &c." occasioned by letters which passed between bishop Clayton and Mr. Penn on that institution. In the correspondence between these writers, a difficulty occurs in the interpretation of the charge given by our Lord to his apostles. Matt. xxviii. 19. Our Lord, it is said, prescribes *one* precise form of words to be used in baptism; the apostles appear, from the Acts and Epistles, to have used *another*; and the evangelists Mark, Luke, and John, do not mention *any precise form* whatever. Various hypotheses have been proposed by Grotius, Lymborch, Lightfoot, Whitby, Clayton, &c. for reconciling the practice of the apostles with the precept of Christ. Mr. Blackburne, dissatisfied with all these, suggests that the words in question contain no baptismal form at all; and that we should rather follow the apostolical form in Acts, as being derived to us by the authority and example of men, who must be perfectly satisfied that the foundation they built upon was sound and good. Accordingly, he proposes that we should read the passage in St. Matthew thus; *Πορευθητε εις παντησους τας εθνας (Βαπτιζοντες αυτους) εις το ονομα του πατρος, και του υιου, και του πνευματος, αγιου;* "Go ye therefore, and disciple all nations (baptizing them) into the name of the Father, and of the Son, and of the Holy Ghost." By construction and parenthesis, the command to baptize refers to no particular form at all, and leaves us to suppose, what was certainly the truth of the matter, that the apostles being already well acquainted with the form used in the baptism of Jesus, it was quite superfluous to enjoin it here.

In 1758, Mr. Blackburne avowed the sentiments which he had for some time entertained concerning subscription to the

liturgy and articles of the church of England, in "Remarks on the Rev. Dr. Powell's sermon in defence of subscriptions, &c." preached in the preceding year before the university of Cambridge, to which is prefixed "An Address to the younger Students in both our universities." The subject of subscription had indeed for some time engaged his attention; and it was not without scruples that he had qualified himself to hold the archdeaconry and prebend in 1750; but when he had reason to expect further advancement in the church, he refused the consideration of the subject, and the result was a determination never to renew his subscription. About this time he began to make collections for his famous work entitled "The Confessional, or a full and free Enquiry into the right, utility, and success of establishing Confessions of faith and doctrine in Protestant churches." This work, in the execution of which he was much encouraged by Dr. Edmund Law, afterwards bishop of Carlisle, lay by him in manuscript for several years, and was at length published in 1766, 8vo. without his name. It excited, as we may naturally imagine, very general attention both among the partizans of reform and the advocates for existing establishments. A second edition appeared in 1767; and the controversy, which it occasioned, lasted for some years, and produced a great number of publications. The third edition, corrected and much enlarged, was published in 1770; and to this edition has been added from the author's manuscript, in the late collection of his works, an appendix, containing a short history of the confessions established in the church of Scotland at different periods. For a further account of the subject of this work, and of the arguments for and against subscription, see SUBSCRIPTION. Soon after the publication of the third edition of the "Confessional," the author was induced by several of his friends to draw up and publish "Proposals for an application to parliament for relief in the matter of subscription to the liturgy and thirty nine articles of the established church of England, humbly submitted to the consideration of the learned and conscientious clergy of the said church." An association was formed for this purpose, for the result of which, see ASSOCIATION.

It was natural to imagine, that the author of such a work as the "Confessional," written with a view of examining and refuting the several pleas that had been urged in favour of subscription, and which had convinced many persons of the insufficiency of these pleas, would have wished to withdraw himself from the established church, which imposed a subscription that appeared to him to be unjustifiable; and accordingly, as the death of Dr. Chandler, in 1766, occasioned a vacancy in the respectable congregation of dissenters at the Old Jewry, in London, some individuals of that society applied to Mr. Blackburne for information, whether such a situation would be agreeable to his views, if it were offered to him. But, with the prospect of a very considerable accession to his income, he declined accepting the proposal, for reasons that were very satisfactory to those who made it. The clear amount of all that he possessed, as a beneficed clergyman, never much exceeded the sum of 150l. a year; whereas, if the removal that had been suggested to him had taken place, his income would have been nearly trebled. Some other circumstances also afterwards occurred, which had a tendency to detach him from the established church. Two very respectable clergymen, immediately connected with his own family, viz. the learned Mr. Theophilus Lindsey, whose excellent character those who are most adverse to his theological opinions concur in applauding, and his son-in-law, Dr. Disney, no less esteemed by all who know him, surrendered their preferments, because they disapproved the doctrine and forms of the established church.

Mr. Blackburne, however, though he agreed with his valued relatives in many of their objections to the liturgy and articles of the church, differed from them with regard to several doctrinal points of importance; and without seeming to advert to his past subscription; in consequence of which he still held his church preferments, he satisfied himself with refusing any further preferment, which was actually offered to him, because he was determined not to renew his subscription. His continuance in the church cannot be justly ascribed to any selfish and interested motives, because he might have left it with advantage, and he remained in it with a fixed purpose of accepting no preferment; and he refused very considerable offers of this kind. But, in order to vindicate his consistency, he thought it right to avow his motives for continuing minister in the church, while he disapproved many things in her doctrine and discipline; and with this view he drew up a short paper containing "An Answer to the question, Why are you not a Socinian?" and also his reasons for officiating in a church, whose forms of faith, worship, and discipline, he thought to be in many things highly exceptionable. Those who wish for satisfaction on these points, are referred to the Appendix annexed to the Memoirs of his Life, p. 120. We shall content ourselves with observing, that Mr. Blackburne was a firm believer of the pre-existence of Christ, and that he also maintained his divinity, with limitations according to his own ideas, which he believed to be founded on the Scriptures; and with regard to the general sentiments of his creed, he is said to have more than once declared himself a moderate Calvinist. Whatever may be the inconsistency which some persons have charged upon his conduct, he manifested his esteem for the church, not only by continuing his own connection with it, but by educating a son for the clerical office, though the condition of performing any duties, or enjoying any emoluments in that church, was subscription, the imposition of which he had strongly reprobated and condemned. On this subject the further discussion of which would lead us beyond our province as biographers, we shall only say, "Let every man be fully persuaded in his own mind; to his own master he standeth or falleth." See SUBSCRIPTION.

Having been accustomed from early life to regard the Roman Catholics as dangerous foes to the government and religion of his country, Mr. Blackburne, notwithstanding the enlarged and liberal sentiments avowed by him on all other occasions, wrote against them with a severity which the friends of freedom have generally condemned. But an alarm with regard to the spread of popery, and the evils to be apprehended from it, prevailed very much at the time; and this induced him, in 1768, to publish a caution against it, under the title of "Considerations on the present state of the controversy between the Protestants and Papists of Great Britain and Ireland, particularly on the question, how far the latter are entitled to toleration upon Protestant principles."

During the intervals of his other professional and literary engagements, he employed himself in collecting materials for the life of Martin Luther, which he proposed to write according to the pattern of Dr. Jortin's life of Erasmus; but he was diverted from accomplishing his design, first by the death of his friend Thomas Hollis, esq. of whom he published "Memoirs" in 2 volumes 4to. in 1780. and afterwards by the loss of his second son Thomas, in 1782, a physician of rising eminence in the city of Durham, which so affected him as to render him incapable of finishing several things which he had undertaken. Soon after his eye-sight failed him, and he was under the necessity of employing an amanuensis. His mind, however, was still enterprising and active; nor

was he prevented by the increasing infirmities of age from prosecuting the object of ecclesiastical reformation, which seems to have occupied his thoughts to the latest period of his life, and from performing his professional duties. Having in the last year of his life prepared a charge for his 38th annual visitation in Cleveland, we caused it to be delivered by his eldest son, who stood by him, and then took leave of his clerical brethren, with an address equally pious and affectionate, that must have deeply impressed the minds of all who heard it. At the close of his visitation circuit, he was taken ill at the house of a friend, and apprehensive of approaching dissolution, hastened to his rectory at Richmond with all the expedition which the state of his health allowed. Within a few weeks after his return, on the morning of August 7th 1787, in his 83d year, he finished the protracted course of a studious and exemplary life, with the sentiment of the amiable Erasmus, and the benevolent Jortin, "I have had enough of every thing in this world." and expired, as he sat in his chair, without a groan. He left a widow, who died August 20th 1799. and four children; viz. Jane, married to the Rev. Dr. Disney, now minister of the Unitarian society in Essex-street, London: the Rev. Francis Blackburne, vicar of Brignal, near Greta bridge, Yorkshire; Sarah, married to the Rev. John Hall, vicar of Chew Magna, and rector of Dundry in Somersetshire; and William Blackburne, M.D. of Cavendish-square, London.

Few persons have ever been more regular and assiduous in the performance of professional duties, whether we consider him as a parish priest, or as an archdeacon, than Mr. Blackburne. Possessing naturally a strong constitution of body, and great firmness of mind, which he preserved by temperance to a very advanced period, he was capable of intense and continued application. He was likewise animated in the discharge of his clerical functions by a conviction of their importance, and by an ardent desire of promoting the best interests of those with whom he was connected. In composing for many years new discourses, whenever he officiated, and also charges for his archidiaconal visitations, and in preparing for the press a variety of publications, a great part of his time must have been spent in study and retirement; and hence he is said to have acquired the appearance of austerity; nevertheless with his intimate friends and associates he was cheerful and unreserved. As a writer he was nervous and animated; and his public discourses were delivered with an unaffected earnestness, which proceeded from conviction of the importance of religious truth and duty, and which interested and impressed those who heard him. In his controversial writings, it must be acknowledged, and he himself lamented it towards the close of his life, that he was occasionally betrayed into precipitance of judgment and asperity of language: but it should be recollected, that he contended with a host of adversaries, whose mode of attack sometimes provoked and justified his resentment; and that his vehemence and ardour were always accompanied with a high sense of integrity and honour, and a laudable solicitude for serving what he conceived to be the cause of truth and liberty. The topics of his numerous publications, the principal of which we have above recited, were chiefly theological or controversial; nevertheless he was an occasional writer on political liberty, and he largely contributed to a collection of letters and essays on this subject, published in 3 vols. 8vo. 1774. A collection of his "Works, theological and miscellaneous, including some pieces not before printed, with some account of the life and writings of the author, by himself, completed by his son Francis Blackburne, L.L.B. and illustrated by an appendix of original papers," has this year (1804) been published in 7 vols. 8vo. The following respectful

specific and just tribute to his memory closes his son's account of his life and writings: "Such was Francis Blackburne; a believer of Christianity, from the deepest conviction of its truth; a Protestant on the genuine principles of the reformation from popery; a strenuous adversary of superstition and intolerance; and of every corruption of the simplicity or the spirit of the gospel; a zealous promoter of civil liberty; a close and perspicacious reasoner; a keen and energetic writer; an attentive, benevolent, and venerable archdeacon; an eloquent and persuasive preacher; a faithful pastor and exemplary guide; of unblemished purity of life, of simple dignity of manners; a sincere and cordial friend; an affectionate husband, and an indulgent father; in short, a just, humane, pious, temperate, and independent man."

BLACKBURNIA, so named by Forster, in honour of John Blackburne, esq. and his daughter Anne, of Orford in Lancashire, in *Botany*. Lin. gen. Schreb. n. 199. Forster gen. 6. Class and order, *Tetrandria Monogynia*. Gen. Char. *Cal.* perianth very short, four-toothed, inferior; teeth short, acute, horizontal. *Cor.* petals four, elliptic. *Stam.* filaments four, subulate, rather shorter than the petals; anthers heart-shaped, erect. *Pist.* germ conic; style filiform, erect, length of the stamens; stigma simple. *Per.* berry. *Seed* single.

Ess. Char. *Cal.* four-toothed; *pet.* four, elliptic; *anth.* heart-shaped; *germ* conic; *stigma* simple. *Per.* berry, with a single seed.

Species 1. *B. pinnata*. Forst. gen. 6. t. 6. fl. Austr. n. 53. *Ptelea pinnata*. Linn. suppl. 126. A native of Norfolk island; found there in 1774. Martyn.

BLACKBURNIÆ, in *Ornithology*, a species of **MOTACILLA**, described in the Arctic Zoology under the name of the blackburnian warbler. The crown is black, with a yellow line in the middle; band through or across the eye black, as are also the lesser wing coverts; greater wing-coverts, vent. and lateral tail-feathers white, the middle ones being dusky black; sides of the neck, chin, and middle of the belly yellow. A native of New York.

BLACKHEAD, in *Geography*, a cape on the east coast of Ireland, at the north entrance into Belfast Lough. N. lat. 54° 45'. W. long. 5° 35'.

BLACKHEAD, a cape on the western coast of Ireland, in the county of Clare, on the south side of the entrance into Galway bay. N. lat. 53° 7'. W. long. 9° 11'.

BLACKHEAD, a cape on the south coast of Ireland, within the old head of Kinsale, and on the west side of Kinsale harbour. N. lat. 51° 38'. W. long. 8° 30'.

BLACKHEAD, a cape on the west coast of Scotland, in the county of Wigton; 6 miles W.S.W. of Stranraer.

BLACKHEAD, a point of land between Falmouth haven and the Lizard point.—Also, one of the peaks between Fermow's harbour on the east coast of Newfoundland, and *Agua fort*; Bald head being the other.—Also, a point on the south coast of Newfoundland, west of cape Race, and half a league further west from cape Pine.—Also, a point on the east coast of the northern island of New Zealand, N.N.E. of cape Turnagain, in about 40° 18' S. lat.

BLACKING, in the *Arts*, &c. is sometimes used for a facitious black, a lamp-black, shoe-black, &c. A mixture of ivory or lamp-black with linseed oil, makes the common oil-blacking. For a shining blacking, small beer or water is used instead of oil, in the proportion of about a pint to an ounce of the ivory black, with the addition of half an ounce of brown sugar, and as much gum Arabic. The white of an egg, substituted for the gum, makes the black

more shining; but is supposed to hurt the leather, and make it apt to crack.

In 1771 a patent was granted to Mr. William Bayley for preparing a composition in cakes, rolls, or balls, which, with the addition of water only, makes an excellent shining liquid blacking for shoes, boots, &c. The recipe for this purpose is as follows: Take one part of the gummy juice that issues, in the months of June, July, and August, from the shrub called the goat's thorn, four parts of river water, two parts of neat's foot, or some other softening lubricating oil, two parts of superfine ivory-black, two parts of deep blue, prepared from iron and copper, and four parts of brown sugar-candy. Evaporate the water; and, when the composition is of a proper consistence, let it be formed into cakes of such a size, that each cake may make a pint of liquid blacking.

BLACKLOCK, THOMAS, in *Biography*, was born in 1721, at Annan in Scotland, of parents, who were natives of Cumberland, and who occupied a humble station. At the age of 6 months he was deprived of his sight by the small-pox; and thus becoming incapable of any mechanical employment, he was in the probable course of nature destined to be a perpetual charge to his parents. His disposition, however, as he advanced towards maturity, engaged the most affectionate attention; and the kindness of his father was such as to impress his youthful mind, and to engage expressions of ardent gratitude. The powers of his mind were no less distinguished than the amiableness of his temper; and he improved the casual opportunities of cultivating them, which were afforded him by the attention of his father and friends, who read to him several passages out of English authors, and particularly from the works of our most approved and popular poets. These he heard with avidity and delight; and at the early period of his 12th year, he began to imitate what he admired. His performances, as he advanced towards maturity, became the subjects of general conversation; and having the misfortune to lose his father in his 19th year, he was invited, at the age of 20, by Dr. Stephenson, physician at Edinburgh, to remove thither and to pursue his studies at the university. Notwithstanding the personal disadvantages under which he laboured, he made very considerable progress in the Latin, Greek, and French languages; but upon the breaking out of the rebellion in 1745, his studies were interrupted, and he retired into the country. On this occasion he was solicited by his friends to publish a small collection of his poems at Glasgow. When the tumult of the rebellion subsided, he returned to Edinburgh, and to the prosecution of his studies for 6 years more, during which period he not only perfected himself in the languages, but made considerable progress in all the sciences, and particularly in polite literature. In 1754, he published a second edition of his poems, much improved and enlarged; and thus gained the patronage of Mr. Spence, who, by an account of his life, character, and poems, brought him into general notice. By means of a subscription to a 4to. edition of his poems, his circumstances were rendered easy and comfortable; and applying himself to the study of theology, he passed the usual trials, and was licensed in 1759 to be a preacher by the presbytery of Dumfries. From the discharge of the duties of his office he derived great satisfaction and reputation. On the alarm of a French invasion in 1761, he published a discourse "On the right improvement of time;" and in the same year he contributed some poems to the first volume of Donaldson's collection of original poems. In 1762 he formed a matrimonial connection, which he regarded as the chief source of the felicity of his future life. About this time he was ordained minister of Kircudbright, on the presentation of the earl of Selkirk; but in consequence of some litigations that ensued, he

thought it most expedient, within two years, to resign this preferment, and to retire upon a moderate annuity. With this slender provision he removed in 1764 to Edinburgh, and opened his house for the accommodation of young persons as boarders and students. In 1766 the marischal college of Aberdeen conferred upon him the degree of doctor in divinity. From this time he continued to maintain his literary character by several publications, which it will be sufficient to enumerate. These were, "Paraclesis, or Consolations deduced from natural and revealed religion," in two dissertations, 8vo. 1767; "Two Discourses on the evidences and spirit of Christianity, translated from the French of Mr. James Armand," 8vo. 1768; "A Panegyric on Great Britain," a satirical piece, 8vo. 1773; "The Graham, an heroic ballad, in four cantos," 4to. 1774; "Remarks on the nature and extent of liberty, &c. and on the justice and policy of the American war, occasioned by perusing the observations of Dr. Price on these subjects," 8vo. 1776; and a valuable article, communicated to the editors of the Encyclopædia Britannica, "On the education of the blind," 1783. A 4to. edition of Dr. Blacklock's poems was printed in 1793. This edition contains an essay on the education of the blind, being a translation of M. Haiiy's celebrated essay on this subject; and prefixed to it we have a new account of the life and writings of the author by Mr. Mackenzie, author of the Man of Feeling, &c. Dr. Blacklock died at the age of 70, in July, 1791. With respect to his talents, Mr. Hume observes, "that he may be regarded as a prodigy;" and to his moral character he bears this honourable testimony, that "his modesty was equal to the goodness of his disposition, and the beauty of his genius." In the depressed circumstances of his early life he was singularly contented and acquiescing; but his loss of sight deeply affected his sensibility, and he deploras it in plaintive accents in one of his poems, written on occasion of his escape from falling into a deep well. At the same time he was distressed by apprehensions of sinking into extreme indigence; however he expresses his trust in Providence, and his hope that the clouds which were gathering over him would be dissipated. Next to his religious principles, were letters, conversation, and music, from which he derived his principal solace. His poetry is easy, elegant, and harmonious; and abounds with images, deduced from visible objects, and aptly applied. He is said to have composed with rapidity, and hence it is owing that his vivacity and animation are often indulged at the expence of correctness and regularity. In sentiment he displays much benevolence and tenderness of disposition, as well as true piety and philosophy. Spence, *ubi supra*. Gen. Biog.

BLACKMORE, SIR RICHARD, M. D. an indefatigable writer, poet, and physician, was born at Corsham in Wiltshire, about the year 1650. After some years spent at a grammar school in the country, he was sent to Westminster school, and in 1668 to Edmund-hall, Oxford. In 1676 he took his degree of master of arts, and continued to reside at college three years after, but apparently without receiving much benefit from his long residence in this seat of the muses, scarcely knowing the names or situations of places, which an intimacy with classical authors must have made familiar to him. At some time in his life, probably immediately on quitting college, he kept a school, but does not seem to have remained long in that station, as he soon after went to Paris, and to other places on the continent, with a view, it is probable, of acquiring or improving his knowledge in medicine, in which faculty he took his degree of doctor at Padua. Returning to England, after a ramble of eighteen months, he came to London, and settled at first in Cheapside, where he acquired so much reputation, that in 1687, he was

admitted a fellow of the college of physicians. In 1697, he received the honour of knighthood from king William, accompanied with a present of a gold chain and medal, which, he intimates, were given him as a reward for some services performed at the revolution. The same year he was made physician ordinary to the king; an office he held afterwards under his successor, queen Anne. He was now in the zenith of his reputation, and having as yet but little exposed himself to the scrutiny of the critics by writing, his merit was probably rated much beyond its real standard. To his popularity as a physician, and his excellent and unimpeached moral character, it was probably owing that his first production, "Prince Arthur," an epic poem, in ten books, published a little before this time, acquired so much celebrity as to pass through three editions in the space of two years. Encouraged by this success, in 1699 he published his "King Arthur," in twelve books, with paraphrases on the book of Job, and on other parts of scripture: and in 1700, his "Satire on Wit," in which he took occasion to retort the sarcasms which had been heaped with no sparing hand on his last poems by Dennis, Dryden, Pope, and most of the wits of the time. Not deterred by their censures, in 1705 he published "Eliza," another heroic poem, in ten books. "This excited," Johnson says, "neither praise nor blame, but seems to have dropped dead born from the press." In 1712, appeared "Creation," a philosophical poem, certainly the best of his productions. It had the honour of being praised by Addison, in the Spectator, and Dr. Johnson has since inserted it in his collection of English poets, with commendation much beyond its merit. This for a time revived its credit, and gave it a degree of celebrity, which seems again to be declining apace. Pleas'd with the reputation procured by this poem, he soon after produced his fourth and last epic poem in twelve books, intended to commemorate the actions of king Alfred, whose name it bore, but like Eliza, it excited little notice; benevolence being ashamed any longer to patronize, and malevolence weary of insulting, such frigid abortions. But as if it was to be the fate of this author to try every species of writing, and to fail in all, on the Spectator ceasing, he produced, in conjunction with Mr. Hughes, the "Lay Monastery;" one paper of which was published three times in the week. This was only continued to the 40th number. Soon after he gave the world two volumes of essays. As these were intended to promote the cause of virtue and religion, they met with some favour. Besides these works, Dr. Blackmore wrote several tracts on different branches of medicine; on the spleen, the gout, the rheumatism, the king's evil, the dropsy, the jaundice, the diabetes, the plague; and as inoculation for the small-pox was making some progress in his time, he thought it incumbent on him to give his decided disapprobation of the practice. But as by this time he began to be esteemed scarcely a better physician than a poet, his opinion had fortunately very little weight with the public. The medical tracts are published together in an 8vo. volume, but are little known or noticed. He died on the 8th of October, 1729. Gen. Biog. Johnson's Lives of the Poets.

BLACKNESS, the quality of a black body; or a colour arising from a texture and situation of the superficial parts of the body, which, as it were, disse, or rather absorb, the light falling on it, without reflecting any, or very little of it, to the eye. In which sense, blackness stands directly opposed to whiteness; which consists in such a texture of parts, as indifferently reflects all the rays thrown upon it, of whatsoever colour they be.

Descartes, says Dr. Priestley (Hist. of Vision, p. 127 and 143, &c.), though mistaken with respect to the nature of light and colours, yet distinguishes justly between black and white, observing, that black suffocates and extinguishes the

rays that fall upon it; but that white reflects them. This, adds the historian of philosophy, is the first distinct account I have met with of this sensible hypothesis. Mr Boyle also made several observations and experiments, which demonstrate his theory in a very satisfactory manner. See BLACK.

Sir Isaac Newton, in his *Optics*, shews, that for the production of black colours, the corpuscles must be less than those which exhibit any other colours; because, where the sizes of the component particles are greater, there is too much light reflected to constitute this colour: but, if they be a little less than is requisite to reflect the white and very faint blue of the first order, they will reflect so little light, as to appear intensely black; and yet may, perhaps, reflect it variously to and fro within them so long, till it happen to be it fled and lost; by which means they will appear black in all positions of the eye, without any transparency.

And hence it appears, why fire and putrefaction, by dividing the particles of substances, turn them black: why small quantities of black substances impart their colours very freely, and intensely, to other substances, to which they are applied; the minute particles of these, by reason of their very great number, easily overspreading the gross particles of others. Hence also appears, why glass, ground very elaborately with sand, on a copper plate, till it be well polished, makes the sand, together with what by rubbing is worn off from the glass and copper, become very black; and why black substances do, sooner of all others, become hot in the sun's light, and burn (which effect may proceed partly from the multitude of refractions in a little room, and partly from the easy commotion of such very small particles): also, why blacks are usually a little inclined towards a blueish colour; for that they are so may be seen by illuminating white paper with light reflected from black substances, where the paper will usually appear of a blueish white; and the reason is, that black borders on the obscure blue of the first order of colours; and therefore reflects more rays of that colour than any other.

BLACKRIE, ALEXANDER, in *Biography*, apothecary, a native of Scotland, published in 1766 a dissertation on medicines that dissolve the stone, in which Dr. Chittick's secret is laid open, 12mo. It was reprinted in 1771, with additions. He found the solvent to be the lixivium saponarium, which may be given, he says, advantageously, mixed with lime water, even when blood is voided with the urine. When the bladder becomes ulcerated, wounded by the asperities of the stone, he recommends the pareira brava and uva ursi. When pain in the reins or pubes is violent, he gives opium; and he has known, he says, persons void stones in their sleep, while taking that drug. Persons who void red sand or gravel with their urine, are never affected, he says, with the stone. Haller. Bib. Chirurg.

BLACKS, *Negroes*: a people so called from the colour of their skin. For the reason of their colour, and the commerce of them, see NEGRO.

BLACKS, is also a name given to an association of disorderly and ill-designing persons, formerly herding chiefly about Waltham, in Essex, who destroyed deer, robbed fish-ponds, ruined timber, &c. See BLACK act.

BLACKSOD BAY, in some old maps erroneously called *Black Harbour*, in *Geography*, a large bay lying between the peninsula of the Mull, and the main land of the county of Mayo, Ireland, to the south of the isthmus. It is well sheltered, the ground in most parts clean, and sufficiently deep for large ships; but the ground being a hard sand, it is not thought that it will hold well in hard gales from the west and south-west, especially in the winter time. It is $2\frac{1}{2}$ miles

wide at its entrance, and runs about 7 miles inland, with several creeks communicating with it, of which those within Barnach isle, and the point of Claggan, are the most remarkable. The south-west point of this bay is in N. lat. $54^{\circ} 6'$. W. long. $9^{\circ} 52'$. M'K nzie, &c.

BLACKSOD Point, the southern point of the Mull, a peninsula in the western part of the county of Mayo, Ireland, which forms the western extremity of Blacksod bay. N. lat. $54^{\circ} 6'$. W. long. $9^{\circ} 52'$.

BLACKSTONE, J. in *Biography*, apothecary, of whom nothing is known, but that he published, in 1737, "Fasciculus Plantarum, circa Harefield, sponte nascentium, cum Appendice ad loci naturam spectante," 8vo. London. Among many common, some very rare plants were discovered by the author, and are described in this volume. He also published, in 1746, "Specimen botanicum, quo plantarum plerumque Angliæ indigenarum, loci naturales illustrantur." 8vo. London, an interesting and useful work. Haller. Bib. Botan.

BLACKSTONE, WILLIAM, SIR, knight and L.L.D. a celebrated English lawyer, was born in London, July 10th 1723, and received the first rudiments of learning at the Charter-house, where he was admitted upon the foundation in 1735, and whence he was removed, in 1738, to Pembroke college, Oxford. At school and in the university he was distinguished by his application and proficiency; and the range of his studies, even at an early period, was so extensive, that he is said to have composed a treatise on the "Elements of Architecture," for his own use at the age of 20. This treatise was never published. As he made choice of the profession of the law, he was entered of the Middle Temple, and quitted Oxford in 1744 to pursue studies, very different from those to which his taste inclined him at the university. This change of his pursuits is feelingly commemorated in the "Lawyer's Farewell to the Muse," composed about this time, and published in the fourth volume of Doddsley's *Miscellanies*. From this period he assiduously applied to his professional studies, residing occasionally in chambers in the Temple, for the convenience of attending the courts, and at other times in the university, to which he was much attached. In 1743 he was elected a fellow of All-Souls college, and on the 24th of November 1746 he was called to the bar, and commenced the practice of the law. Destitute of a ready elocution, and of other talents requisite for a popular advocate, his progress was slow; and he had leisure to discharge the duties of bursar, or steward, of All-Souls, which he did with such skill and diligence, as to improve the revenues of the college, and to aid in completing the magnificent structure of the Codrington library. A treatise which he composed on this occasion is still useful in conducting the pecuniary concerns of this society. In 1749, he was appointed recorder of Wallingford in Berkshire; and desirous of more constant residence at Oxford, he took in the following year the degree of doctor of laws. About this time he published an "Essay on collateral consanguinity," particularly referring to the claim made by the kindred of the founder of All-Souls to a preference in being elected fellows of that society. It was written in defence of the college, which had lately rejected some of these claims; but the reasoning, though supported by great learning and ingenuity, is deemed by some competent judges inconclusive. In 1753, Mr. Blackstone, perceiving, after a trial of seven years, that he had no prospect of success in the courts at Westminster, determined to quit London, and to retire to his fellowship at Oxford. This resolution was eventually very favourable both to himself and the public. As no public provision had been made either by the founders of the English universities, or at any subsequent period

period, for teaching students the laws and constitution of their own country, Mr. Blackstone undertook to supply this defect, and opened a course of public lectures upon this interesting subject. With such reputation and success did he prosecute his plan, from Michaelmas term 1753, when his first course of lectures commenced, during a series of successive years, as probably to suggest the idea to Mr. Viner of founding by his will a very liberal establishment in the university of Oxford for the study of the common law. As soon as the plan of Mr. Viner's institution could be arranged, Mr. Blackstone was very properly elected, in October, 1758, the first Vincian professor; and he introduced the duties of his new office by a well-written lecture, adapted both to the subject and the audience, which was soon afterwards published, and which has been since prefixed to the first volume of his Commentaries.

With his engagements as a lecturer, Mr. Blackstone combined the occasional exercise of his profession as a provincial barrister; and, in 1754, he was employed as counsel in the great contested election for the county of Oxford. The substance of his pleadings on this occasion was published in a pamphlet entitled "Considerations on Copyholders;" with a view to the legislative decision of the point controverted at this election. The argument of this treatise is founded on feudal principles, and excludes copyholders from the right of voting; this right being, by his reasoning, restricted to those who have a freehold or permanent interest in land, which does not belong to copyholders, whom the feudal system considers as mere vassals, and dependent on the will of the lord. But it has been more liberally argued by others, that a series of legal decisions has given to this tenure all the permanence of freehold property, and that as the reason of the distinction between the two species of tenure has ceased, the distinction itself ought no longer to exist. However, in the parliamentary discussion of this question, the technical arguments prevailed; and a declaratory act was soon afterwards passed, in conformity to the principles advanced by the professor's treatise, excluding copyholders from the right of suffrage. In 1759, Blackstone published, besides two tracts of a local and temporary nature, a new edition of the "Great Charter, and Charter of the Forest," introduced by an historical preface, which evinced a considerable knowledge of antiquities. In the same year, the reputation gained by his lectures encouraged him to return to the Temple, and to resume his attendance at Westminster; where he soon acquired professional eminence, and where he was employed for a considerable time in almost all cases that required great learning and deep research. In 1761, he was elected member of parliament for Hindon, and had a patent of precedence to rank as king's counsel, having before declined the office of chief justice of Ireland. In 1762, he collected and republished several of his pieces under the title of "Law Tracts," in 2 vols. 8vo. In 1763, he was appointed solicitor general to the queen, in the establishment of her majesty's household, and barrister of the Middle Temple. Having vacated his fellowship by his marriage, in 1761, he was immediately afterwards appointed principal of New Inn-hall, by lord Westmoreland, then chancellor of the university. But in 1766, he resigned both this office and his Vinerian professorship.

The first volume of his lectures was published in 1765, under the title of "Commentaries on the Laws of England;" a work which sir William Jones has characterized as "the most correct and beautiful outline that was ever exhibited of any human science." In the execution of this undertaking, the author combines the humbler duty of an expositor with the higher character of a philosophical writer on jurisprudence. Under the former character he is entitled to the

highest praise. The style is correct, perspicuous, and elegant; and the author has admirably contrived to connect amusement with instruction, and to render the study of the law as agreeable as it is important and interesting. Notwithstanding the immense mass of materials of which this comprehensive work consists, few errors have been detected in it, and it has been cited as a book of authority.

It has been objected, however, to these Commentaries, excellent as they are in a variety of respects, that in those parts of them where the author examines the reasons and principles of law, he does not investigate them with a truly philosophical spirit, and that he does not rise above the ordinary level of those writers who, in every country and age, have extolled their own municipal institution as "the wisdom of ages," and "the perfection of reason." In discussing the propriety of particular laws, it is said that "his ingenuity is always occupied by the forms of jurisprudence; and instead of referring to public convenience and general utility, the sole standard of all rational legislation, he perpetually appeals to those technical arguments which are dignified with the title of "legal reasons." He is, in all cases, the advocate and the apologist of existing institutions; and it is the constant tendency of his work to justify whatever has been established by antiquity, to discredit the improvements of modern times, and to expose to contempt or indignation all proposals for further change. In his political principles he has been charged with being too much the advocate of prerogative; and his ecclesiastical opinions have been thought to incline towards intolerance. Notwithstanding the undue deference to authority, with which this writer has been charged, there are many passages in his admirable work, in which he expresses a marked disapprobation of standing armies and military barracks, and in which he delineates the progress of the influence of the crown, and the probable effects of a further increase of the national debt. These passages, however, have been attributed, by some of those who have animadverted on his Commentaries, more to the spirit of the times, than to that of the writer. Several obnoxious passages in the ecclesiastical part of this work were pointed out by Dr. Furneaux and Dr. Priestley; but though the author had not magnanimity enough explicitly to acknowledge his errors, these passages were retrenched in subsequent editions. The political principles of the Commentaries were some years afterwards, viz. in 1776, more severely noticed in a treatise entitled "A Fragment on Government," by Jeremy Bentham, esq. To the honour of Mr. Blackstone it should be mentioned, that, notwithstanding the severity of this author's criticism, he afterwards became acquainted with him, and lived with him upon terms of regard and friendship.

Having given his opinion in parliament, on occasion of the debates about the Middlesex election, that an expelled member was not eligible to the same parliament, and this opinion appearing to contradict the language of his Commentaries, he was violently attacked for this inconsistency by the celebrated Junius and others; but, though he defended himself with ingenuity, he inserted the case of expulsion in the next edition of his work, of which he had before taken no notice, as one of the disqualifications for a seat in parliament.

His distinguished talents and meritorious services entitled him, without doubt, to the notice and recompence of government. Accordingly, when he declined the offer of being solicitor-general, on the resignation of Mr. Dunning, in 1770, he was appointed immediately afterwards one of the justices of the common pleas, which office he held, except for a short interval, during which he accommodated Mr. Justice Yates by sitting as one of the justices of the king's

king's bench, till his death. Towards the end of the year 1779, a dropical disease, occasioned chiefly by early application, and by neglect of exercise, made rapid advances, and terminated in his death, Feb. 14th, 1780. in his 56th year. In private life, judge Blackstone was distinguished for mildness and benevolence, and for every domestic and social virtue. In studies and avocations that contributed to establish his own reputation, and to benefit both his contemporaries and posterity, he was eminently assiduous; and the intervals of leisure which he enjoyed in the later period of his life were devoted to schemes of local improvement in the neighbourhood where he resided, or to great public undertakings. The two volumes of Reports, which he left in MS. have been published since his death, in 2 vols. folio, with a preface containing Memoirs of his life; but their merit is said not to correspond with the fame of the author. He also left in MS. several small poetical pieces; and his notes on Shakespear inserted in Mr. Malone's Supplement, shew how well he understood, and how capable he was of appreciating, the excellence of that author. Life prefixed to Blackstone's Reports. Gen. Biog.

BLACKSTONE, in *Geography*, a small river of America, which has its source in Ranshorn pond, in Sutton, Massachusetts; and, passing through Providence, discharges itself into Narraganset bay, at Bristol, receiving in its course several tributary streams.

BLACKSTONIA, in *Botany*. See CHLORA.

BLACKWALL, ANTHONY, in *Biography*, a native of Derbyshire, was admitted a sizar of Emanuel college, in the university of Cambridge, in 1690. Having taken the degree of M. A. in 1698, he became head-master of the free-school at Derby, and lecturer of the parish of All-hallows in that town. In 1706, he excited notice by an edition of the "Moral Sentences of Theognis," with a new Latin version, together with notes and emendations. He also published, in 1718, "An Introduction to the Classics," 12mo. in which he displays their excellence, gives directions for studying them with advantage, and illustrates those rhetorical figures by which language is elevated and adorned. In 1722, he was appointed head-master of the free-school at Market Bosworth, in Leicestershire; and in this situation he prepared for the press his principal work, entitled "The Sacred Classics defended and illustrated; an essay humbly offered towards proving the purity, propriety, and eloquence of the writers of the N. T. in 2 parts 4to." This was published in 1725; and a second edition in Svo. appeared in 1727. After his death, a second volume was published under the title of "The Sacred Classics defended and illustrated, the second and last volume, in 3 parts." Svo. 1731. The design of the author, in this elaborate and learned work, was to vindicate the writers of the New Testament from the charge of barbarism in their language, and to shew that the words and phrases which they have used are to be found in the most approved classical writers. Many of the obscurities and seeming faults he attributes to transpositions and mis-translations, and he urges the necessity of a new version. See BIBLE. This book has been highly valued by biblical scholars; and a Latin translation of it was published at Leipzig, in 1736, by Christopher Wolfius. Nevertheless it has been thought by several very competent judges to be written with more zeal than solidity; and Dr. George Campbell, in his Preliminary Dissertation to his Version of the four Gospels, has attacked the fundamental principle of the work, and made several particular strictures upon it. Mr. Blackwall was eminently distinguished as a schoolmaster, and formed many good scholars, among whom was Richard Dawes, author of the *Miscellanea Critica*. In his school he used a Latin grammar composed by himself, and published

in 1728 without his name. Sir Henry Atkins, bart., who had been one of his scholars, presented him, in 1726, with the valuable rectory of Clapham, in Surrey; but he resigned it in 1729, and returned to Market Bosworth, where he died in 1730.

BLACKWATER, in *Geography*, the name of four rivers in England and Scotland. That of England rises near the middle of the county of Essex, and falls into the mouth of the Thames, where it forms a spacious bay called Blackwater bay. Those of Scotland are, 1st. in Bainsshire, 2d. in Berwickshire, and 3d. in Perthshire.

BLACKWATER, the name of several rivers in Ireland, one of which is very considerable. This rises in the mountains which separate the counties of Limerick and Kerry; and, taking a southern direction, divides the latter county from the county of Cork for about 12 miles. After passing at the foot of *Slieve-logher* mountain, from which it receives a large supply of water, it runs westerly across the northern part of the county of Cork, which is about 45 English miles. In this course it passes the flourishing towns of Malow and Fermoy, to the former of which it was navigable in lord Orrery's time, and receives the rivers Allo, Awbeg, and Funcheon, besides many smaller streams. A few miles below Fermoy, it enters the county of Waterford, and continues in the same direction for 12 miles, when, having passed the ancient city of Lismore, it bends nearly at a right angle to the south at Cappoquin. At this town it becomes navigable, and in its course receiving the river Bride, and opening into two or three spacious loughs, it flows into the sea a little below the town of Youghal, which is situated on its western bank. This river passes for almost the whole of its course, which, without making any allowance for its great windings, is about 90 English miles, through a rich and well-wooded country, "equally remarkable," says Mr. Young, "for beauty of prospect and fertility of soil." The banks are crowded with a number of fine seats, some of which, as Dromana and Lismore castle, may vie with those in any county, and have furnished artists with beautiful landscapes. The cyder made in its neighbourhood is held in great estimation, being preferred to the best imported from England, and of course brings a very high price. The Irish name of this river was *Auniduff*, or *Awin-dubb*, the black river, and also *Awin-more*, the great river, to distinguish it from the *Awebeg*, or *Awin-beg*, which runs into it. The latter is the Mulla of the immortal Spenser, who had an estate on its banks, where he resided for a long time. In his marriage of the Thames, he has mentioned the Blackwater and several of its tributary streams, though not with geographical accuracy, as the Allo does not rise near Slievegher, but has the Blackwater between it and that mountain.

"Swift Auniduff, which of the Englishman
Is called Blackwater, and the Liffar deep,
Sad Trowis that once his people overran,
Strong Allo tumbling from Slievegher sleep,
And Mulla mine, whose waves Iwhilom taught to weep."

Spenser's Fairy queen, b. iv. c. 11.

—2. Another river, called Blackwater, rises in the county of Tyrone, and, for the greater part of its course, divides that county from those of Monaghan and Armagh. The linen manufacture is extensively carried on in its neighbourhood, so that there are many bleach-greens. The flourishing little towns of Aughnacloy, Caledon, Blackwater town, Moy, &c. are on its banks; and its navigation to Lough Neagh, into the south-western angle of which it pours its waters, has been improved at a considerable national expence, on account of the collieries at Drumglass, in the county of Tyrone.—3. A river Blackwater rises in the

the county of Monaghan, and, having passed through Lough Ramor, unites its waters to those of the Boyne at Navan. — There are also small rivers of this name, one in the county of Longford, which joins the Shannon near Lanesborough, and one in the county of Wexford, which flows into St. George's channel at the place where Bannow formerly stood. Smith's Cork. Beaufort's Map. Holmes's Tour in the South, &c.

BLACKWATER Town, a small town in the county of Ar-magh, in Ireland, on the river Blackwater, which has a linen market. Distance from Dublin 66 miles.

BLACKWELL, THOMAS, in *Biography*, was the son of one of the ministers at Aberdeen, and born in that city in the year 1701. He was educated at the grammar school and marischal college of his native place, of which, in 1723, he was appointed Greek professor, and in this office he contributed in no small degree to promote Greek literature, and the study of the classics in general. In 1735, his "Enquiry into the Life and Writings of Homer," 8vo. was published without his name; and by its popularity served to establish his reputation for learning and ingenuity. Of this work, discussing a variety of topics without any very obvious connection, Dr. Bentley is said to have remarked, "that when he had gone through half, he had forgotten the beginning; and that when he had finished the perusal of it, he had forgotten the whole." It is reckoned, however, the author's principal performance, and is both curious and entertaining. His "Letters concerning Mythology," 8vo. were published in 1748; and they were intended to establish a regular system of ancient fable, as an allegorical representation of the religion, laws, and philosophy of early times. The work is learned, fanciful, and desultory. In this year Dr. Blackwell was appointed principal of the Marischal college, and allowed his office of Greek professor. In 1751, he announced to the public his design of publishing a new edition of Plato's works; but this design was never executed. The first volume of "Memoirs of the Court of Augustus," 4to. was published in 1753; the second in 1755; and the third, after the author's death, in 1764. The object of this work is to exhibit, in an elegant and popular form, the principal facts of Roman history, at the commencement and during the period of the public life and reign of Augustus. It is written with vivacity, and was at first well received; but the affected ease and familiarity of the style, united with a considerable degree of that pompous kind of pedantry, which displays not only erudition but a knowledge of the world, has contributed to lower its reputation. This work manifests also a republican spirit, not altogether free from party prejudice. The author's affected mode of writing increased as he advanced in years; and though it must be acknowledged, that he possesses genius and fancy, and had a relish for the beauties of ancient authors, he never acquired that simplicity of taste, which leads to the true ease and elegance of composition. This peculiar style and manner of composition have been attributed to an injudicious imitation of lord Shaftesbury. Some years before his death Dr. Blackwell's health declined; and his disorder being of the consumptive kind, which he is thought to have increased by his abstemious mode of living, he was under a necessity of remitting his studies, and advised to travel: but with this view he could proceed no farther than Edinburgh, where he died in 1757, the 56th year of his age. His temper was singularly mild and equable; and he retained his natural vivacity and cheerfulness through the whole period of his illness, and till the hour of his death. In conversation he was instructive and entertaining; and he blended a considerable knowledge of the world and urbanity of manners with an extensive acquaintance with ancient and modern

authors. But it was his foible, that he was apt to assume the appearance of universal knowledge; and this weakness betrayed him into conversation on philosophical and mathematical subjects, with which his acquaintance was very imperfect. Among his friends and correspondents were many persons of literary eminence; and it is said, that his patrons proposed to introduce him into the professorship of modern history at Cambridge, if he had not died before a vacancy occurred. Biog. Brit.

BLACKWELL, ELIZABETH, widow of Alexander Blackwell, M. D. author of "A New Method of improving cold, wet, and clayey ground," 1741, London, 8vo. Rejecting dung and other manures, he depended entirely on repeated ploughing and turning the ground. He died a miserable death in Sweden. His widow, being left in indigence, undertook, by the advice of her friends, to publish an account of 500 medicinal plants, to be drawn, engraved, and the greater part of them coloured by herself. The plants were furnished by Rand and Miller, from the botanical garden, belonging to the company of apothecaries, at Chelsea. They are, in general, Haller says, faithfully delineated. In some parts, however, she has failed. Not well instructed in the Linnæan system, she has not delineated the fibres or filaments of the flowers with the accuracy now required. A short account is annexed of the medicinal virtues of each of the plants, some of which are extremely rare. The first volume of this work was first published in 1737, and the second in 1739, when the whole was published in 2 vols. fol. under the title of "A curious Herbal, &c.;" and it is creditable to the authoress to say, that this bulky and expensive work passed through several editions. The last, which came out in 1760, in 5 vols. folio, at Nuremberg, is furnished with a preface and considerable additions by James Trew. After his death, in 1769, a supplemental volume, conducted by Ludwig, Bosc, and Boehmer, was printed in 1773. This work has been in a great measure superseded by Dr. Woodville's SS. Medical Botany, in 4 vols. 4to. Haller. Bib. Bot. Pulteney's Hist. and Biog. Sketches of the Progress of Botany in England, vol. ii. p. 254.

BLACKWOOD, ADAM, was born at Dumferline, in Scotland, in 1539, and educated at Paris under Turnebus and Dorat. He was particularly patronized by Mary queen of Scots; and when he had finished his law studies at Toulouse, he obtained the office of counsellor to the presidial of Poitiers, which was Mary's dowry-town. In this place he settled and married; and, during the imprisonment of Mary, took several journeys to England with a view of serving her. He died in 1613. His religious and political sentiments may be deduced from the titles of his works, which were written both in verse and prose. Of these the principal were, "Caroli IX. pompa funebris versibus expressa," Paris, 1754; "De vinculo religionis et imperii, et de conjunctionum in diis, religionis fuco adumbrata," 1575; "Adversus G. Buchanani dialogum de jure regni apud Scotos, &c.;" Poitiers, 1581; "Martyre de Marie Stuart, reine d'Ecosse," &c. &c. His account of the execution of Mary Stuart is a virulent invective against queen Elizabeth, her parentage, her right to the crown, her government, &c. His works were collected and published in a 4to. volume by Gabriel Naudé, in 1644, with an eulogy of the author prefixed. Moreri. Ger. Biog.

BLADDER, in *Anatomy*, is a membranous bag, serving as a reservoir for some secreted fluid. That which is considered as the chief receptacle of this kind, is the urinary bladder. As the anatomy of these parts, in general, will be described with that of the organ which prepares the fluid which they are intended to contain; therefore, for the sake of uniformity of method, the description of the urinary bladder

bladder is given with that of the kidneys and other urinary organs. See KIDNEY.

BLADDER, Diseases of the, in *Surgery*. This viscus being supplied with nerves, blood-vessels, absorbents, and muscular fibres, will be necessarily liable to all the common disorders of soft parts; such as *wounds, inflammation, ulceration, gangrene, palsy, contraction, dilatation, rupture, &c.* But, besides these affections, the bladder is subject to other morbid changes, which occur very rarely or not at all in most other parts of the body. It is sometimes included among the contents of a herniary sac. See HERNIA. Partial bags, or facculi, may likewise form in the coats of the bladder, so as to retain one or more calculous bodies generated in the urine. See CALCULUS, CYSTOTOMY, LITHOTOMY, and STONE. Fungous, painful, and dangerous excrescences arise also on the inner surface of this organ, which are frequently denominated *cancers*, and are perhaps equally fatal in their consequences. These disorders will, in general, produce either a retention or a preternatural evacuation of urine, and require a peculiar plan of treatment adapted to the diversity of symptoms. See URINE, *Retention of,* &c. &c.

BLADDERS, vesiculae, in *Botany*, a kind of air-bags found in some species of fucus.

Vegetable bladders are found every where, in the structure of the bark, the fruit, pith, and parenchyma, or pulp; besides those morbid ones raised on the surface of leaves by the puncture of insects.

BLADDER, swimming. See AIR bladder.

BLADDERS, oil, in the *Anatomy of Plants*. See OIL-bladders.

BLADDER, puceron, in *Entomology*. See CHERMES.

BLADDER-nut, in *Botany*. See STAPHYLĒA.

BLADDER-nut, African. See ROYENA.

BLADDER nut, laurel-leaved. See HOLLY.

BLADDER fena. See COLUTEA.

BLADDER-shaped, inflatus, denotes inflated or distended like a blown bladder; such are the cup of the bladder campion, and the blossom of the fig-wort.

BLADDER-spout. See UTRICULARIA.

BLADDER-wort, common. See UTRICULARIA.

BLADE, in *Agriculture*, a spire of grafs, or green shoot of corn.

BLADE, in *Anatomy*. See SHOULDER-blade.

BLADE of an Anchor, denotes that part of the arm on which the palm is shut.

BLADE, in *Commerce*, a thin slender piece of metal, either forged by the hammer, or run and cast in moulds, to be afterwards sharpened to a point, edge, or the like. Sword-blades are made by the armourers, knife-blades by the cutlers, &c. The English and Damascus blades are most esteemed. Among the French, those of Vienne and Dauphiny have the preference. The conditions of a good blade of a small sword are, that it be light and tough, apter to bend than break. When it will stand in the bend, it is called a *posr man's blade*.

BLADE of a Chissel, is the iron or steel part, as distinguished from the wooden handle.

BLADE of Maee, or cinnamon, among apothecaries, are little slips or slices of those barks.

BLADE of an Oar, is that part which is plunged into the water in rowing. On the length of this do the force and effect of the oar, in a great measure, depend.

BLADE of a Saw, the thin part wherein the teeth are cut, which, to be good, must be stiff, yet bend equally into a regular bow all the way, without yielding more in one place than another.

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BLADE mill, is that contrived for grinding iron tools, as scythes, reaping hooks, axes, chissels, and the like, to a bright edge.

BLADED, in *Heraldry*, is a term used when the stalk or blade of any kind of grain or corn is borne of a colour different from that of the ear or fruit: thus, *argent an ear of wheat or BLADED vert*.

BLADEN, in *Geography*, a county of North Carolina, in the district of Wilmington; having 6963 inhabitants, including 2278 slaves.

BLADENSBURG, a post town of America, in Prince George county, Maryland, on the eastern bank of the eastern branch of Patowmack river, at the confluence of the N. W. and N. E. branches, 9 miles from its mouth at the Federal city, 38 S. W. from Baltimore, and 12 N. E. from Alexandria, in Virginia. It contains about 160 houses.

BLADHIA, in *Botany*, so named by Thunberg, from Peter John Bladh, a Swede, resident at Canton. Lin. gen. Schreb. n. 370. Thunb. nov. gen. 6. fl. jap. 7. Clafs and order. *Pentandria Monogynia*. Gen. Char. Cal. perianth one-leaved, very short, permanent, five-parted; parts ovate, concave, spreading, torn-subferrate. Cor. one-petaled, wheel-shaped, five-parted; parts ovate, obtuse, spreading. Stam. elements five, very short; anthers heart-shaped, acute, converging into a cone; shorter than the corolla. Pist. germ superior; style filiform, longer than the corolla; stigma simple, acute. Per. berry globose, crowned by the permanent style, one-celled. Seed single, globose, involved in a membrane.

Ess. Char. Cor. wheel-shaped, deciduous. Berry containing one arilled seed.

Species, 1. *B. japonica*. Lin. Syst. 235. Thunb. jap. 95. t. 18. Kœmpf. Amœn. 5. 776. (Quackitz) "Leaves ferrate smooth." 2. *B. rubra*. Lin. Syst. 237. Thunb. jap. 96. t. 19. "Leaves ferrate, villose." 3. *B. crispata*. Lin. Syst. 237. Thunb. jap. 97. Kœmpf. Amœn. 5. 776. 2. ic. select. t. 7. "Leaves oblong, curled, smooth." All these are natives of Japan. Thunberg has another species among his obscure plants, jap. p. 350. Martyn.

BLADUM, in *Middle Age Writers*, is taken for all sorts of standing corn in the blade and ear. The word is also written *blatum, blava,* and *blavium*. In our old charters, the word *bladum* included the whole product of the ground, fruit, corn, flax, grafs, &c. and whatever was opposed to living creatures. The word *bladum* was sometimes also applied to all sorts of grain or corn threshed on the floor: *tria quarteria frumentii, tria quarteria avenarum, & urum quarterium sabaarum, erunt quili de solutione predicti bladi in perpetuum*. But the word was more peculiarly applied to bread-corn, or wheat, called in French *blé*. Thus the Knights Templars are said to have granted to Sir W. de Meriton's wife *duas summas bladi*. Kennet's Paroch. Ant. and Du Cange.

Hence *bladarius* denotes a corn-monger, meal-man, or corn-chandler; and it is used in our records for such a retailer of corn. Pat. 1 Ed. III. par. 3. m. 13. And *bladius* signifies an ingrosser of corn or grain.

BLAE, in *Ornithology*, among French writers, an African bird of the falcon tribe described by Latham under the name of *falco melanopterus*, which see.

BLÆRIA, in *Botany*, so denominated from Patrick Blair, M. D. Lin. gen. n. 139. Reich. 145. Schreb. 183. Juss. 160. Clafs and order, *Tetrandria Monogynia*. Nat. Ord. *Bicornes*. *Ericæ*. Juss. Gen. Char. Cal. perianth four-parted; leaflets linear, erect, a little shorter than the corolla, permanent. Cor. monopetalous, campanulate; tube cylindrical, the length of the calyx, pervious; border small, four-cleft;

divisions ovate, reflex. *Stam.* filaments four, setaceous, the length of the tube, inserted into the receptacle; anthers oblong, compressed, erect, obtuse, emarginate. *Pist.* germ. four-cornered, short; style setaceous, much longer than the corolla; stigma obtuse. *Per.* capsule obtuse, quadrangular, four-celled, gaping at the angles. *Seeds*, some roundish. *Obs.* The anthers are emarginate, but not horned, as in *ericca*, allied to this.

Ess. Char. *Cal.* four-parted. *Cor.* four-cleft. *Stam.* inserted into the receptacle. *Capf.* four-celled, many-seeded.

Species, 1. *B. ericoides*, heath-leaved B. "Anthers awnless, standing out; calyxes four-leaved; bractes the length of the calyx; leaves in fours, oblong-acerose, hairy, imbricate." This has the stature of the common heath. Flowers terminating, white with a tinge of purple; corollas tubulous, erect; anthers two-parted, scabrous; style capillary, longer than the anthers. Introduced into Kew garden in 1774 by Mr. F. Masson. 2. *B. ciliaris*, ciliated B. "Flowers in a head, calyxes ciliate." Resembling the preceding, and readily known by its white calyxes, most distinctly ciliate. 3. *B. articulata*, jointed-leaved B. Penza Sarcocolla. Berg. cap. 25. "Stamens protruded, two-parted; corollas cylindrical." A distorted shrub, of the stature of common heath. Leaves in fours, pressed to the branches; heads of flowers terminating, with white-villose calyxes; corollas flesh-coloured; anthers very narrow, black; differing from the first in having equal stamens, and leaves more imbricated. 4. *B. purpurea*, purple-flowered B. "Stamens included, two-parted; corollas oblong, straight; flowers terminating, aggregate; peduncles erect." Like the third; but the heads are nodding. 5. *B. pusilla*, dwarf B. "Flowers scattered; corollas funnel-form." This has the stature of small heath. Branches pubescent; leaves in fours, rugged, petioled, scored underneath with a line; flowers minute, scattered, shorter than the leaves. 6. *B. muscosa*, moss-leaved B. Ait. Hort. Kew. 1. 150. "Anthers awnless, almost standing out; calyxes one-leaved, hairy; corollas bell-shaped, hairy in the upper part; flowers axillary; stigmas obovate." Found at the Cape of Good Hope by Mr. F. Masson, and introduced in 1774; flowering from June to August.

Propagation and Culture.—These are all shrubs, inhabitants of the Cape of Good Hope, require the same treatment and shelter with other Cape plants in the dry stove, and may be increased by cuttings, like the ericas, or heaths, which they much resemble. Martyn.

BLÆSLING, in *Ornithology*, one of the synonymous names of the greater coot of English writers, and *fulica atririma* of Linnæus. Vide *Günther Nest. und. Eyer*. The common coot, *fulica atra* of Linnæus, is also named by this author *kleiner blasling*.

BLÆSUS, in *Medicine*. See STAMMERING.

BLAGAITZKI, in *Geography*, a town of Croatia; 10 miles N.N.W. of Sluin.

BLAGNAC, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the district of Toulouse, on the Garonne; 3 miles N.W. of Toulouse.

BLAGOVETSCHENSKOI, a town of Russia, in the government of Archangel, near the south-east coast of the White sea; 70 miles S.W. of Archangel.

BLAGRAVE, JOHN, in *Biography*, an English mathematician, was born of an ancient and honourable family at Bulmarsh court near Sunning in Berkshire, towards the middle or close of the 16th century, and educated, first at a school in Reading, and afterwards at St. John's college, Oxford. Before he took any degree he retired from the uni-

versity to his patrimonial seat at South-cote lodge, near Reading, where he diligently pursued his studies, particularly mathematics. His works, of which we have any account, are, "A Mathematical Jewel," shewing the construction and use of an instrument so called, and its application to astronomy, cosmography, geography, &c. Lond. 1585, fol.; "The Construction and Use of the Familiar Staff, &c.," performing the geometrical mensuration of all altitudes, Lond. 1590, 4to.; "Altrabium Uranicum generale," containing the use of an instrument, or astrolabe, Lond. 1596, 4to.; and "The Art of Dalling, in two parts," Lond. 1609, 4to. Mr. Blagrave was distinguished by his benevolence, both during his life, and at his death. Having never been married, he bequeathed 50l. to each of the children of his three brothers, or their posterity, payable at the age of 26; and his bequests in this way were so well adjusted, that near 80 of his nephews and their descendants were thus benefited out of his leasehold estate. He also bequeathed lands for producing an annual donation of 10l. to a maid-servant in the town of Reading, according to the directions of his will. These directions required, that the church-wardens of each of the three parishes should on Good Friday send one virtuous maid, who had lived five years with her master. The three maids were to appear in the town-hall before the mayor and aldermen, and to cast dice. She, whose throw was the greatest, received the ten pounds. The two maids who had lost were to appear the next year, together with a third added to them. Accordingly each maid was to have by his will the chance of three annual throws; but if any failed in three successive years, he orders new persons to be presented. On the same Good Friday, money is distributed to 80 widows in pursuance of his will, who attend a sermon, for which the preacher is to receive ten shillings. Mr. Blagrave died Aug. 9th, 1611, and was buried in the church of St. Lawrence, Reading, where a sumptuous monument is erected to his memory. Biog. Brit.

BLAGRE, in *Ornithology*. Under this name Levaillant describes the African species of eagle called by Latham *falco blagrus*, which see.

BLAIN, a distemper incident to beasts, consisting in a bladder growing on the root of the tongue against the windpipe, which at length swelling stops the breath.

It comes by great chafing and heating of the stomach; whereby, as some judge, it still grows and increases by more heat.

It is perceived by the beast's gaping, holding out his tongue, and foaming at the mouth: to cure it, cast the beast, take forth his tongue, and then slitting the bladder, wash it gently with vinegar and a little salt.

BLAIN, in *Geography*, a town of France, and principal place of a district in the Lower Loire. The population of the place consists of 1897 persons, and of the canton of 10,274; its territorial extent is $34\frac{1}{2}$ kilometres, and it includes 4 communes; 18 miles N.N.W. of Nantes, and 40 S. of Rennes.

BLAINVILLE, in *Biography*, a learned musician of Paris, who proposed, in 1751, a third mode or key, which he called a *mixed mode*, because it participates of the modulations of the two other, or rather from its being compounded of both, a mixture which the author does not regard as an inconvenience, but rather as an advantage and source of variety both in the melody and harmony. Rousseau. Dict. de Musique, published 1768.

BLAINVILLE, a performer on the violoncello, and music-master at Paris, who had many symphonies and motets performed at the Concert Spirituel, in the middle of the last century,

century, without success; but abandoning the *practice* of harmony or composition, in order to try his force in the *theory*, in 1751, he produced "L'Harmonie theorico-practico;" in 1754, "L'Esprit de l'Art Musical;" in 1765, "L'Histoire générale, critique, et philologique de la Musique." These works are no better than his symphonies. They are compilations without taste, which teach nothing new to those who know any thing about music already; and not enough to those who know nothing. In 1751, he had the courage to publish as a discovery a pretended *new mode*, a key different from the major and minor, which, he said, was neither major nor minor, but *mixed* of both. He composed a symphony in this new mode, and had it performed at the Concert Spirituel, which gave birth to many dissertations and discussions, &c. Laborde, *Essai sur la Musique*, tom. iii. p. 577.

"Who shall decide, when doctors disagree?"

The *new mode*, as it was called, was attacked by the ingenious and speculative writer on music, M. Serre, of Geneva, and defended by Rousseau in his Dictionary. Thirty years after, it became the subject of a very long article in M. Laborde's *Essai sur la Musique*, merely to attack Rousseau for having defended it. In this attack of the dead lion, the abbé Roullier was *bottle-holder* to his friend Laborde.

All these gentlemen seem utterly ignorant of the church music of the 15th and 16th century, built on the ancient ecclesiastical modes, in which nothing was more common in the masses of the old masters, than for a movement beginning in A minor to end on the fifth of that key, with a sharp third, which would be called now a *semi cadence*. The melody of the several parts is equally in the scale of C and A natural, which, without accidental flats or sharps, produces nothing but different species of octaves in the key of C natural. But calling E the key note instead of A, it has a peculiarity in the second, which, instead of being a tone major above the key note, is only a major semitone.

Now Dr. Pepusch, who rigidly adhered to the laws of the ecclesiastical modes in his "Treatise on Harmony," so late as 1731, in speaking of the key of E as formed of one of the species of octave in the scale of C natural, has explained the properties of this key with only a major semitone for its second, much better than Blainville, or any of his defenders or opponents, and terminates his remarks on this key, by saying that "it differs from all others; for they are introduced by the semitone major *below* them, but this is by the semitone major *above* it; they by their *seventh* major, but this by its *second*, which happens to be *minor*; that is from F downwards to E. It is because of this difference and peculiarity in its modulation, which makes what is composed in it to be very *solemn*, that this key is as it were appropriated to church-music, and called by the Italians *tuono di chiesa*." p. 65.

But the doctor does not call it a *new key*, for it is as old as counterpoint; and we should suppose that Blainville had either seen Dr. Pepusch's treatise, or found in some old mass a movement that ended on the fifth, instead of the key note, and wished to pass for an *inventor*. But it is plain that all the French gentlemen, who took a part in this controversy, were disputing about the *dent d'or*, before they had ascertained its existence. In examining the masses of Josquin, Palestrina, and the cantions of Tallis and Bird, we find movements of the description of Dr. Pepusch's *tuono di chiesa*. And in Padre Martini's "Saggio di Contrepoint," tom. i. p. 42, he calls this mode *il terzo tuono autentico*, the third authentic mode, which Blainville calls the *new* or *mixed mode*; and P. Martini even calls it *terzo tuono misto del quarto suo plagale*, p. 44. He gives the same natural scale for its intervals as Rousseau and Blainville, EFGABCDc,

p. 51. An example of this *mixed mode* is given from Palestrina, in which no accidental sharps are marked, though it modulates into G major, A minor, C \sharp , and G, a second time. A sharp only is given to G upon the close note, as sharp third to the final E.

In 1756, Blainville published what he called "A general, critical, and philological History of Music;" a work for which the author's materials seem to have been so scanty, that he was reduced to fill two-thirds of his thin quarto with an indigested treatise on composition. See Pepusch, p. 65, and examples 15 and 176.

BLAINVILLE, in *Geography*, a town of France, in the department of La Manche, or the Channel, and chief place of a canton, in the district of Coutances, five miles west of Coutances, and 13 north of Granville.

BLAINVILLE *sur l'Eau*, a town of France, in the department of the Meurte, and chief place of a canton, in the district of Luneville, four miles S. W. of Luneville, and 12 S. E. of Nancy.

BLAIR, JOHN, in *Biography*, a chronologer and geographer, was born in Scotland, and educated at Edinburgh. Upon his first arrival in England, he was usher at a private school; and first appeared with singular advantage before the public by publishing, in 1754, a work intitled "The Chronology and History of the World, from the Creation to the year of Christ 1753, illustrated in 56 tables, of which four are introductory, and contain the centuries prior to the first olympiad; and each of the remaining 52 contains in one expanded view 50 years, or half a century; by the Rev. John Blair, L.L.D." This comprehensive work, on which the author must have bestowed a very great degree of attention and labour, was published by subscription, and dedicated to lord Hardwicke; and the author acknowledges great obligations to the earl of Bath. Dr. Blair appears at this time to have taken orders in the English church; in 1755, he was elected fellow of the Royal Society, as he was of the Antiquarian Society, in 1761. In 1756, he published a second edition of his Tables, and in 1757, he was appointed chaplain to the princess-dowager of Wales, and mathematical tutor to the duke of York. In 1761, he obtained a prebendal stall at Westminster, and several church preferments in very quick succession. From the vicarage of Hinkley, in Leicestershire, which he held, by dispensation, with the rectory of Earton Coggles, in Lincolnshire, he was promoted first to the vicarage of St. Bride's, in London, in 1771, and in 1776, to the rectory of St. John the Evangelist in Westminster, with which he held that of Horton near Colebrooke, in Buckinghamshire. During the years 1763 and 1764, he accompanied the duke of York in his travels on the continent. In 1768, he published an improved edition of his "Chronological Tables," which he dedicated to the princess-dowager; and to this edition he annexed 14 maps of ancient and modern geography, and prefixed a dissertation on the rise and progress of this science, which was also printed separately in 12mo. His death, which happened June 24th 1782, was probably accelerated by the shock that attended the news of his brother, captain Blair's death in the memorable sea-fight of April 12, 1782; more especially as he then was severely afflicted with an epidemic influenza. After his death, in 1785, his "Lectures on the canon of the Scriptures, comprehending a dissertation on the Septuagint version," were published; and a new edition of his "Chronological Tables," extended to the year 1790, appeared in that year. Biog. Dict.

BLAIR, PATRICK, practised physic and surgery at Dundee, in Scotland, where he was probably born. He first became known, in 1706, by his account of the anatomy of an elephant, which he had the opportunity of dissecting there. It was published in the Philosophical Transactions, Nos. 326

and 327, in the year 1710. It contains an accurate description of the proboscis and its muscles, and confirms, Haller says, the opinion formerly given, that the elephant has no gall bladder. In a subsequent number of the Transactions, he gives a description of the ossicula auditus, accompanied with engravings. In the rebellion, in 1715, being suspected, on account of his religious principles, of hostility to government, he was for a small time confined. He came afterwards to London, where he re-published his "Anatomy of the Elephant," in 4to.; and, in 1718, published a volume of "Miscellaneous observations on the practice of physic, anatomy, surgery, and botany," in 8vo. This was followed, in 1720, with "Botanical Essays," in two parts, also 8vo. with figures, in which he treats of the sexes of plants, confirming the arguments adduced in proof of them by sound reasoning, and some new experiments of the manner of fecundation, of the circulation of the sap, &c. This work still retains its credit among botanists, although some of the author's opinions are abandoned. About the same time, he gave an account of the asbestus, found in the county of Angus, in Scotland, printed in the Phil. Trans. N^o 333: and of the dissection of an emaciated child, in which he could find no vestige of the omentum, Id. N^o 353; and also of a boy, who lived a considerable time without food, Id. N^o 354; and in the same number is also a dissertation on the means of discovering the medicinal properties of plants from their external figure. He soon after settled at Boston, and published "Pharmaco-botanologia," or an alphabetical and classical dissertation on all the British indigenous and garden plants of the London Dispensatory, in seven decades, 4to. 1723 and 1728, introducing some plants which he had first discovered growing near Boston. The work only proceeded to the letter H. The time of his death is not known. Haller Bib. Anat. et Botan. Pulteney's Sketches, vol. ii. p. 134, &c.

BLAIR, JAMES, an episcopalian divine, was born and educated in Scotland, where he was ordained and beneficed; but meeting with some discouragements in that country, he quitted his preferments, and removed to England, about the latter end of the reign of king Charles II. Being introduced to Dr. Compton, then bishop of London, he prevailed on him to go, about the year 1685, as a missionary to Virginia, where by his conduct and ministerial labours he was eminently serviceable in promoting the cause of religion. In 1689, he was appointed by the same prelate as his commissary for the province. Intent upon doing good in the office with which he was entrusted, he observed with concern, that the want of proper seminaries for religion and learning obstructed every attempt for propagating the gospel in this colony: and he therefore formed the benevolent design of erecting and endowing a college at Williamsburg, the capital of Virginia, for professors and students in academical learning. With this view he raised a considerable sum of money by voluntary subscription; and, in order the more effectually to accomplish his purpose, he came over into England in 1693, to solicit the concurring aid of government. King William and queen Mary very much approved the design, and accordingly a patent was issued for erecting and endowing a college, which was to be denominated from its founders, "the college of William and Mary." Mr. Blair, who first projected the scheme, was appointed president of the college. (See WILLIAMSBURG.) He was also rector of Williamsburg and president of the council in that colony. Having faithfully and honourably discharged the duties of his office as president of the college for about 50 years, and those of his ministerial function for above 60 years, he finished his course of laborious and useful ser-

vice in the year 1743. His works, comprising "Our Saviour's divine Sermon on the Mount explained, and the practice of it recommended, in divers sermons and discourses, with a recommendatory preface, by the Rev. Dr. Waterland," were published in 1740, 4 vols. 8vo. Waterland's Preface. Burnet's Hist. of his own Times, vol. iii. p. 165. 8vo.

BLAIR, HUGH, a distinguished preacher and writer, the descendant of an ancient family of Ayrshire, in Scotland, and the son of a respectable merchant at Edinburgh, was born in that city, April 7th, 1718. As his views were at an early period directed towards the church, he entered the university of his native place in 1730, and spent eleven years in the assiduous prosecution of those literary and scientific studies which the church of Scotland prescribes to such as profess themselves candidates for the ministerial office. During this period his application and proficiency gained repeated testimonies of approbation from the professors under whom he studied. One of his performances at this time, indicating the bent of his genius towards polite literature, was an essay Περὶ τῆς καλῆς, or "On the Beautiful," which afforded such satisfaction to professor Stevenson, that it was appointed to be publicly read at the conclusion of the session. This honour, without doubt, stimulated his emulation, and proved the earnest of his future fame. The method of study, which he commenced at college, and which he occasionally practised in his maturer years, contributed in a considerable degree to the accuracy and extent of his knowledge. It consisted in making abstracts of the most important works which he read, and in digesting them according to the train of his own thoughts. This was the method in which he studied history in particular; and with this view, aided by some of his youthful associates, he constructed a comprehensive series of chronological tables, in which was inserted every important fact that occurred. In conformity to this plan, his learned friend, Dr. John Blair, formed his valuable work, already noticed under his article. In 1739, Mr. Blair took his degree of master of arts; and on this occasion he printed and defended, in elegant Latin, a thesis, "De Fundamentis et Obligatione Legis Naturæ." Having completed his academical course, he passed through the customary trials before the presbytery of Edinburgh, and, was licensed as a preacher, October 21st, 1741; and in the following year he was presented to the parish of Coleffie, in Fife, where he was ordained Sept. 23d, 1742. Such at this time was his established reputation as an eloquent preacher, that when a vacancy occurred in the Canongate church of Edinburgh, he was chosen at a contested election to supply it; and accordingly he returned to his native city in July 1743. In this situation he continued for eleven years, exhibiting specimens of those talents for pulpit compositions, which have since obtained distinguished testimonies of public approbation. In 1754, he was translated from the Canongate to lady Yester's, one of the city churches; and in 1756, he was promoted to the High Church of Edinburgh, the most important ecclesiastical charge in North Britain. To this honourable rank he was advanced at the request of the lords of council and session, and of other distinguished persons holding public offices, who attend that church; and the wisdom of their choice was amply justified by the prudence, ability, and success, with which his ministerial labours were conducted for a period of more than 40 years. Previously to his advancement to this station of public service, Mr. Blair's attention seems to have been almost wholly devoted to the attainment of professional excellence, and to the regular discharge of his parochial duties. Of the productions of his pen, we have only two sermons, preached on particular occasions; some translations, in verse, of passages of Scripture for the psalmody

psalmody of the church; and a few articles in a periodical publication intitled the "Edinburgh Review." See JOURNAL. From this time he enjoyed greater leisure for directing his views to other important literary objects, besides his weekly preparations for the pulpit; and, accordingly, he commenced, Dec. 11, 1759, with the approbation of the university, a series of lectures on composition. Of his qualifications for an office of this kind, none could entertain the least doubt; they had been in some measure sanctioned by the university of St. Andrew's, which, in June 1757, had conferred on him the degree of doctor in divinity, then very rarely bestowed; and the success that attended his first course, afforded ample evidence of the able manner in which it had been conducted. The patrons of the university determined in the following summer to institute a rhetorical class, under the direction of Dr. Blair, as a permanent part of their ecclesiastical establishment; and on the 7th of April 1762, his majesty was graciously pleased "to erect and endow a professorship of rhetoric and belles lettres in the university of Edinburgh, and to appoint Dr. Blair, in consideration of his approved qualifications, regius professor thereof, with a salary of 701." The lectures which he delivered on this occasion, were published in 1783, under the title of "Lectures on Rhetoric and Belles Lettres," in two volumes. 4to.; and they have been since frequently re-published in 3 vols. 8vo. Of these lectures it will be sufficient to observe, that the general voice of the public not only in our own country, but in other nations on the continent into whose languages they have been translated, has pronounced them to be a most judicious, elegant, and comprehensive system of rules for forming the style, and cultivating the taste of youth. By a happy and singular union of taste and philosophy, the author has supplied a great defect in the science of criticism, and has made a valuable addition to the polite literature of the present age. In the course of this Dictionary we shall have frequent occasions for referring to this excellent work, and availing ourselves of its interesting and useful contents. In 1763, Dr. Blair published "A Critical Dissertation on the poems of Ossian," which for beauty of language, delicacy of taste, and acuteness of critical investigation, has few parallels. As it was partly by his solicitation, that Mr. Macpherson was induced to publish his "Fragments of Ancient Poetry," it is no wonder, that, independently of the test of criticism, he should be a zealous advocate in favour of their authenticity and antiquity; but, notwithstanding his able defence, a degree of scepticism has prevailed on this subject.

Dr. Blair's reputation as a preacher, or rather as a composer of sermons, had been for a long time acknowledged by those who had the pleasure of attending on his ministry; but it was not till the year 1777, that he could be induced to favour the world with a volume of the discourses which had so long furnished instruction and delight to his own congregation. The MS. of this volume, it is said, was received by the bookseller with some hesitation; but it was no sooner published, than he found it his interest to engage the author to furnish him with other volumes. Accordingly five volumes, in the whole, have been published at different intervals; and we may venture to affirm, that liberally as the author was recompensed, no collection of sermons has ever been more profitable to the bookseller, or more acceptable to the public, than Dr. Blair's. The circulation of them was rapid and extensive. They were translated into several foreign languages; and they received a royal reward. A pension of 200l. a year, issuing out of the exchequer in Scotland, was conferred, in 1780, on the author, and it was continued without any alteration till his death. These ser-

mons, though they possess various degrees of comparative excellence, and some must be allowed to be much superior to others, are upon the whole models in their kind; and they will long remain as monuments of the piety, the genius, and sound judgment of the author. Occupying a middle place between the dry metaphysical discussions or controversial speculations of one class of preachers, and the loose incoherent declamations of another, they blend the light of argument with the warmth of exhortation, the elegance of composition with judicious observations on human life, and practical knowledge with important principles of religion and virtue. The last volume was prepared for the press by the author after he had completed his eighty-second year, and delivered to the publishers about six weeks before his death. Although he left many other discourses in manuscript, he explicitly enjoined that they should be destroyed, and thus wisely prevented that injury to his reputation which has sometimes been the result of posthumous publications. The author's fame, as a preacher, depended principally, if not wholly, on the intrinsic excellence of his discourses, with respect to matter and composition; for we are informed, that his delivery, though distinct, serious, and impressive, was not remarkably distinguished by that magic charm of voice and action, which captivates the senses and imagination, and which, in the estimation of superficial hearers, constitutes the chief merit of a preacher. Dr. Blair, in the exercise of his professional duties, as far as they regarded the government of the church, was steadily attached to the cause of moderation. Diffident and unaccustomed to extemporary speaking, he declined interfering in ecclesiastical politics, and never would consent to become moderator of the general assembly of the church of Scotland; nevertheless, his opinion, which was always guided by sound judgment, uniformly commanded deference and respect. Whilst he was anxious to preserve the church from a servile corrupting dependence on the civil power, on the one hand; it was his wish, on the other, to prevent a greater infusion of democratical influence than he thought to be compatible with good order, and the established constitution of the country. His reputation in public life was well sustained by the great respectability of his private character; and he was eminently distinguished through life by the prudence, purity, and dignified propriety of his conduct. With a mind free from envy, and yet not insensible to the estimation in which he himself was held; inflexibly upright, and yet condescending to his friends, and disposed to enjoy the pleasures of social intercourse; few men have passed through life more universally respected by those who knew him, more sincerely esteemed in the circle of his acquaintance, or more tenderly beloved by those who enjoyed the benefit of his private and domestic connection. His wife, to whom he was married in 1748, contributed for almost half a century to his felicity, and was taken from him a few years before his death; and his two children, a son and a daughter, died, the former in infancy, and the latter in her 21st year. His constitution was naturally delicate and feeble; but he enjoyed, upon the whole, a state of good health; and by habitual cheerfulness, temperance, and care, survived the usual term of human life. He retained his faculties to the last stage; and after a short illness of three days, expired on the 27th of December, 1800, with the composure and hope of a Christian pastor; and his funeral sermon was preached by Dr. Finlayson, who has annexed to the fifth volume of his Sermons a short account of the life and character of the author, from which the preceding article is chiefly compiled.

BLAIR, in *Geography*. See ATHOL.

BLAIREAU, in *Zoology*, the common French name of

of *ursus meles*, or badger. A variety of a white colour found in New York is also called in France *Blaireau blanc*.

BLAIREAU *puant du Cap de Bonne Esperance*. Kolbe, and after him Abbé de la Caille, have described under this title a little quadruped found in the interior of Africa, which exhales a most insupportable odour. Whether it be of the badger kind in reality, or not, is uncertain. Sonnini believes it to be of the civet kind, *viverra Capensis*; and on the contrary, Gmelin supposes it to be of the glutton kind, perhaps a variety of *ursus gulo*.

BLAIRIA, in *Botany*. See **VERBENA**.

BLAISE, **ST.**, *Order of*, was founded in Armenia, about the commencement of the twelfth century. The habit of the knights of this order was a sky-blue; and on the breast thereof was embroidered their badge, being a *cross of gold*.

BLAISE. *St. Blaise and the Virgin Mary* was an order ecclesiastical and military. The particular time of its institution is not absolutely ascertained; but it is universally agreed that it took place soon after that of the Knights Templars. The badge of the order was a *red cross, on the centre of which was a medallion with the image of St. Blaise enamelled thereon*. When the knights assembled in chapter, or set out on any military expedition, they wore on their breast the same badge embroidered on a white habit.

BLAISE, in *Geography*, a town of France, in the department of the Upper Marne, and chief place of a canton, in the district of Chaumont, 12 miles N.N.W. of Chaumont. — Also, a river of France, which runs into the Marne near Larzicour, in the department of the Marne.

BLAISE, or **BLAS**, **ST.**, a cape on the coast of West Florida, in the gulf of Mexico. It is a promontory, which separates the bay of Apalache on the east from that of St. Joseph, forming a kind of shepherd's crook. N. lat. 29° 40'. W. long. 86°.

BLAISOIS, a province of France before the revolution, bounded on the east by Orleannois, on the south by Berry, on the west by Touraine, and on the north by Vendomois and Dunois. The capital was **BLOIS**, which see.

BLAISON, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Angers; 8 miles S.E. of Angers.

BLAKE, **ROBERT**, in *Biography*, a celebrated English admiral, was a descendant of an ancient family of the name in the parish of Spaxton and county of Somerset, and born at Bridgwater, in August, 1589. Having received the rudiments of grammar learning at a free school in his native town, he became a member of St. Alban's hall, Oxford, in 1615, and translated himself from thence to Wadham college, where, in 1617, he took the degree of bachelor of arts. In 1619, he lost a fellowship of Merton college, for which he was a candidate, on account of his low stature; sir Henry Savile, the warden, paying particular respect to personal comeliness. Soon after the year 1623, in which he wrote a copy of verses on the death of Mr. Camden, he left the university, where he had been noticed for his early rising and application to study, and lived privately at Bridgwater. Adopting at an early period republican principles, and prejudiced against the ecclesiastical establishment, by the severity with which Dr. Laud, then bishop of Bath and Wells, enforced uniformity in his diocese, he inclined also to those opinions that were deemed puritanical. Accordingly the puritan party prevailed in procuring his return as a member for his native town, to the parliament of 1640, but for the Long Parliament he lost his election. Upon the breaking out of the war between the king and parliament, he declared for the latter, and entering into military service, was soon

appointed captain of dragoons. In this capacity he exhibited proofs of his talents by an obstinate defence of Brittol against the attack of prince Rupert, which he was at length obliged to surrender. In 1644 he was appointed governor of Taunton, which he had surprized and taken possession of for the parliament, and which he defended with a small but well-disciplined garrison, during a vigorous siege by the king's forces, till he obtained relief. For this service the parliament voted Blake, who was then colonel, a present of 500 pounds. After the murder of the king, which he is said to have disapproved, he cordially joined the republican party, and was reckoned, next to Cromwell, the ablest and most successful officer in the service of the parliament. Without affecting the character of a politician, he thought it his duty to serve his country to the utmost of his power, and to execute any measures that were adopted by the party to which he was attached, and by the existing government for this purpose. Early in the year 1649, he was appointed, in conjunction with Col. Deane and Col. Popham, to the command of the fleet; and his first naval expedition was directed, in 1649, against prince Rupert and prince Maurice, to the harbour of King'sale in Ireland; where he blocked them up for some time, and whence he pursued them to Lisbon, whither they had fled for the protection of the king of Portugal. War being declared on this account against the Portuguese, Blake annoyed their trade, and took several rich prizes; and he afterwards proceeded, first to Carthagen and then to Malaga, in pursuit of prince Rupert. At the latter place he burnt and destroyed his whole fleet, two ships excepted; and in the beginning of the year 1651, he returned with his squadron to Plymouth, where he received the thanks of the parliament, and was appointed warden of the cinque ports. In the following year he was constituted one of the admirals and generals of the fleet, and employed in reducing the isles of Scilly and the island of Guernsey. Having accomplished this service, he was elected one of the council of state; and in 1652, promoted to the rank of sole admiral for nine months, in the prospect of a Dutch war. The States, jealous of the naval power of England, determined to reduce it by a very vigorous effort. With this view they dispatched Van Tromp with 45 sail of men of war into the Downs, who was met by Blake with a much inferior force of 23 ships, and, after a very severe action, which took place May 19th 1652, obliged to retreat. After several skirmishes with the Dutch ships, and the capture of many prizes, during the progress of the summer, Van Tromp appeared again in the Downs, towards the close of the year, with 80 ships, for the purpose of renewing his attack upon Blake. The English admiral, whose force was much inferior, and who had the disadvantage of an unfavourable wind, disdained however to retreat, and engaged the enemy on the 29th of November. Notwithstanding every possible exertion, he lost six ships, and was compelled to retreat into the Thames with his shattered fleet; and Van Tromp was left in triumphant possession of the channel. Blake lost no time in repairing and recruiting his fleet; and in February 1653, he set sail in pursuit of his antagonist. On the 18th day of the month the English admiral, with 80 ships of war, came up off Portland with Van Tromp, who had 70, and a fleet of 300 merchant ships under his convoy. The engagement was such as seldom occurs in the history of naval combats; it lasted three days, and on both sides equal valour was displayed; at length, however, after a running fight up the channel, the Dutch anchored safely in the sands of Calais, having lost 11 men of war, 30 merchant-ships, and 1500 men who fell in the action, whilst the English lost only one ship, but as many lives as the enemy. In this action Blake was wounded in the thigh.

BLAKE.

At this time Cromwell dismissed the parliament, and assumed the supreme power; nevertheless, Blake and his colleagues declared their fixed purpose to serve their country faithfully, and to guard it, by every effort in their power, against foreign injury and insult. "It is not for us," said Blake, "to mind state affairs, but to keep foreigners from fooling us." Accordingly, when generals Monk and Deane, on the 23d day of June, had engaged Van Tromp with a fleet of 120 men of war, with dubious success, and with the loss of several men, among whom was Deane, Blake on the next day came up to their assistance with 18 fresh ships, and gained a victory so complete, that if the Dutch had not again saved themselves on the sands of Calais, their whole fleet must have been sunk or taken. After this engagement, his health being much impaired, he took his seat in the new parliament, summoned by the protector Oliver, as a representative of his native town, and he was constituted one of the commissioners of the admiralty. Cromwell indeed treated him with great respect; but he was not unapprized of the admiral's strong inclination to a commonwealth; and he was therefore the more disposed to send him, in November 1654, with a strong fleet into the Mediterranean, for the purpose of supporting the honours of the English flag, and procuring satisfaction for any injury which the British merchants had suffered. Whilst he lay in the road of Cadiz, he was treated with great respect by the Dutch and French, and even by the Algerines. However on the 10th of March in the following year he appeared before Algiers, and demanded satisfaction for the piracies committed on the English, and a release of all English captives. He then failed to Tunis on the same errand; but the dey, confiding in the strength of the place, treated Blake's message with contempt; "Here," said he, "are our castles of Goletta and Porto Ferino, do your worst; do you think we fear your fleet?" Blake, curling his whiskers, as he was accustomed to do when in a passion, consulted his officers, and then bore into the bay with his heavy ships; demolished the castles, burnt all the shipping in the haven of Tunis, and forced the haughty and obdurate dey to an humble submission, and an advantageous peace. This daring action spread the same terror of his name through Africa and Asia, which had for a long time prevailed in Europe. He also awed the piratical state of Tripoly into a peace with England, and the knights of Malta into a composition for the injuries which they had committed. Such was the effect of these exploits on the princes and states of Italy, that most of them thought fit to pay their compliments to the protector; and the grand duke of Tuscany, and the free state of Venice, in particular, sent magnificent embassies for that purpose. During the war with Spain, which was carried on with great spirit at this time, Blake, in pursuance of the protector's order, exerted himself in razing their maritime force in Europe, and Montague being joined with him, on account of his declining state of health, blockaded up for several months a Spanish squadron in the bay of Cadiz, and detached a part of their fleet to capture the Spanish plate fleet. Montague returned to England with the prizes; but Blake, whose constitution was broken by the dropsy and scurvy, staid behind; and in April 1657 failed with 25 men of war in pursuit of another plate fleet which had put into Santa Cruz in the island of Teneriffe. Upon his arrival, he found that the governor had used every possible precaution for the defence of the harbour; 16 Spanish ships were disposed in a circular form within the bay, and strongly barricadoed; and the entrance was guarded by a castle and 7 forts, connected with one another, and furnished with large cannon. Blake steered boldly into the bay, leaving some of his ships to silence the batteries, while with the rest he at-

tacked the Spanish vessels. Having driven the enemy from all their fortified posts, he set fire to the shipping, which it was impossible for him to remove, and destroyed the whole, to an immense amount. Having accomplished his object, the wind veered about in his favour and brought him out again without the loss of a single ship. This exploit has been censured by some cool politicians as an act of rashness; but such timid reasoners should consider that by such acts of valour the British navy has made the world to tremble. On this occasion the brother of the admiral was found deficient in some service which was expected from him; upon which he was degraded from his command, and sent home to his own country, though afterwards he shared the fraternal regard of Blake, in whose mind genuine patriotism absorbed every selfish and partial interest. This great enterprise was the last act of Blake's public life; and the news of it at home was honoured with a public thanksgiving, with a vote of thanks to all the officers and seamen, and with a diamond ring, of the value of 500*l.* to Blake himself. He lived to receive this welcome tribute of the gratitude and respect of his country, to the prosperity and glory of which he was invariably devoted. As his end approached, he wished to return to his native land; as he drew near, he often anxiously inquired for land; but before he could see it, he died as he was entering Plymouth sound, on board his ship the *St. George*, August the 17th 1657, at the age of about 59 years. His body was embalmed, and interred with singular honours in Henry the Seventh's chapel, Westminster; but after the restoration in 1661, it was removed and interred in *St. Margaret's* church yard. Blake was, with regard to his person, of low stature, of a quick, lively eye, and martial aspect, he was singularly brave, cool in action, and wise in the disposition of those desperate attacks, which men of a colder temperament have judged rather fortunate than expedient. He loved his country, and whatever was the established government, he was solicitous to do his duty; and this duty he performed with the most upright and disinterested views; for notwithstanding the high and lucrative posts which he occupied, and the many rich prizes which he captured, he only added to his own original patrimony about 500 pounds. He was pious without affectation, strictly just, and liberal to the extent of his fortune. His officers he treated with the familiarity of friends, and he was truly a parent to his sailors. Although no epitaph or sculpture monument records his great and good qualities, all parties have been eager to do justice to his memory. Dr. Bates, physician to king Charles I., the protector Oliver, and king Charles II., sums up his character in the following words: "He humbled the pride of France, reduced the Portuguese to submission, broke the strength of the Dutch, and drove their fleets out of the sea, subdued the pirates in the Mediterranean, and twice triumphed over the Spaniards, blamable only in this, that he joined himself with the parricides." Lord Clarendon says of him, that he was the first man that declined the old track, and disregarded ancient established rules, which served merely to keep his ship and his men out of danger; he first taught ships to contain castles on shore; he first infused that courage into seamen, which made them learn by experience what mighty things they could do if they were resolved, and taught them to fight in fire as well as upon water; and though he hath been very well imitated, he was the first that gave the example of that kind of naval courage, and bold, resolute achievements. Bishop Burnet mentions a story that is related of him, well known, but worth again recording. Whilst he lay in the road of Malaga, some of his seamen being on shore, met the host, and treated the procession with neglect and indignity. One of the

the Spanish priests resented this insult, fell upon them, and beat them severely. When they returned to their ship, they complained of this usage; upon which Blake sent to the viceroy demanding the surrender of the offending priest. The viceroy replied that he had no power over the priests; to which Blake returned for answer, that he would not enquire who had the power to deliver up the priest, but if he were not sent within three hours, he would burn their town. The viceroy sent the priest to Blake, who justified himself on account of the petulant behaviour of the seamen. Blake answered, that if complaint had been made to him, he would have inflicted just punishment, for he would not suffer his men to affront the established religion of any place, at which he touched; but he wished to have it known to the whole world, that an Englishman was only to be punished by an Englishman. He then treated the priest civilly, and sent him back. When Cromwell received this intelligence, he was highly delighted, and said he hoped that he should make the name of an Englishman as great as ever that of a Roman had been. It is said, that when Blake was cruising in the Mediterranean he met with a French ship of considerable force, and commanded the captain to come on board, no war having been declared between the French and English. The captain, being asked whether "he was willing to lay down his sword and yield," gallantly refused, though in his enemy's power. Blake, scorning to take the advantage of an artifice, and detesting the appearance of treachery, told him, "that he was at liberty to go back to his ship, and defend it as long as he could." The captain did so, and after an engagement of two hours, confessed himself conquered, kissed his sword and surrendered it. Mr. Granger, speaking of Blake's naval exploits, says, "that the very temerity of his enterprises struck terror into his enemies, and greatly contributed to his success. He not only improved the method of attack, but carried the naval power of Cromwell to a greater height than had been known in any age or nation." "Never man," says Mr. Hume, "so zealous for a faction, was so much respected and esteemed by the opposite factions." He was by principle an inflexible republican; and the late usurpatrons, amidst all the trust and caresses which he received from the ruling powers, were thought to be very little grateful to him. "It is still our duty," he said to the seamen, "to fight for our country, into whatever hands the government may fall." Disinterested, generous, liberal; ambitious only of true glory, dreadful only to his avowed enemies; he forms one of the most perfect characters of that age, and the least stained with those errors and violences, which were then so predominant. The Protector ordered him a pompous funeral at the public charge; but the tears of his countrymen were the most honourable panegyric on his memory. To the above testimonies we shall add the following lines from Mr. Glover's poem entitled "London."

———"Thy name

Was heard in thunder through th' affrighted shores
Of pale Iberia, of submissive Gaul,
And Tagus trembling to his utmost source.
O! ever faithful, vigilant, and brave,
Thou bold asserter of Britannia's fame,
Unconquerable Blake!"

Biog. Brit.

BLAKEA, in *Botany*, so named by Dr. Patrick Browne, from Mr. Martin Blake of Antigua, a great promoter of natural knowledge, and patron of the doctor's natural history of Jamaica. Lin. gen. 593. Reich. 647. Schreb. 810. Brown. t. 35. Juss. 328. Class and order, *Dodecandria Monogynia*. Gen. Char. *Cal.* perianth of the fruit inferior, six-

leaved; leaflets ovate, concave, expanding, the size of the flower:—perianth of the flower superior; margin quite entire, hexangular, membranaceous. *Cor.* petals six, ovate, expanding, equal. *Stam.* filaments twelve, subulate, erect; anthers triangular, depressed, concatenated into a ring. *Pist.* germ inferior, obovate, crowned with the margin of the calyx, style subulate, the length of the flower; stigma acute. *Per.* capsule obovate, six-celled. *Seeds* very many.

Ess. Char. *Cal.* inferior, six-leaved; superior entire. *Pet.* six. *Capf.* six celled, many-seeded.

Species, 1. *B. trinervia*. "Two-calyceled; leaves nerveless, very finely striated acos." Leaves oblong-ovate, petioled, quite entire, coriaceous, opposite; the three nerves underneath protuberant, blackish; flowers opposite, solitary. Generally rising to the height of 10 or 14 feet; one of the most beautiful productions of America; at first a climber, but gradually acquiring a more robust stem, which divides into many weak declining branches, well supplied on all sides with beautiful rosy blossoms. A native of Jamaica, in cool, moist, shady places. 2. *B. triplinervia*. "Uncalyceled; leaves triple nerved." A tree growing to the height of 16 feet; leaves opposite, petioled, six or seven inches long, ribbed underneath, and having a nerve running along the edge; peduncles three-flowered; flowers distinct, without any lower perianth; upper perianth three or five-cleft, coriaceous, permanent; petals about seven; filaments twelve or fifteen; anthers ovate, parallel, flattish at the back, shorter than the corolla, truncated, not concatenated; style club-shaped; stigma capitate, streaked; fruit a roundish, many-celled berry, crowned with the calyx; seeds minute; fruit of a yellow colour, and sapid. A native of Surinam, where it was observed by Dalberg; also of Guiana, where it flowers and fruits in May.

Propagation and Culture.—These trees have not been yet cultivated in Europe. In the West Indies the first species thrives best on the sides of ponds or rivulets; and when planted in gardens, where its appearance is elegant, it ought to be supplied with some supports, whilst it continues young and weakly.

BLAKENEY, in *Geography*, a harbour on the coast of Norfolk, between Cromer at east by south, and Wells at west by north nearly, distant from the former 2 leagues, and from the latter 3 leagues.

BLAMONT, a town of France, and principal place of a district in the department of the Meurthe; containing 1863 inhabitants, and the population of the canton is 10,695. The territory comprehends 212½ kilometres and 30 communes; 4½ leagues east of Luneville. N. lat. 48° 35'. E. long. 6° 44'.—Also, a town of France, in the department of the Doubs, and chief place of a canton; containing 400 persons, and the canton contains 3539; the territory comprehends 107½ kilometres and 14 communes; 1½ league north of St. Hippolyte.

BLAMPIN, THOMAS, in *Biography*, a Benedictine of St. Maur, was born at Noyon in Picardy in 1640, and taught philosophy and theology in his own congregation. He is chiefly known as editor of the works of St. Augustin, in which he displayed much critical erudition and sagacity, and great accuracy in his collation of MSS. Besides other preferments in the church, he was appointed in 1708 visitor of the province of Burgundy, and in consequence of the austerities exercised in this office, he died in 1710. Moreri.

BLANC. See BLANK.

BLANC, FRANCIS LE, in *Biography*, distinguished himself by the study of belles-lettres, history and medals, and was appointed by Louis XIV. to draw up an account of the

monies of France from the establishment of the monarchy. Accordingly he published "A Treatise on the Monies of France," Paris, 1698, 4to. with figures; reprinted at Amsterdam, 4to. 1692. To this is usually annexed his dissertation, published the preceding year, "On the coins of Charlemagne and his successors struck at Rome." He was chosen historical tutor to the royal children; but died before he entered on his office, at Versailles in 1698. *Nouv. Dict. Hist.*

BLANC, JOHN BERNARD LE, ABBE, historiographer of the public buildings, and member of the academies of La Crusca, and of the Arcadi at Rome, was born at Dijon in 1707, and entering in the literary career, wrote a tragedy entitled "Abelaid," which, notwithstanding the harshness of its versification, was at first well received. At Paris, where he settled, he obtained friends and patrons; and in 1746 Maupertuis was empowered by the king of Prussia to offer him a residence, as a man of letters, at his court, which he declined accepting. His "Letters on the English nation," in 3 vols. 12mo. 1758, are the most known of his works, and were occasioned by his visit to England. The style is heavy, and the thoughts trite and vulgar, so that they are now little read. He died in 1781. *Nouv. Dict. Hist.*

BLANC, LEWIS LE, *Sieur de Beaulieu*, a professor of divinity at Sedan in the 17th century, was born at Plessis-Marli, where his father was minister, and in the progress of his life, of which few particulars are recorded, was distinguished by his learning and virtue. He died in 1675, at the age of 60 years and 6 months. His "Theses Theologicæ" were collected into one volume after his death, passed through several editions, and are highly worthy of an attentive perusal. The first edition was printed at Sedan in 4to, and two other editions were printed in England; the third in 1683. He was eminent for the persuasive power of his eloquence, and discovered an uncommon degree of penetration and sagacity in his writings and negotiations. Anxious for a reconciliation and union between the Reformed and Romish churches, he passed in review many of the controversies that divided them, and seemed to prove, with the utmost perspicuity, that some of them were merely disputes about words, and that the others were of much less consequence than was generally imagined. This manner of stating the differences between the two churches drew upon him the indignation of those who regarded all attempts to soften and modify controverted doctrines as dangerous and detrimental to the cause of truth. Among these we may reckon Arnould, Saurin, and Jurieu. On the other hand, the acuteness and dexterity with which he treated this delicate subject, made a considerable impression upon several persons, and procured him disciples who entertained his reconciling sentiments, but either entirely concealed them, or discovered them with caution, as they were known to be displeasing to the greatest part of the members of both communions. Some of Le Blanc's sermons were printed at Sedan in 1675. *Gen. Dict. art. Beaulieu. Moss. Eccl. Hist. vol. v. p. 379.*

BLANC, LEWIS LE, a skilful surgeon and lithotomist of Orleans, published in 1764 "A Discourse on the utility of Anatomy;" and in 1768, "Nouvelle Methode d'operer des Hernies," 8vo. He recommends dilating the ring with the finger, if practicable, which it usually is, he says, in recent cases; in those of long standing, with a pair of forceps he invented for the purpose, instead of using the knife. This doctrine having been opposed by Ant. Louis, he was answered by Le Blanc in a dissertation on the subject, published in the fourth volume of the Memoirs of the Academy of Surgery. After reducing the intestine, by his method, no truss is wanted, as is invariably the case when the ring is

opened by incision. The forceps are introduced into the ring, closed, and open themselves by the force of an elastic spring. He also wrote on the operation for the stone, on the method of extracting small portions of the placenta left in the uterus, and further observations on the cure of hernia. These papers were published in the 30th, 35th, and 39th volumes of the Journal de Médecine. In 1775 he published "Precis d'operations de Chirurgie," 2 vols. 8vo., containing the substance of the above, with some additional observations. *Haller. Bib. Anat. de Chirurg.*

BLANC-manger. Fr. q. d. *white food*, in *Domestic Economy*, is a preparation of dissolved isinglass, milk, sugar, cinnamon, &c., boiled into a thick confistence, and furnished for the table with blanched almonds. It is cooling and strengthening.

BLANCS *manteaux*, in *Ecclesiastical History*, a name originally given to the *Servites*, or servants of the Blessed Virgin, on account of their white cloaks; but since applied to divers sorts of religious, who have successively inhabited the house of the *Servites*, and now to the Benedictines at Paris, though habited in black.

BLANC, *Mont*, in *Geography*, a lofty mountain of Savoy, in the duchy of Faucigny, being part of the ancient "Alpes Penninæ." See ALPS. This is reckoned the most elevated mountain of the ancient continent, its height above the level of the sea being, according to the calculations of M. de Luc, 15,304, English feet; or, according to the measurement of Sir George Shuckburgh, 15,662 feet. This accurate observer informs us (*Phil. Trans. vol. lxxvii. p. 595*), that the height of Vesuvius, estimated by Saussure at 3900 feet, placed upon mount *Ætna*, elevated, according to Sir George, 10,954 feet, would not be equal to the height of Mont Blanc, which he supposes to be the most elevated point of Europe, Asia, and Africa. This mountain, observed from the "Col de Balme," and the vale of "Chamouny," is particularly distinguished from other mountains by a mantle of snow, which clothes its summit and sides, almost without the intervention of the least rock to break the glare of the "white" appearance, from which its name is derived. Those who have seen it from the valley of Aost observe, that on that side it does not appear to be covered with a mantle of snow, and that it exceeds the Schreckhorn in ruggedness and horror. See SCHRECKHORN. "Those who are totally unacquainted with Alpine scenes," says Mr. Coxe, (*Swiss. vol. ii. p. 5.*) "may, perhaps, conceive a faint idea of this gigantic mountain, on being informed, that the mantle of snow, which appears to cover its top and sides, exceeds an altitude of 4000 feet perpendicular, and 6000 feet in an horizontal direction from the *dôme de Gouté*, to the summit; and that the height of the snow and ice, estimated from the source of the Arveron, at the bottom of the glacier of Montenvert, to the summit of Mont Blanc, cannot be less than 12,000 perpendicular feet, or near three times as high as Snowdon in North Wales. The highest point of this mountain appears like a compressed hemisphere, and is called from its form "La Boffe du Dromedaire;" from that point it gradually sinks, presenting a kind of concave surface of snow, in the midst of which is a small pyramid of ice; it then rises into a second hemisphere, called by some "Little Mont Blanc," but, more properly, by others "Le Dôme du Milieu," or the "Middle Dôme;" thence it descends into another concave surface terminating in a point, indiscriminately styled by the natives "Aiguille de Gouté," "Point de Gouté," and "Dôme de Gouté;" from this dome it ends abruptly, and loses itself arid the mountains that bound the vale of Chamouny. Five gorges extend into this vale, and are separated from one another by forests, corn-fields, and meadows; so that large tracts of ice are blended with cultivation, and perpetually succeed each

other in the most singular and striking vicissitude. These glaciers, which lie chiefly in the hollows of the mountains, and are some leagues in length, unite at the foot of Mont Blanc.

Of the various attempts that have been made to reach the summit of Mont Blanc, the first was that of M. Couteran, and three guides of Chamouney, Michael Paccard, Victor Tassay, and Maria Coutet. On the 13th of July, 1776, they set off from the priory, about 11 in the evening; passed between the glaciers of Bosson and Tacona; and after spending above 14 hours in mounting rugged and dangerous ascents, and in crossing several valleys of ice, and large plains of snow, found themselves on the top next to Mont Blanc. But though at first sight it appeared to be scarcely a league distant, they soon perceived that it seemed, on account of the clearness of the air, the whiteness of the snow, and its great height, to be much nearer than it really was, and that it would require at least four hours more to reach the summit, even if it were practicable. As the day was far advanced, and the vapours near the summit of the mountain began to gather into clouds, they relinquished their enterprize; and returned to Chamouney, not without personal danger in leaping over chasms of ice, after a journey of 22 hours, with this satisfaction, that they had approached nearer to Mont Blanc than any former adventurers. The summit which they had attained is, according to Sir George Shackburgh, more than 13,000 feet above the Mediterranean. After some subsequent but unsuccessful attempts, M. Bourrit, accompanied by six guides, departed from Bionafay, and began to "scale (as he terms it) the rampart" of Mont Blanc, when he suddenly found himself so exceedingly affected by the intense cold that he was unable to proceed. Maria Coutet, and Francis Guidet, two of his guides, proceeded to the dome of Gouté, which is about 9400 feet in an horizontal direction from the summit; but the approach of night obliged them to return. On the 4th of September 1785, Maria Coutet and James Balmat advanced beyond the dome of Gouté, towards the summit, but a violent storm of hail and wind compelled them to abandon the enterprize. On the 13th of this month Messrs. Saussure and Bourrit, attended by twelve guides, well provided with barometers, thermometers, and other necessary instruments, left Bionafay, and arrived at a hut, which was constructed by their orders, at "Pierre Ronde," 7808 feet above the level of the sea; and on the next morning they pursued their journey to the dome of Gouté; but a heavy fall of snow prevented their progress. Saussure says, that the mercury in the barometer sunk $1\frac{1}{2}$ inches, and that he reached an elevation of 8256 English feet. In July 1786, James Balmat, one of six guides of Chamouney, being separated from his companions, who failed in another attempt, passed the night on a spot above the "Dome of Gouté," elevated more than 12,000 feet above the level of the sea. On his return, however, to Chamouney, he was seized with a very severe indisposition, the effect of extreme fatigue, and of the intense cold; but being attended by Dr. Paccard, a physician of the place, he offered, as an expression of gratitude for his attendance, to conduct him to the summit of Mont Blanc. Accordingly, on the 7th of August, these two daring adventurers sallied forth from Chamouney, and reached the mountain of "La Côte," which overhangs the upper part of the glacier of Bosson. Here they passed the night, and at three on the next morning they pursued their route over the ice, ascended the "Dôme of Gouté," passed under the "Middle-Dôme," and turning to the east, at the last pyramid of rock, continued along the ridge which is seen from Geneva, and which lies on the left of the summit. Here cold and fatigue discouraged Dr. Paccard; but being animated by his companion, he deter-

mined to advance, struggling with a very violent and piercing wind, till at length they attained the summit which no one had visited before. Here they remained about half an hour, when they found the cold so intense, that their provision was frozen in their pockets, the ink congealed in their inkhorns, and the mercury in Fahrenheit's thermometer sunk to $18\frac{1}{2}$ degrees. They spent 15 hours in ascending; but found great difficulty in their descent, their light being much debilitated by the reflection of the snow. On their return to Chamouney at eight in the morning, their faces were excoriated, their lips much swelled, and Dr. Paccard was almost blind. These adventurers prepared the way for the observations and discoveries of future naturalists, and particularly of Saussure, whose indefatigable zeal would not allow him to rest, till he had reached the top of Mont Blanc, and made those experiments, which have served in a very considerable degree to elucidate the theory of the atmosphere.

Having arrived at Chamouney, a village at the base of the mountain, M. de Saussure was detained by continual rains for four weeks; after which, he set out on the 1st of August 1787, accompanied by a servant and 18 guides, who carried the philosophical instruments and the tents, and other apparatus necessary for the intended experiments. Although the distance from the priory of Chamouney to the summit of the mountain is little more than two leagues, or about $6\frac{3}{4}$ miles, in a straight line, it requires nevertheless 18 hours to gain the summit, on account of the difficulties of the road, as well as the necessary circuits. In the evening, they arrived at a hut constructed for them on the top of the mountain of "La Côte," about a mile perpendicularly above the village. Their second day's journey was attended with many difficulties, owing to the wide, deep, and irregular chasms intersecting the ice-valley on the side of the hill, which can only be crossed by means of bridges naturally formed of snow, and often very slender; extended, as it were, over an abyss. In this perilous valley, they were obliged to pursue a winding road, so that they were three hours in crossing it, though in a straight line its breadth is not above three-quarters of a mile. At length, however, they reached the chain of rocks that border on the perpetual snows which cover Mont Blanc, and then mounted, in a serpentine direction, to a valley filled with snow, and running from north to south, to the foot of the highest pinnacle. The surface of the snow in this valley has numerous fissures; penetrating to a great depth, and considerably broad; presenting to view, by their broken sides, the successive horizontal layers of snow, which are annually formed. In this situation the guides wished to pass the night; but Saussure, observing that the loftiest of these rocks is at least 1400 yards perpendicularly lower than the summit of the mountain, wished to proceed, and at length prevailed with the guides to accompany him. At four in the afternoon, they arrived at the second of the three plains of snow, which they had to pass; but as the day was far advanced, and they were apprehensive of exposing themselves to the "Avalanches," which are frequently tumbling from the summit of the mountain, they determined to proceed no farther. Here they encamped at the height of 9312 feet above the priory of Chamouney, or 12,762 feet above the level of the sea. For this purpose, they dug a deep hole in the snow, of sufficient width to contain the whole company, and covered its top with the tent-cloth. In this situation the barometer had fallen to 17 inches, 10 lines $\frac{3}{2}$; and they all felt the effects of the rarefied air. Seven or eight hours' walk, which they had just performed, had not in the least affected these robust and hardy men; but they had scarcely raised five or six shovels of snow, in forming their intended habitation, before they were under a necessity

of desisting from labour and of taking breath at very short intervals. M. de Saussure himself, though accustomed to the atmosphere of mountains, and finding himself, as he says, much better in it than in the air of plains, now felt exhausted with fatigue, only by observing his meteorological instruments. This uncomfortable sensation was heightened by an acute thirst, and water could not be procured, except by melting snow: for the water which they had seen during their ascent, would by this time be congealed; and the small ch.iling-fish which they had taken with them, very slowly supplied 20 people languishing with thirst. From the middle of this snowy plain, not far below the top of Mont Blanc, the snow exhibited the most dazzling brightness, and formed a singular contrast with the sky, which, in these elevated regions, appears almost black. No living creature was seen here, nor the least trace of vegetation. The moon shone with the brightest splendour in the midst of a sky as black as ebony. Jupiter, rayed like the sun, arose from behind the mountain in the east; and the light of these luminaries was reflected from the white plain, or rather basin, in which they were situated and by their dazzling lustre, eclipsed every star, except those of the first and second magnitude. Whilst they were composing themselves to sleep within their tent, incommoded by heat and vitiated air, they were soon alarmed by the noise of an immense mass of snow, or "Avalanche," which fell from the top of the mountain, and covered part of the slope over which they were to climb the next day. The next morning they departed at seven for the third and last plain; turning to the left in their way to the highest rock, which is on the east part of the summit, they found the ascent in some places so steep, that the guides were obliged to hew out their footsteps with hatches. Their progress was slow, and it took them two hours to climb a hill about 1590 feet high. Having arrived at this last rock, they turned to the west, and climbed the last ascent, about 900 feet high, and inclining about 28 or 29 degrees. Here the air was so rarefied, that Saussure could not take 15 or 16 steps without stopping for breath; and at intervals he found himself faint, so that he was under the necessity of sitting down, until, with the return of respiration, his strength was revived. On his arrival to the summit, at 11 o'clock, a slight vapour, suspended in the inferior regions of the air, prevented him from beholding the lower and more distant objects; such as the plains of France and Lombardy; but he had the less reason for regretting this loss, as he was agreeably surpris'd by a most distinct and comprehensive view of all those elevated summits, with the organization of which he had so long desired to be acquainted. He thought himself dreaming, when he saw beneath his feet many majestic peaks, especially "Aiguilles," "Le Midi," "L'Argentiere," and "Le Géant," the bases of which he had found it so difficult to ascend. He seized in his mind their mutual proportion and connection, their form and structure; and a single glance removed doubts, and afforded information much more satisfactorily, than whole years of previous study. During this time, his guides pitched his tent, and made preparations for his experiments; but in attempting to dispose his instruments for this purpose, he was obliged, almost at every instant, to desist, and wholly to occupy himself about the means of respiration. Considering that the barometer stood at only 16 inches, 1 line, or 17.145 inches English, and that the air, consequently, possessed little more than half the density of that on the plains, it is manifest that the deficiency was to be supplied by more frequent inspirations. This frequency, of course, accelerated the circulation of the blood, more especially as the arteries, on the surface of the body, were no longer actuated from without by the pressure which they usually experience.

When M. de Saussure remained perfectly quiet, he only felt rather uncomfortable, with a slight disposition to be sick; but in any exertion, or when he fixed his attention for a few successive moments, and particularly when, by stooping, he compressed his chest, the necessity recurred of resting himself, and respiring for two or three minutes. His guides also experienced similar sensations. They felt no appetite, and had no inclination to take wine or brandy, having found that strong liquors increased the above indisposition; without doubt, by quickening the circulation of the blood. Nothing but fresh water was coveted and relished, and yet both time and exertion were required to light the fire, without which it was impossible to obtain any. In this situation Saussure and his companions continued 4½ hours, and in their descent they found fewer difficulties than they expected. They arrived the next morning at the valley of Chamouny, without the least accident; and as they had taken the precaution to wear veils of crape, their faces were not excoriated, nor their sight debilitated.

M. de Saussure has given an ample detail of his observations on the summit of Mont Blanc, in the 4th volume of his "Voyages dans les Alpes;" and a translation of this account by professor Martyn, of Cambridge, forms an appendix to his sketch of a tour through Switzerland. We shall here select a few particulars. We learn from this narrative, that the summit of the mountain is a ridge, nearly horizontal, lying east and west; the slope at each extremity inclining from 28 to 30 degrees, the south side between 15 and 20, and the north about 45 or 50. This ridge is so narrow as scarcely to allow two people to walk abreast, especially at the west end, where it resembles the roof of a house: it is wholly covered with snow; nor is any bare rock to be seen within 150 yards of the top. The surface of the snow is fealy, and in some places covered with an icy crust, under which the snow is dusty, and without consistence. The highest rocks are all granites; those on the east side are mixed with steatites; those on the south and west contain a large quantity of schist, and a little lapis corneus. Some of them, especially those on the east, which are about 150 yards below the summit, seem to have been lately shivered with lightning. M. de Saussure saw no animal on the mountain, except two flies, a grey phænax, and a "Myrtillus," which he supposes must have been driven there by the wind. At the elevation of 11,202 feet above the sea, he observed the "Silene Acaulis," or moss camp on, in flower; and still higher, on the most elevated rocks, the "Lichen Sulphureus," and "Lichen Rupestris" of Hoffman. He has given us the height of the barometer on the top of the mountain: viz. Aug. 3. at noon, 16 inches 0 line, and 1½ of a line, French measure, *i. e.* 16.181 English; and Reaumur's thermometer was 2.3 below the freezing point, or 27 of Fahrenheit. M. Sennelier, at the same time, observed, at Geneva, the barometer 27 inches 2 ⅞ lines, or 29.020 inches English, and the thermometer 22.6 above freezing, or 82 of Fahrenheit. From these data he makes the height of Mont Blanc 2218 toises, or 14,180 English feet, according to M. de Luc's rule, and 2272 toises, or 14,525 English feet, according to M. Trembley's. To these heights 13 toises, or 83 feet, the height of M. Sennelier's room above the lake of Geneva, must be added, to give the height of the mountain above the level of the lake 14,253 feet, according to M. de Luc, and 14,608 feet, according to M. Trembley. Sir George Shuckburgh made the height of Mont Blanc, by trigonometrical measurement, 14,429 feet above the lake, which is almost the mean between the other two. The result of the observations made at Chamouny, cotemporary with these on Mont Blanc, agrees still more nearly with Sir George's measurement. The general mean result makes the summit of Mont

Blanc 2450 toises, or 15,673 English feet, or nearly three English miles above the level of the sea. By M. de Saussure's experiments with the hygrometer, the air on the top of Mont Blanc contained six times less humidity than that of Geneva, and to the extreme dryness of it he attributes the burning thirst which he and his companions experienced. But the result of his experiments seems very different from the system of meteorology published by M. de Luc. See *HYGROMETER*. It requires half an hour to boil water on the top of this mountain; whereas 15 or 16 minutes are sufficient at Geneva, and 14 or 15 by the sea-side. Water boiled at 68.993 degrees of a thermometer, which rises to 85 with the barometer 27 French inches high. By experiments with the electrometer, M. de Saussure found, that the electricity of the air on the summit of the mountain was positive. The wind on the summit was north, and very piercing; but southward of the ridge the temperature of the air was agreeable. The experiments with lime-water, and with the caustic alkali, shewed that the air was mixed with atmospheric acid, or fixed air.

The difficulty of respiration, experienced by M. de Saussure and his companions, has been ascribed by some to fatigue, and not to the rarefaction of the air; but his observations prove, that the latter was the cause both of the difficulty of breathing and the quickness of the pulse. This, indeed, was so considerable, that the pulse of one of the guides, after continuing four hours on the summit, was 98, of the servant 112, and of M. de Saussure himself 100 in a minute; whereas at Chamouny they were 49, 60, and 72 respectively. M. de Saussure's observations confute an opinion, which is very common, with respect to the change of the senses of smelling and taste supposed to take place on high mountains. He tried the experiment on different mountains, and both the taste and smell of bread, wine, meat, and fruit, appeared to him and to his attendants not at all different. As to sound becoming weaker, this circumstance is not to be attributed to any impaired state of the organ of hearing, but to the rarefied air, which both reflects less and vibrates less. Besides, on an insulated summit there are no echoes nor solid objects to repel the sound. These concurring causes rendered the sounds on the top of Mont Blanc remarkably feeble; the report of a discharged pistol being equal in strength only to that of a small Chinese cracker let off in a room.

Soon after M. de Saussure's expedition, Mr. Beaufoy, an English gentleman, succeeded in an attempt to ascend Mont Blanc; but it was attended with peculiar difficulty, arising from the enlargement of the chasms in the ice. An account of this enterprise was communicated to the Royal Society in 1787.

BLANC, Mont, gives denomination to a department formed of Savoy. It is bounded on the north by the departments of Leman and Ain; on the east by Piedmont; on the south by Piedmont and the departments of Upper Alps and of Here; and on the west by those of Here and of Ann. Its superficies is about 1,254,796 square acres, or 640,427 hectares; and its population about 283,106 individuals. It is divided into four communal districts; *viz.* Chambery, its capital, Annecy, Moutiers, and St. Jean de Maurienne.

BLANC-en-Berry, Le, a town of France, and principal place of a district, in the department of the Indre, containing 3850 inhabitants. The population of the canton amounts to 10,622; and its territory comprehends 387½ kilometres and 10 communes; six leagues W. of Argenton.

BLANC-Courfier Herald, created by patent on the revival of the most honourable military order of the Bath, 1725, "to attend the first and principal companion of the order for the time being." He enjoys all rights, privileges, and

immunities as any other herald; and his office is annexed, united, and perpetually consolidated with the office of genealogist of the said order. See *GENEALOGIST of the Bath*.

BLANCA, in *Geography*, a small island in the West Indies, north of Margarita, in the province of Andalusia, low and uninhabited; having savannahs of long grass, plenty of guanas, and some trees of lignum vitæ: but chiefly remarkable for its turtle fishery. N. lat. 11° 25'. W. long. 64° 10'.

BLANCA, or *BLANCHE*, an island in the gulph of Mexico, near the coast. N. lat. 25°. W. long. 62° 14'.—Also, a river in the province of Chiapa, in the Audience of Mexico, in New Spain. Its water, though clear, is said to have a petrifying quality.

BLANCARD, STEPHEN, in *Biography*, was son of Nicholas Blancard of Leyden, by whom he was initiated into the knowledge of philosophy and medicine. At a proper age he went to Brada, and thence to Francker, where he took his degree of doctor in medicine about the year 1678. We soon after find him settled at Amsterdã, where he dedicated his time to the practice of his art, but principally to writing or compiling a great variety of anatomical and medical works, of which the most valuable, Haller says, is his "Anatomia practica rationalis, s. variorum cadaverum morbis denatorum anatomica inspectio," published 1688, 12mo. But he has, even in this work, introduced many observations taken from other writers, without acknowledging it. The cases here described are 200 in number, and, in general, curious and deserving notice. Geollicke, however, not only accuses him of plagiarism, and of mutilating and spoiling the observations taken from other anatomists, but he blames him for publishing so many of his works in the Dutch, his native language, which cannot fail, in the end, he says, of being highly injurious to the profession of medicine, by enabling persons to practise who have not previously received a liberal education. This is, however, now done pretty generally all over Europe, and necessarily at the least in this country, where there are so many persons practising in every branch of medicine who are incapable of reading any other language than their own, the law here authorizing any persons who may chuse it to practise medicine, without examination, excepting physicians and surgeons residing in the neighbourhood of London, or of the two universities. We shall only mention one other of this writer's multifarious productions, his "Lexicon Medicum," containing explanations of all the terms used in medicine, surgery, and anatomy, first published in 1679, 8vo. This has passed through numerous editions, and lately, in 1777, by the care of Jac. Frãd. Hænsliam, is increased to nearly treble its original bulk, making two large volumes. 8vo.

Blancard's works were collected and published at Leyden, under the title of "Opera omnia theoretica et practica," in 1 vol. 4to. 1701. Haerl. Bib. Med. Chirurg. Anat. Botan. Eloy. Dict. Hist.

BLANCARDS, a name given to certain linen cloths thus called, because the thread used to weave them, has been half-blanchèd or bleached before it was used. They are manufactured in Normandy, particularly in the places which are in the district, or under the jurisdiction of Pont-Audemer, Bernay, and Lisieux.

BLANCAT, St. in *Geography*, a town of France, in the department of the Upper Garonne; 4 leagues W.N.W. of St. Gaudens.

BLANCH, a cape on the French coast, N. W. of Calais, almost opposite to Dover, on the English coast.

BLANCH, or *White Island*, one of the large islands on the coast of France, lying along the shore of the projecting coast to the N. E. of Morlaix.

BLANCH fermé, or *BLANK farm*, in *Law*, a *white farm*, that is, where the rent was to be paid in silver, not in cattle.

In ancient times, the crown-rents were many times reserved to be paid in "libris albis" called *blanche fermes*: in which case the buyer was holden *dealbare firmam*; viz. his base money or coin, worse than standard, was melted down in the exchequer, and reduced to the fineness of standard silver: or instead thereof he paid to the king 12d. in the pound, by way of addition. In Scotland, this kind of small payment is called "blanch holding," or "redius albae firmæ."

BLANCH-Lyon Pursuivant of Arms. This officer took his title from the arms and supporters of the Mowbrays', dukes of Norfolk (being ruby, a lion rampant, pearl.) Thomas Howard, duke of Norfolk, instituted the office of blanch-lyon poursuivant 29 Hen. VIII. and he attended at the funeral of queen Jane. Blanch-lyon was also a name to an officer of the crown in the reign of Edward IV.

BLANCH Rofs Pursuivant of Arms, was a poursuivant created by Edward IV. and to denominated from the distinguished badge of the house of York.

BLANCH-Singlier Pursuivant of Arms. This office was instituted by Richard duke of Gloucester during the reign of his brother Edward IV. in allusion to his badge or cognizance being a white bear.

BLANCHARD, WILLIAM, in *Biography*, an advocate in the parliament of Paris, was admitted to the bar in 1674, and much employed. Notwithstanding his professional labour, he found leisure for literary researches, and in 1687, published a chronological table of the ordinances of the French kings of the third race; which was republished, with improvements, under the title of "A Chronological Compilation, containing a collection of the ordinances, edicts, declarations, and letters patent of the kings of France, relative to public justice, police, and the finances, from the year 987 to the present time," 2 vols. fol. 1715. The work abounds with accurate researches; and a supplement to it was preparing by the author, when he died in 1724. Moreri.

BLANCHARD, JACQUES or JAMES, a painter of history and portrait, was born at Paris in 1600, and having been instructed in the first principles of painting in his own country, he travelled into Italy, where he studied for some time at Rome and Venice, and acquired, from particular attention to the works of Titian and of the Venetian school, distinguished excellence in the art of colouring, so as to have obtained the flattering appellation of the "French Titian." He was employed a considerable time at Turin by the dukes of Savoy, and afterwards painted several pieces at Lyons. Upon his return to Paris he was much engaged, and by his descent of the Holy Spirit, and a St. Andrew kneeling, gained high reputation. Colouring was his peculiar excellence, and he was distinguished for his judicious management of lights and shades. His principal works, besides those already mentioned, are a gallery at the hôtel de Bourbon, of subjects from the heathen mythology, and the bacchanals in the saloon of M. Morin, with some pieces at Versailles and Trianon. To Blanchard is ascribed the good taste for colouring which obtained in France. He is said to have etched several plates from his own compositions. He died at Paris in 1658, and left a son *Gabriel*, who was also a painter of eminence. D'Argeville. Strutt. Pukington.

BLANCHE, in *Ornithology*. Scopoli describes a kind of tern, or *hirondine de mer*, under this name, in his additions to Buffon's History of Birds. The plumage is entirely white; with the legs and bill black. It inhabits the Cape of Good Hope, and may be placed in the Indian and southern seas. Latham calls this bird *Sterna alba*.

BLANCHE-Carte. See **CARTE**.

BLANCHE-Criffe, or **BLANCHE Coiffe,** in *Ornithology*, is the

corvus cayanus of Gmelin and Latham, in Buffon's History of Birds. It is likewise called in the same work *geay de Cayenne*, and by Latham the *Cayenne jay*.

BLANCHE-Raie, synonymous with *étourneau des terres magellaniques*, names given in Buffon's History of Birds to the Linnæan *sturnus milibaris*, a native of Falkland island.

BLANCHE, Fr. for a minim, in *Musick*, or a white note with a tail to it. See **MUSICAL Characters**, and **TIME-TABLE**.

BLANCHERS, a name given to mechanics employed in blanching, i. e. the art or manner of bleaching or whitening.

BLANCHET, THOMAS, in *Biography*, a painter of history, perspective, and portrait, was born at Paris in 1617, and first manifested a genius for sculpture; but on account of the weakness of his constitution he was advised to direct his attention to painting. Accordingly, having practised for some time at Paris, he travelled for further improvement into Italy. By the counsel and assistance of Poussin and Andrea Sacchi, he applied to history painting; and on his return to Paris, he painted several pieces, particularly a picture at Notre Dame, much admired. At Lyons, where he afterwards settled, he became director of an academical school. During his absence from Paris, he was admitted, in 1676, into the academy of painting. Blanchet designed well, and understood the principles of perspective and architecture. His composition was rich, and his colouring natural; and though he was not always correct, his deficiency in this respect is imputed more to the fire of his genius and the rapidity of his execution, than to want of skill. His master-piece was the ceiling of the great hall in the hôtel de ville at Lyons, which was unfortunately consumed by fire; and the accident is said to have affected him so deeply, as nearly to have cost him his life. The magistrates of Lyons rewarded him with a pension, and with apartments in the hôtel de ville. His character was amiable, and his conversation lively and interesting, so that his company was much sought and valued. He died at Lyons in 1689. Some few of his pieces have been engraved. D'Argeville. Pukington.

BLANCHET, in *Ichthyology*, the familiar French name of a sort of salmon that inhabits the American seas; *salmo fetens* of Linnæus.

BLANCHET, in *Zoology*, *P'Amphibène blanchet*, a kind of amphibæna known among the French naturalists of the present day by this name. The species is described as being of a white colour, without any spots; the body as consisting of 230 annulations, and the tail of 16: on the head are six large scales, and about the vent eight very small tubercles. The length is 18 inches, exclusive of the tail, which measures an inch and an half. This is a native of South America, where it feeds on ants and other insects.—Bosc, from whom the above detail is copied, we are convinced, can mean no other than the *amphibæna alba* of Linnæus, when he describes this species. The Linnæan character states the number of rings on the body of this kind at 223, in which particular alone the two descriptions seem to be at variance; and the inconstancy of that character is too well known to justify the opinion of their being distinct, for that reason only.

BLANCHING, in *Gardening*, is the art of rendering the leaves and stems of various sorts of plants, as endive (cichorium), celery (apium), &c. white, tender, and esculent. It consists in producing a kind of vegetable debility or disease, by depriving them of the stimulant effects or influence of light, and is accomplished either by earthing them well up, or completely covering them, when perfectly dry, by boards, tiles, or other similar means, as will be more fully

fully explained in treating of the different plants that require this sort of management.

BLANCHING also denotes the operation of covering iron plates with a thin coat of crut of tin. See LATTEN.

BLANCHING of copper for sale, in imitation of silver; or mixing blanch'd copper with silver, or exposing the same to sale; or any malleable composition or mixture of metals, or minerals heavier than silver, and which looks, and touches, and wears like gold, but is manifestly worse than standard, is made felony, 8 and 9 W. III. &c. 26.

BLANCHING of wax. See WAX.

BLANCHING, in *Coinage*, the operation of preparing the pieces before striking, to give them the requisite lustre and brightness.

The blanching, as now practised, is performed by heating or heating the pieces in a kind of pan or shovel, with a wood-fire, in manner of a reverberatory furnace, so that the flame passes over the shovel. The pieces being sufficiently heated, and cooled again, are put successively to boil in two copper pans, wherein are aqua fortis, common salt, and tartar of Montpellier; when they have been well-drained of this first water in a copper sieve, they throw sand and fresh water over them; and when dry, they are all well rubbed.

The ancient method of blanching was, by putting the pieces, after heating, in a large vessel of common water; and some ounces of aqua fortis, but in different proportions for gold and silver.—The method is now disused, partly by reason of its expensiveness, and partly because it diminishes the weight of the metal.

BLANC-JAUNE, in *Ichthyology*. *Salmo niloticus*, of Linnæus, a fish of the salmon tribe found in the Nile, is called blanc-jaune by some French authors.

BLANCKAMERE, in *Geography*, a town of Brabant, 2 miles S. of Breda.

BLANCKENBERG, BLANKENBURG, or BLAKENBERG, a town of Germany, in the circle of Upper Saxony, and county of Schwartzburg-Rudolstadt, seated on the Rinne, 4 miles S.W. of Rudolstadt.

BLANC-NEZ, in *Zoology*. Under this name the Linnæan *Simia petaurifla* is described, both in Buffon's Natural History, by M. Allamand, and Sonnini, and in the history of Apes, published recently in Paris by Audebert. The prevailing colour of this animal is a very dark olive; the visage is black, with the exception of the nose, a remarkable snowy white spot of a triangular form being situated on the latter, which gives the creature a very singular appearance. The appellation of *blanc-nez* or *Guenon blanc-nez*, is very well applied, and might be rendered into English with much propriety, the white-nose monkey, if that name had not been previously assigned to another species by Mr. Pennant and Dr. Shaw. In the Zoology of the last writer we are informed, that the distinguishing character of his white-nose monkey (*Simia nidiitans*, Linn.) is the tip of the nose, which is milk-white, while the face itself is black. Dr. Shaw observes, however, shortly after, that the white-nose, in this species, is not absolutely peculiar, but is found in another; alluding, as we imagine, to his vaunting monkey, which answers to that description. The last mentioned animal he considers as the *Simia petaurifla* of Linnæus, and *blanc-nez* of Allamand's edition of Buffon's quadrupeds, as Gmelin states them; and so far the countenance of the French naturalists appears in favour of his opinion. But, perhaps, it will admit of some doubt how far we may be authorized in believing still further with Dr. Shaw, that the *Guenon blanc-nez* of Allamand, and Sonnini, in Buffon's Natural History, and *Guenon à nez blanc proëminent* of the Supplement of that work, are of the same species. Dr. Shaw thinks the first of these must be the female, and the other

the male. Virey, and likewise Audebert, are persuaded that they are certainly distinct species. *Guenon blanc-nez*, they consider as the Linnæan; *Simia petaurifla*, and *Guenon à nez blanc proëminent*, as *Simia nidiitans* of the same author.

BLANCO, in *Geography*, the name of a cape of Africa, on the north coast of the kingdom of Tunis, called the "White Promontory;" or, with the same meaning by the inhabitants, "Ras-el-abcaâ;" and supposed to be the "Promontorium candidum" of Pliny; and the "Promontorium pulchrum" of Liyy, where Scipio landed in his first African expedition. N. lat. 37° 9'. E. long. 10° 18'.—Also, a small point to S. E. of cape Corso, in the island of Corsica.—Also, a cape on the western coast of Africa, in Negro-land; first discovered by the Portuguese in the year 1441. N. lat. 20° 55' 30". W. long. 17° 10'. high water 9^h 45'.—Also, a cape on the western coast of the territory of Tschesmê in Asiatic Turkey, opposite to the southern point of the island of Scio. N. lat. 38° 20'. E. long. 25° 9'.—Also, a cape of South America, on the coast of Brazil, between cape Roque on the north, and cape St. Augustine on the south. S. lat. 6° 50'. W. long. 35° 33'.—Also, a cape of South America, on the eastern coast of Patagonia, north of port Desfado. S. lat. 47° 20'. W. long. 64° 42'.—Also, the north-western point of the bay of Salinas, on the coast of Nicaragua. N. W. from Panama-bay. N. lat. 9° 20'. W. long. 85° 48'.—Also, a cape on the north-west coast of America in New Albion, southward of the mouth of the river called "the river of the west," between cape Gregory and point St. George, and at a further distance between cape Foulweather and Mendocino. N. lat. 43° 20'. W. long. 128° 20'.—Also, a promontory of Peru, in South America, on the coast of the South sea, 120 miles S. W. of Guayaquil. S. lat. 5° 45'. W. long. 83°.

BLANCO, an island on the south-eastern part of the peninsula of Yucatan in New Spain. N. lat. 21°. W. long. 88° 5'. See BLANCA.

BLANDA, in *Entomology*. a species of BUPRESTIS, that inhabits South America. The wing-cases are attenuated, serrated, and furrowed; colour brassy-green, with the furrows coppery. Fabricius.

BLANDA, a species of TENTHREDO, found in England. The colour is black; abdomen rufous in the middle; posterior thighs marked with a white spot. Fabricius, &c.

BLANDA, in *Ancient Geography*, a town of Hispania Taragonensis, mentioned by Mela, Ptolemy, and Pliny, situate on the coast of the Laetani, south of Garunda.—Also, a town of Ita'y, in the country of the Brutii, according to Pliny and Mela, but called "Blandz," by Livy, and placed by him in Lucania.

BLANDFORD, commonly called *Blandford forum*, in *Geography*, is a market town of Dorsetshire, England. It is seated on the eastern banks of the Stour, and on the great post road from London to Exeter, Cornwall, &c. In the Dome-day book no less than nine parishes or parishes are included under the name of Blandford or Blandford, of which this is the most considerable, and was stiled a borough in some ancient records, though it does not appear to have been represented in parliament more than twice; once in the reign of Edward I. and again during the reign of Edward III. James the first granted it a charter, and made it a free borough with certain corporate privileges and immunities. The town is governed by a bailiff and six capital burgeses; a part of whom is invested with the power of determining suits not exceeding 10l.

Here is a small manufactory of shirt and waistcoat buttons, and another of thread, but the principal trade of the town depends upon its neighbourhood, and the passage of travellers. The town has been destroyed several times by fire.

In Camden's time it was mostly burnt by accident, but was soon rebuilt in an improved manner. The years 1676, 1713, and 1731 are recorded as particularly calamitous to this town, and in the latter year nearly the whole of it was destroyed. The church, town-hall, alms-house, free-school, and all the houses, but forty, were consumed. Many lives were lost, and the distressing calamity was greatly augmented by the small-pox, which raged in above sixty families. The computed damage was valued at 100,000*l.* but the distress, terror, and misery that prevailed at the time, and resulted from the direful catastrophe, far exceed all calculation, and defy the powers of verbal description. The town has since been rebuilt, and its appearance much improved by some respectable houses, a new church, town-hall, &c. The latter is a neat building composed with Portland stone, and constructed on columns of the Doric order. Within the building is a pump which was erected by John Bland, who having been a considerable sufferer by the last fire, had this pump constructed to supply the town with water, and thereby to prevent another similar disaster. The new church, built in the Grecian style of architecture, consists of a body, two aisles, a chancel, and a tower. Its interior is very neatly ornamented, and contains several handsome marble monuments.

The charitable donations to Blandford are numerous and valuable, and are appropriated to endow an alms house, to apprentice and clothe the poor boys, to erect and support a charity school, two free-schools, and for other benevolent purposes. Blandford is 104 miles W.S.W. from London, and contains 408 houses, with 2526 inhabitants: at the east end of the town are the remains of a handsome old building, called "Damory court," which has been possessed by many noble and distinguished personages.

Blandford is the birth-place of many celebrated characters: among whom the following are the most distinguished: *George Ryves*, who was warden of New College, Oxford, in 1599, and vice-chancellor, in 1601; *Bruno Ryves*, author of the *Mercurius Rusticus*, a singular book, recording many of the events of the civil wars. He also assisted in publishing the Polyglot Bible, was dean of Chichester and Windsor, and died at the latter place in 1677, aged 81 years; *William Wake*, archbishop of Canterbury, &c. was born here in the year 1657, and died at Lambeth in 1736; *Thomas Creech*, the translator of *Lucretius*, and other ancient classical authors, was born here in 1659; *Christopher Pitt*, another translator, dates his birth at Blandford, where he was buried in 1748.

About one mile south of Blandford-Forum is Blandford St. Mary, a village noted in the annals of literature as the birth-place of *Browne Willis*, the celebrated antiquary and topographer (see *WILLIS*). At the distance of one mile west of this town is *Brianstone-house*, the elegant and commodious mansion of *Edward Berkeley Portman*, esq. This house was erected from the designs of *James Wyatt*, who has displayed much judgment and taste in the disposition of the apartments, the arrangement of the offices, and in the two principal façades. The river *Stour* winding in a broad sheet through the grounds, with the plantations and distant fences, combine to render this a charming and delightful residence. *Hutchins's History of Dorsetshire*, second edition, fol. 1796.

BLANDFORD, a township of America, in Lunenburg county in Mahon bay, Nova Scotia, settled by a few families.—Also, a township in Hampshire county, Massachusetts, west of Connecticut river; about 25 miles S.W. of Northampton, and 116 W. of Boston; containing 1778 inhabitants.—Also, a town in Prince George county, Virginia, about 4 miles N.E. from Petersburg, and within its jurisdiction. It contains 200 houses, and 1200 inhabitants, and is pleasantly situated on a plain, on

the eastern branch of Appamattox river. There are many large houses, and three tobacco warehouses, which receive annually 6 or 7000*000* shreds. It is a thriving place; and as the marshes in its vicinity are drained, the air of this town, and also that of Petersburg, are much improved.

BLANDINA, in *Zoology*, one of the Fabrician species of *PAPILIO*, in the *Triphala* section; the wings of which are centrated, black, and marked with white spots; at the base of the anterior pair a blue streak, and another along the margin of the posterior ones. The rare insect inhabits India. *Vid. D. nov. Inf. Ind. Olf.* There is another species of the *Papilio* genus, that bears the same name, that ought by no means to be confounded with the above mentioned insect. (This is also described by *Fabricius* in his "*Entomologia Systematica*," in 14 section "*Satyræ*;" the wings of this kind are centrated, the colour brown, with a nervous ocellated band; posterior pair beneath rufous with a cinereous stripe. This is *papilio ligæ* of *Scopoli*, *albiops* of *Lepèr*, and *mela* of the *Vienna Catalogue*. It inhabits several parts of Europe, but has not been hitherto discovered in Great Britain. The same specific name again occurs in *Cramer's Papiliones*, a strong variety of the *Gmelinian papilio melicerta*, being so named by that author.

BLANDRATA, *GEORGE*, in *Biography*, a physician and divine of the 16th century, was born in the marquessate of Saluzzè in Italy, and practised physic in Poland and Transylvania; but upon his return to Italy, he was obliged by the inquisition to fly, on account of his religious opinions, from Pavia to Geneva, where he declared himself a Catholic. Here, however, his sentiments, which then inclined to Arianism, excited the suspicions of Calvin, which obliged him first to return to Poland, and afterwards, in 1563, to remove to Transylvania; where *Sigismund*, at that time sovereign of the country, appointed him his physician. After the death of *Sigismund* he sustained the same office to *Stephen* and *Christopher Bator*, and to the former when he obtained the crown of Poland. By his credit and influence the doctrine of *Socinus*, which *Blandrata* seems to have now adopted, made its way from Poland to Transylvania; and it was by his means that *Faulus Socinus* was brought thither from Basil in 1578, to second his arguments and efforts in counteraffecting *Francis Davides*, who zealously opposed the custom of offering up prayers and divine worship to *Jesus Christ*. It is said, that *Blandrata*, either through natural levity, or under the influence of an avaricious disposition, abandoned the interests of the Unitarians, and he is accused by *Socinus* with inclining towards the *Jesuits*, who had obtained credit and influence at the court of king *Stephen*. His wealth, however, tempted his nephew to strangle him in his bed, at some period, not ascertained, between the years 1585 and 1592; and this unfortunate termination of his life has been charitably interpreted, both by the orthodox and heterodox, as a divine judgment. Of his character as a writer the theologians of Geneva express a contemptuous opinion; and his conduct seems to have been chargeable with a degree of unsteadiness and duplicity, which has been partly attributed to the persecuting spirit of the times in which he lived. *Gen. Dict. Moss. Eccl. Hist.* vol. iv. p. 513, 525. *Toulmin's Life of Socinus*, p. 6, &c.

BLANÈS, or **BLANDA**, in *Geography*, a sea-port town of Spain, in Catalonia, on the Mediterranean, 34 miles N.E. of Barcelona. N. lat. 41° 42'. E. long. 2° 45'.

BLANFORD, a township of America, in the West Riding of York county, Upper Canada, on the Thames, opposite to Oxford.

BLANGIS, or **BLANCY**, a town of France, in the department of the Lower Seine, and chief place of a canton, in the district of Neufchâtel. The population of the town includes 1749 persons, and that of the canton 12,879. The territory

territory comprehends $24\frac{1}{2}$ kilometres, and 31 communes: 14 miles N.N.E. of Neufchatel, and 20 miles E. of Dieppe.

BLANGY, a town of France, in the department of the Calvados, and chief place of a canton, in the district of Pont l'Évêque; the place contains 771 persons, and the canton 10,531. The extent of the territory includes 140 kilometres, and 23 communes; 8 leagues E. of Caen, and $1\frac{1}{2}$ league S. E. of Pont l'Évêque.—Also, a town of France, in the department of the Côtes de Calais, and chief place of a canton, in the district of Montreuil, 2 leagues N.E. of Hesdin.

BLANK, or BLANC, in a general sense, signifies WHITE; and BLANCUS, or BLANCA, is more particularly used for a kind of white or silver money, of base alloy, coined by Henry V. in those parts of France then subject to England, valued at 8d. sterling. They were forbidden by his successor to be current in this realm, 2 Henry VI. c. 9. In some ancient charters they were called “solidi blanki, or white shillings.”

BLANK also denotes a small copper coin, formerly current in France, at the rate of five deniers Tournois.

They had also great blanks or pieces of three blanks, and others of six in resp. et whereof the single sort were called little blanks; but of late they are all become only moines of account.

BLANK, or *Blank ticket*, in *Lotteries*, that to which no prize is allotted. The French have a game, under the denomination *blaque*, answering to our lottery.

BLANK, in *Coinage*, a plate, or piece of gold, or silver, cut and shaped for a coin, but not yet stamped. See COINING.

BLANK-bar, in *Law*, is used for the same with what we call a “common bar,” and is the name of a “plea in bar,” which, in an action of trespass, is put in to oblige the plaintiff to assign the certain place where the trespass was committed. 2 Cro. 554.

BLANKS, in judicial proceedings, certain void spaces sometimes left by mistake. A *blank* (if something material be omitted) in a declaration, abates the same; 4 Ed. IV. 14. 20 H. VI. 18. and such a blank is a good cause of demurrer. Blanks in the imparlance-roll aided “after verdict” for the plaintiff. Hob. 76.

BLANK-verse. See VERSE and RHYME.

BLANK-point. See POINT-blank.

BLANKENBERG, in *Geography*, a sea-port town and fortresses of Flanders, situate near the sea-coast, between Ostend on the S.W. and Cadzand island to the N. E. N. lat. $51^{\circ} 18'$. E. long. $3^{\circ} 24'$.—Also, a small town of Germany, seated on a mountain, in a prefecture of the same name, in the circle of Westphalia, and duchy of Berg, 20 miles S. E. of Cologne.

BLANKENBURG, a principality of Germany, in the circle of Lower Saxony, belonging, since the year 1731, to the reigning house of Brunswick-Wolfenbützel, for which he holds a seat at the diet of the empire, and pays 12 rix-dollars a month. This principality lies partly on and partly near the Hartz mountain, and is about 20 miles long and about 8 wide. The northern part, without the Hartz, consists of very good corn-land, but that which lies on the Hartz abounds in woods, quarries of marble, and mines of iron ore. A considerable part of the country is watered by the Bode. The capital town is of the same name; in which are held the courts of judicature and the consistory, with the superintendance of the principality. Near the town, on an eminence, is the ducal palace. It is 7 miles distant from Halberstadt.

BLANKENHAYN, a small town in the circle of Upper Saxony, and principality of Altenburg, belonging to a lordship of the same name, which is a fief of the electorate of Mentz; 17 miles E. S. E. of Erfurt.

BLANKENHEIM, a small town in Germany, and capital of a county of the same name, in the circle of Westphalia, and archbishopric of Treves. The prince, resident here, pays 64 florins a month, and 72 rix-dollars, and $54\frac{1}{2}$ kreutzers to the imperial chamber; 36 miles N.N.E. of Treves. In the French arrangement it is the principal place of a canton in the district of Prüm, and department of Sarre. The population of the place includes 500 persons, and the canton 3936. Its territory comprehends 19 communes.

BLANKENSEE, a lake of Germany in the circle of Upper Saxony, and middle mark of Brandenburg, 6 miles E. of Belitz.

BLANKENSTEIN, a town of Germany in a prefecture of the same name, in the circle of Westphalia, and county of Mark, seated on an eminence near the Rhur, 19 miles E.N.E. of Duffeldorp.

BLANKET, in *Commerce*, a warm woolly sort of stuff, light and loose woven; chiefly used in bedding. The manufacture of blankets is principally confined to Witney in Oxfordshire, where it is advanced to that height, that no other place comes near it. Some attribute a great part of the excellency of the Witney blankets to the absterfive nitrous water of the river Windrush, wherewith they are scoured; others think they rather owe it to a peculiar way of loose spinning, which the people have about that place. Be this as it will, the place has engrossed almost the whole trade of the nation for this commodity; inasmuch that the wool fit for it centres here, from the farthest parts of the kingdom. Plott. Hist. Oxf. chap. ix. § 163.

Blankets are made of felt wool, i. e. wool from off sheepskins, which they divide into several sorts.

Of the head wool, and bay wool, they make blankets of twelve, eleven, and ten quarters broad; of the ordinary and middle sort, blankets of eight and seven quarters broad; of the best tail wool, blankets of six quarters broad, commonly called cuts, serving for seamen's hammocks. See HYKES.

BLANKET, *tossing in a*, a ludicrous kind of punishment, of which we find mention in the ancients under the denomination *sagatio*. Martial describes it graphically enough. “Ibis ab excussu, missus ad astra, sago.”

A late writer represents it as one of Otho's imperial delights. But this is turning the tables; that emperor's diversion, as related by Suetonius, was not to be the subject, but the agent in the affair; it being his practice to stroll out in dark nights, and where he met with a helpless or drunken man, to give him the discipline of the blanket.

BLANKOF, JOHN TEUNISZ, in *Biography*, a Flemish painter, was born at Alkmaar in 1628. After having spent some years in receiving instruction from Arent Tierling, Peter Scheyenburg, and Cæsar van Everdingen, he went to Rome, where he diligently copied the works of the best masters, and was admitted into the society of Flemish painters, called Bentvogels, by whom he was distinguished by the appellation of Jan Maat, signifying, in Dutch, mate or companion, and under which appellation, he is most generally known. His subjects were landscapes with views of rivers, or sea-shores, havens, or ports, which he executed with a light free pencil; and in the representations of storms and calms, he particularly excelled. Those of his pictures that are principally commended, are the Italian sea-ports, with vessels lying before them. And his most capital performance is a view of the sea-shore with the waves retiring at ebb-tide; which Houbraken describes as admirably beautiful and natural. His imagination was lively, and his execution rapid. He died in 1670. Pilkington.

BLANQUEFORT, in *Geography*, a town of France,

in the department of the Gironde, and chief place of a canton, in the district of Bourdeaux, five miles north of Bourdeaux. The place contains 2003, and the canton 9304 inhabitants. The territory comprehends 272½ kilometres, and 9 communes.

BLANQUILLE, in *Commerce*, a small silver coin, equivalent to about 11½*d.* sterling, current in Morocco, and on the coasts of Barbary.

BLANZAC, in *Geography*, a town of France, in the department of the Charente, and chief place of a canton, in the district of Angouleme, 4 leagues S.S.W. of Angouleme. The place contains 546, and the canton 10,440 inhabitants. The territory includes 242½ kilometres, and 20 communes.—Also, a town of France, in the department of the Gard, and chief place of a canton, in the district of Uzès, 3 miles S. S. W. of Uzès.

BLAPS, in *Entomology*, one of the Fabrician genera of *coleopterous* insects, the palpi of which are clavated, and four in number; jaws straight and bifid; lip membranaceous and cleft; and the antennæ moniliform at the tip. Fabricius includes in this genus some of the *tenebriones* of Linnæus, such as *tenebrio gages* and *mortifaga*. Gmelin adopts the genus only as a subdivision of *Pimelia*, in the Syst. Nat. See PIMELIA.

BLAPSIGONIA, compounded of *βλαπτεω*, *I hurt*, and *γυν*, *brood* or *issue*, a kind of disease, or defect in bees, when they neglect or fail to produce young, being wholly employed in making honey.

BLARE, in *Commerce*, a small copper coin, containing a little mixture of silver, struck at Bern, and valued at much the same with the RATZE in other places.

BLARINGHEM, in *Geography*, a town of France, in the department of the North, and chief place of a canton, in the district of Hazebrouck, 2 leagues S. E. of St. Omer.

BLARNEY, a small market town of the county of Cork, and province of Munster, Ireland, situated on a river of the same name, about 4 miles W. of the city of Cork. In the reign of queen Elizabeth, its castle was reckoned one of the strongest fortresses in Munster, and it has often proved very troublesome to the inhabitants of Cork. It belonged formerly to the earls of Clancarty, but at present is the property of Mr. Jeffries, whose father built the town, and established several manufactures, of which Mr. A. Young has given a detail in the account of his tour through Ireland. These establishments, however, as too generally happens in like cases, have not been successful, and Blarney is not at present the flourishing town, which Mr. Young's account would lead us to expect. A paper-mill, a stamping-mill, a bleach-green, and one or two cotton manufactories still exist; and many stockings made in the neighbourhood are sold at the weekly market and in Cork, but all may be considered as on the decline. The castle and the grounds about it have been considerably improved, and the country around, as well as the park, is well watered. There is a stone at one of the corners of the top of the castle, which is shewn to strangers, on account of a saying, that any person who has kissed it is privileged to lie and flatter. The origin of this saying, which is often referred to, and from which *Blarney* has become a vulgar synonym for flattery, the writer has not been able to discover. In the castle there is an original painting of Charles 12th of Sweden, at full length, drawn in the dress mentioned by Voltaire, brought over by one of the family who had been envoy to that monarch. The adjoining country is mostly under corn and pasture; the soil is a yellowish clay, and is mostly manured with lime-stone, of which there is a vein that supplies large quantities. Smith's Cork. Young.

BLAS, Str. a cape on the coast of the North Pacific ocean,
Vol. IV.

near which, to the S. E., stands the town of Compostella, in the province of Galicia, in New Spain. N. lat. 21° 30'. W. long. 105° 12'. See BLAISE.

BLAS, a term, in the Helmontian philosophy, denoting the local and alterative motion of the fluids; from whose influence proceed changes of weather, seasons, storms, and the like.

In imitation of this *blas stellarum*, the same author framed another in animals, either natural, whereby each *vifcus* is framed according to the model of its particular; or voluntary, which is directed to motion by the will.

BLASCON, in *Ancient Geography*, an island of Gaul, mentioned by Pliny, situate at the mouth of the Rhone.

BLASE, Str., in *Geography*, a town of Germany, in the archduchy of Austria, 8 miles S.W. of Steyr.

BLASENDORF, or BALASFALVA, a town of Transylvania, in the district of Weissenbourg, the residence of the bishop of Walachia.

BLASIA, from Blasio Biagi, an Italian monk, in *Botany*. Lin. Gen. n. 1199. Mich. Gen. t. 7. Clafs, *Cryptogamia Alge*. Species, 1. *B. pusilla*. Lin. Spec. 1605. Hudf. Angl. 519. Dill. t. 31. f. 7. Pl. dan. t. 45. The dwarf blasia grows on the sides of ditches and brooks, and in moist shady places in a sandy soil, in many parts of Europe; with us on Honnslow heath, and also near Manchester and Halifax. It flowers in the beginning of May.

BLASII ZELLA, in *Geography*, a small town of Germany, in the circle of Upper Saxony, and principality of Gotha, separated in 1640 from the bailiwick of Reinhardsbunn, and added to that of Schwarznot-wald, and famous for its foundery of fire-arms; 16 miles S. of Gotha.

BLASIMONT, a town of France, in the department of the Gironde, and chief place of a canton, in the district of La Réole, 7 leagues E. of Blanout, or 3½ N. of La Réole.

BLASIUS, GERARD, in *Biography*, son of Leonard, physician at Amsterdam, who received pupils into his house, to instruct them in the knowledge of medicine, particularly in the anatomy of brute animals, of which he dissected a great variety. It was this which probably inclined Gerard to this branch of study, and gave birth to several of his works; such as his "Zootomie, seu Anatomies variorum Animalium," published 1676; "Observata anatomica, in homine, simia, equo, vitulo, testudine, echino, glire, serpente, ardea, variisque animalibus aliis," Lugduni, 1674, &c.

After making some progress under his father, he went, for further improvement, to Copenhagen, and at length to Leyden, where he commenced doctor in medicine, about the year 1646. He then returned to Amsterdam, where he acquired so much credit and reputation for his skill in his profession, that in 1660 he was made professor in medicine in the schools of that city, and soon after physician to the hospital.

Besides a variety of original works, Blasius published new editions of parts of the works of Primerose, Th. Bartholine, Licetus, Bellini, Borelli, and Willis, to most of which he gave notes and additional observations, containing such discoveries on the subjects treated of, as had been made since those works had been originally published. Of his original works, besides those mentioned above, we shall notice his "Oratio de noviter inventis," Amst. 1659, 4to. "Observationes medicæ rariores, accedit triplicis monstri historia," Amst. 1667, 8vo. in six books, containing accounts of the dissection of numerous morbid bodies, in one of which, the spleen, and in another the gal-bladder, were found to be misplaced; in one two stomachs were found, in another three testicles. "Anatome animalium terrestrium variorum volatilium, aquatilium, serpentum, insectorum, ovorumque structura"

structuram naturalem proponens." Amst. 1601, 4to. The greater part of this work is collected from Severinus, Harvey, Malpighi, Willis, Bartholine, and other writers and journals. The work has, however, its utility, by bringing into a small compass a great number of curious facts, and observations, which were only before to be found by recurring to a variety of publications. In a letter published in the third century of Th. Bartholine's epistles, Blasius claims the discovery of the ductus salivaris, which he says he first shewed to Steno, then a young man. This has not, however, prevented the discovery from being attributed to Steno, the duct taking his name. For the titles of the rest of the works composed or edited by Blasius, see Haller. Bib. Anat. Med. et Chirurg. and Eloy's Dict. Hist.

BLASKET SOUND, in *Geography*, lies on the west coast of Ireland, between the Great Blasket island and Dunmore-head, on the mainland of the county of Kerry. In this sound there is ten fathom water, and in the summer time and moderate weather a vessel may stop off the east end of the Great Blasket; but the ground will not hold well in blowing weather. In passing through this sound, it is necessary to attend to a pretty strong tide, and to a rock not far from Dunmore point, which is covered at high water.

BLASKETS, BLASQUETS, or *Ferriter* islands, a cluster of islands on the west coast of the county of Kerry, Ireland, being the most westerly land in the European part of the British empire. They are five in number, besides several rocks, some of which are always above water, and others are covered by high tides. Their islands were given by the earl of Desmond to the family of Ferriter, from which one of their names is taken; but at present they belong to the earl of Cork and Orrery. The largest, called *Innismore*, i. e. the Great Island, and more commonly the *Great Blasket*, was visited by Dr. Smith, who found it inhabited by five or six families, and speaks in high terms of the salubrity of its air. Ruins of churches, and cells or hermitages, are found in some of the others, but when Dr. Smith was there, they were not inhabited. The small rocks are frequented by sea-fowl, the feathers of which are collected by the people of the neighbouring coast. The hawks which are found here are remarkably good, and were formerly in much esteem. Amongst other sea fowl the *stormy petrel*, (*procellaria*, Linn.) is common here. The Greater Blasket is 9 leagues S.W. by W. from Louphed, the north point of the Shannon, and 5 leagues north of the Skeligs. The whole cluster lie between $10^{\circ} 17'$, and $10^{\circ} 31'$ W. longitude, and between $51^{\circ} 58'$, and $52^{\circ} 3'$ north latitude. Smith's Kerry. McKenzie.

BLASPHEMY, *bl sphemia*, or *blasphemium*, in *Middle Age Writers*, denotes simply the blaming or condemning of a person or thing. The word is Greek, βλασφημία, from βλαπτω, *lelo*. Among the Greeks, to *blaspheme*, was to use words of evil omen, or that portended something ill, which the ancients were careful to avoid, substituting in lieu of them other words of softer and gentler import, sometimes the very reverse of the proper ones.

BLASPHEMY is more peculiarly restrained to evil or reproachful words spoken of the Deity. Augustin says, "Jam vulgo blasphemia non accipitur nisi mala verba de Deo dicere."

According to Lindwood, blasphemy is an injury offered to God by denying that which is due and belonging to him; or attributing to him what is not agreeable to his nature.

By the Mosaic law, blasphemy was punished with death. Levit. chap. xxiv. ver. 13—16. As also by the civil law. Novel. 77. In Spain, Naples, France and Italy,

the pains of death are not now inflicted. In the empire, either amputation, or death, is made the punishment of this crime.

By the canon law, blasphemy was punished only by a solemn penance, and by custom, either by a pecuniary or corporal punishment. By the English laws, blasphemies against God, and religion, as denying his being, or providence, and all contumelious reproaches of Jesus Christ, &c. to which may be also referred all profane scoffing at the holy scripture, or exposing it to contempt and ridicule, are offences by the common law, and punishable by fine, imprisonment, and pillory. 1 Hawk. P. C. And by the statute law, he that denies any one of the persons of the Trinity to be God, or asserts there are more Gods than one, or, having been educated in, and having made profession of the Christian religion, denies, by writing, printing, teaching, or advised speaking, Christianity to be true, or the holy scriptures to be of divine authority, for the first offence is rendered incapable of any office or place of trust; and for the second, adjudged incapable of bringing any action, being guardian, executor, legatee, or purchaser of lands, and to be imprisoned for three years without bail. 9 and 10 W. III. c. 32. To give room, however, for repentance, if, within four months after the first conviction, the delinquent will in open court publicly renounce his error, he is discharged for that once from all disabilities.

According to the law of Scotland, the punishment of blasphemy is death. The first species thereof consists in railing at or cursing God, and here the single act constitutes the crime. The second consists in denying the existence of the Supreme Being, or any of the persons of the Trinity; and therein obstinately persevering to the last. For reiterated denial does not fully constitute the crime, because the stat. of Charles II. 1661, admits of repentance before conviction as a complete expiation.

This statute of 1661, is ratified by a statute of king William, whereby the calling in question the existence of God, or of any of the persons of the Trinity, or the authority of Scripture, or the Divine Providence, is made penal. For the first offence, imprisonment till satisfaction given by public repentance in sackcloth. For the second, a fine of a year's valued rent of the real estate, and twentieth part of the personal estate: and the trial in both these cases is competent to inferior judges. The punishment of the third offence is death, to be tried only by the justices.

BLASPHEMY against the *Holy Ghost*. Divines are not agreed with respect to the nature of the crime thus denominated, Matthew, xii. 31. Mark, iii. 28, 29. Luke, xii. 10. and the grounds of the extreme guilt ascribed to it. On this subject it may be observed in general, that from our Saviour's expression this sin appears to consist, and to be completed, not in our thoughts, nor in our works, but in our words. Nor, indeed, is the epithet "blasphemous," or any synonymous term, ever joined in scripture, as is common in modern use, with doctrines, thoughts, and opinions. It is never applied but to words and speeches. A "blasphemous opinion," or "blasphemous doctrine," are phrases, which, however familiar to us, are as unsuitable to the scripture idiom, as a "railing opinion," or "slanderous doctrine," is to ours. It may be also observed, that this blasphemy is not of the constructive kind, but direct, manifest, and malignant. It is mentioned as comprehended under the same genus with abuse against man, and contradistinguished only by the object: and it is further explained by being called "speaking against," in both cases. The expressions are, in effect, the same in all the gospels, where

is mentioned, and imply such an opposition as is both intentional and malevolent. This could not have been the case with respect to all who disbelieved the mission of Jesus, and even decried his miracles; many of whom, we have reason to think, were afterwards converted by the apostles.

The learned Grotius, in order to mollify the severity of the sentence denounced against this sin, suggests, that what our Lord expresses absolutely, must be understood comparatively; and that he only designed to intimate, that it is very difficult to obtain the pardon of this sin, but not that it will admit of no forgiveness. But our Saviour here says expressly of this sin, whatever it was, both negatively, that it shall never be forgiven, and affirmatively, that the person guilty of it shall be obnoxious to eternal judgment, confirming the whole with an asseveration. Dr. Waterland (see his *Serm.* vol. ii. N^o 9. p. 177—183.) seems to incline to Grotius's opinion; alleging that ἀβυσσῶν signifies only exceedingly difficult. Dr. Hammond comments upon the words with observing, that this sin shall not be pardoned, but upon a particular repentance; but this is true of every sin as well as of the blasphemy against the Holy Ghost. Some have made this crime consist in final impenitency, because that is unpardonable; but it is not easy to assign a reason why this should be called the sin against the Holy Ghost. Others have represented it as, in its specific nature, a wilful and obstinate opposition to the truth; others again as a malicious opposition to the truth, on the part of those who know and are convinced that it is the truth; whilst some have supposed it to consist in a renunciation of the truth for fear of suffering, which made Francis Spira think that he had committed this sin. Mr. Wakefield, in his *Notes on the Translation of the Gospel of St. Matthew*, p. 178, is of opinion, that what is meant by the blasphemy of the Spirit appears from the context to be perversely resisting and belying with contumacy, against plain and satisfactory evidence, the operation and interference of the holy spirit of God; and he thinks, that those men who reject the Christian revelation, without contemplating its claims with diligence, candour, and exactness, upon a precipitate presumption of its falsehood; and those, who refuse their assent to that degree of moral evidence, of which alone these subjects are capable, and which they would think sufficiently satisfactory in other cases, and in the ordinary occurrences of life, are as much guilty of the sin of blasphemy in our times, as those cavilling and hypocritical Pharisees were in the days of Christ.

Dr. Tillotson (vol. i. *serm.* xvii.) maintains, that this sin, of which the Pharisees were guilty, consisted in maliciously attributing the miraculous operations which Christ performed by the power of the Holy Ghost to the devil. This sense is adopted by bishop Pearce, in his *Commentary on the four Evangelists*, vol. i. p. 85. But Dr. Whitby, with greater probability, refers it to the dispensation of the Holy Ghost, which commenced after our Lord's resurrection and ascension; and those were guilty of the crime, who persisted in their unbelief, and blasphemed the Holy Ghost, representing him as an evil spirit. The crime was unpardonable, because it implied a wilful opposition to the last and most powerful evidence which God would vouchsafe to mankind, and precluded the possibility of a recovery to faith and repentance. Whitby's *Fourth Appendix to the Gospel of St. Matthew*, in his *Paraphrase*, vol. i. p. 289.

Of this sin, it is said, it shall not be forgiven, either in this world or in that which is to come. With regard to the meaning of this expression, it is observed both by Lightfoot (*Hor. Heb.*) and by Grotius (in *loc.*), that through a fond

imagination of the final happiness of all the seed of Abraham, the Jews supposed, there were some sins that had not been forgiven here, which would be expiated by death, and be forgiven after it; and that our Lord designed by this expression to assure them, that there was no forgiveness for those who should be guilty of this sin, either before or after death, and that their expectations of forgiveness then would prove no other than a deceitful dream. Dr. Whitby, however, has clearly shewn, that this was used as a proverbial expression, and that it only signified, "a thing should never be," when it was said, "It shall not be, either in this world, or in the world to come." Others, however, among whom we may reckon bishop Pearce and Mr. Wakefield, have thought that the expressions of "this world," and "the world to come," denote the Jewish and the Christian dispensations. Ὁ αἰὼν, and ὁ νεὺν αἰὼν, say these writers, signify in the New Testament the Jewish age or dispensation, which continued till the annihilation of the Jewish polity, civil and ecclesiastical, by the destruction of Jerusalem under Titus; and ὁ μελλῶν αἰὼν, or the future age, denote the Christian dispensation. Bishop Pearce adds, that under the Jewish law, there was no forgiveness for wilful and presumptuous sins; concerning which he refers to *Numb.* xv. 30, 31. xxxv. 31. *Lev.* xx. 10. and *1 Sam.* ii. 25. With regard to the age to come, or the Christian dispensation, the bishop observes, that no forgiveness could be expected for such sinners as the Pharisees were; because, when they blasphemed the Spirit of God, by which Jesus wrought his miracles, they rejected the only means of forgiveness, which was the merit of his death applied to men by faith, and which under Christianity was the only sacrifice that could atone for such a sin; in this sense, as things then stood with them, their sin was an unpardonable one. But, he adds, it is not to be concluded from hence, that, if they repented of this blasphemy, they could not obtain forgiveness. Mr. Wakefield observes, that the unreserved affirmation in *Matt.* xiii. 32. must be interpreted, as well as the preceding verse, with considerable qualification. Οὐκ ἀφεθήσεται, "will not be forgiven him," must signify, says this writer, "will not readily be forgiven—will not be esteemed a common and venial fault," agreeably to the eastern mode of expression, which constantly requires such limitation. Accordingly he thus gives the general sense of this verse. "Offences of the most heinous nature, even reproach and injustice against the anointed prophet of God, may more readily find pardon, than contumacious blasphemy of the Holy Spirit." This aggravated sin, the result of obstinacy, depravity, and malice in the extreme, will have no title to forgiveness, even from the clemency and mercy of the Christian revelation, a revelation of pardon and peace, in the fullest sense, and to the whole race of man. See *Heb.* vi. 4—7. Nevertheless, "will not any sins be pardoned on sincere repentance, and steadfast purposes of amendment, under that consoling dispensation, which breathes out life; but reconciliation and forgiveness—nothing but favour, mercy, and peace, from God our Father, and our Lord Jesus Christ?"

BLASQUES ISLAND, in *Geography*, lies on the west coast of Newfoundland, in about 42° 30' N. lat.

BLASS-ENT, in *Ornithology*. The common wild duck is called by this name in the vicinity of the lake of Constance.

BLASSENTE, (*Frisch. av.*) a name synonymous with *anas Penelope* of Linnæus, and common *swigron* of English writers.

BLAST, *status*, in the *Military Art*, a sudden compression of the air, caused by the discharge of the bullet out of a great gun. The blast sometimes throws down part of the embrasures of the wall.

B L A S T.

BLAST is also applied, in a more general sense, to any forcible stream of wind, or air, excited by the mouth, bellows, or the like.

BLAST, in *Agriculture*, a disease in grain, trees, &c. See BLIGHT.

The sugar-cane in the West Indies is subject to a disease called the blast, and said to be occasioned by the *aphis* of Linnæus, which is distinguished into two kinds, the black and the yellow; and of these the latter is the most destructive. It consists of myriads of little insects, invisible to the naked eye, whose proper food is the juice of the cane, in search of which they wound the tender blades, and consequently destroy the vessels. Hence the circulation being impeded, the growth of the plant is checked, until it withers and dies in proportion to the degree of the ravage. It is frequently affirmed, says Mr. Bryant Edwards (*Hist. West Indies*, vol. ii. p. 215.) that the blast never attacks those plantations where colonies have been introduced of that wonderful little animal, the carnivorous ant, or "formica omnivora" of Linnæus, called in Jamaica the "raffles ant," from its being supposed to have been introduced there by one Thomas Raffles from the Havannah, about the year 1762. These minute and busy creatures soon clear a sugar plantation of rats; and their natural food seems to consist of all kinds of insects and animalcules.

Fire BLAST. See BLIGHT.

BLASTS, among *Miners*. See DAMPS. See MINES, and MINING.

BLAST, the term used at iron founderies to denote the column of air introduced into the furnace for the purpose of combustion. Its velocity is occasioned by the impelling power of the blowing machine forcing the whole contents of the air-pump through one or two small apertures called nose-pipes; and, according to the absolute power of the engine, air of various densities will be produced, so that density and velocity are always intimately connected, and mutually implied.

The well-known combustibility of iron, and the indispensable necessity of exciting combustion by the introduction of large quantities of condensed air into the furnace, in contact with ore in various states of maturity as to separation, into contact with iron existing in all the modifications of quality as to carbonation, and into contact with an immense body of ignited fuel, render this subject the most important in the major scale of our manufactures. Unfortunately for art, as well as for science, few practical deductions can be brought forward to establish any one theory of blast; one common principle only is acknowledged, that all reduction in the furnace is in consequence of the combustion excited by the column of air introduced.

To take a proper view of this interesting subject, it will be necessary to submit it to the following divisions.

1st. Combustion, as excited in this particular branch of manufacture.

2d. The nature of the fuel submitted to combustion.

3d. The density of the air.

4th. The quantity.

5th. The properties which follow as a consequence of density and quality.

1st. Combustion in the blast furnace consists chiefly in the rapid reduction of a given quantity of solid fuel, and its accompanying portion of ore, in the shortest possible time. That furnace, and that blast, which can, in a given time, reduce the greatest quantity of fuel, all things else being alike, will always manufacture the greatest quantity of iron. In common, before the introduction of the blast, the furnace is previously filled with alternate strata of coke, iron-stone,

and limestone, heated by simple atmospheric pressure to a bright red or white heat, and the iron stone to a melting heat. This temperature is soon increased throughout the furnace, after the blast is applied. The blowing orifices or tuyeres of the furnace exhibit the fuel increasing in whiteness, and the iron-stone rapidly dissolving before the blast, of a blackish colour. At this period, the lava which flows from the furnace, in consequence of the reduction of the ore and lime-stone, is considerably charged with iron, and is of a black, blackish brown, or greenish brown colour. These appearances will continue for twelve, twenty-four, or thirty-six hours, according to the mode of treatment in bringing forward the furnace after blowing. The tuyere (if a bright tuyere furnace) will appear like a blaze of uncommonly pure light, at times very offensive to the eye; it soon, however, becomes accustomed to it, and can with facility discern the individual masses of coke, as they are forced away, with the rapidity of lightning, before the irresistible force of the air. The concrete ore and lime-stone are no longer visible; but a fine metallic spray is constantly descending, and, forced from the fuel, precipitates itself to the bottom of the furnace. The scoria formed by the fusion and union of the lime-stone, with the immetallie parts of the ore, is carried before the blast in a similar manner and form, but easily distinguishable from the fluid metal by its buoyancy, want of velocity when impelled, and by its dull colour. In this state, the furnace is deemed in excellent smelting order. The iron is generally revived with little loss; and the colour and purity of the cinder or lava sufficiently indicate the perfection of the separation. When at any time the brightness of the tuyere fails, and becomes dull white or reddish white, then a change is indicated; the iron-stone and lime-stone will again appear in the solid unseparated state, and the change of colour in the cinder infallibly betokens an irregularity in the movements of the furnace. These appearances are so general, as scarcely to admit of an individual exception, and are sufficient to warrant the following explanation.

At the introduction of the blast, the interior of the furnace at the tuyere was simply a mixture of ignited masses of coles and iron-stone, the latter partly semifused, but the greatest part merely heated to a bright red heat. In the descent through the furnace, in contact with ignited coke, the particles of metal in the ore may, by parting with the oxygen, have received a disposition to become revived. The increased temperature creates an additional tendency, by establishing a greater force of affinity betwixt the fuel and the iron. But the metal approaching to its proper state, meeting the current of blast, is immediately subject to a partial combustion. The portion thus oxydated conveys to the lava in proportion to its quantity and oxygenation, the colour already mentioned.

As soon as the continuation of the blast conveys a higher temperature to the superior regions of the furnace, the appearance of the solid matter at the tuyere ceases. The fusion and separation of the metal from the ore are effected in situations more remote from the blast, or chief source of decomposition in a temperature more suited to the nature and existence of the metal. The iron, once formed into a fluid, and its fluidity preserved, its descent to the blast is attended with little or no injury to its carbonation.

To understand this distinctly, it will be necessary to state two curious facts relative to cast iron in a fluid state; and but for the existence of these properties, the manufacture of the metal in open furnaces or vessels would be totally impracticable. 1st. Cast iron, while kept fluid, never decomposes atmospheric air, and never itself becomes oxydated. 2d. The degree of carbonation passed upon the metal at the

moment it enters into complete fusion, continues without diminution or augmentation throughout the whole operation of the furnace; or, in other words, cast iron neither receives nor loses carbon whilst it preserves its fluidity. The first fact explains the reason why the iron is preserved from combustion, when it descends opposite to the current of blast. The second is a proof that the carbonaceous matter is conveyed to the iron in the furnace by a species of cementation previous to fusion; and that after this point, cast iron will not take up any addition of carbon.

To preserve and establish the relation of cementation and fusion in the furnace ensures uniform products. Combustion in this presents us with a gradation of temperature, diminishing from the tuyere upwards through thirty or forty feet of ignited matter. The inferior temperature towards the top of the furnace heats the materials to redness; an affinity is here commenced betwixt the carbonaceous matter and the oxygen of the ore; the latter is gradually removed, and a second affinity is instituted betwixt the de-oxygenated particles of metal and the carbon: this, as the ore descends to higher temperatures, is rapidly increased, and by and by the saturation of the coaly principle is complete. As the saturation of carbon always increases the fusibility of iron, the metal of the furnace enters into fusion at a comparatively low temperature, and speedily precipitates, through the high temperatures in the neighbourhood of the blast, to the general reservoir below.

It is not, therefore, necessary to suppose, that the great volume of air thrown into the furnace, and the great temperature of course excited, are necessary to the manufacture of the iron, so far as it regards quality; this, is more than probable, may be injured by it, and even the economy of the manufacture itself. Quantity, however, is in general secured; but this is more the effect of mechanical reduction, than of any necessary operation of the blast upon the ore and materials above.

The quicker the body of coles can be reduced, which occupy that part of the furnace between the point of separation and the tuyere, the greater will be the reduction of the whole, and the greater the quantity of manufactured metal. To this point the whole force of the blast is directed; here the chief part of the decomposition of the atmospheric air takes place; and here the destruction of the intervening coles is effected, and that always in proportion to the quantity of air poured upon their highly ignited surfaces.

If we assume, with a blast of a certain density, any two points in the furnace, the one as the point of decomposition, and the other of separation and fluidity of the metal, suppose the former at the tuyere, and the other at the lower end of the bushes at A, (See *description of BLAST furnace*;) then it must be allowed probable, that a change taking place in the density, or even in the quantity of the blast, that change will affect not only the points themselves, but also their relative distances. The point of separation may be brought nearer (and perhaps injuriously so) to the level of the blast, the elevation of which is supposed to remain the same. The contrary may with equal truth be inferred; that if the point of separation is carried to a more elevated situation by a change or increase of temperature, the ore may enter into fusion before it has remained sufficiently long in contact with the ignited fuel, and thereby both the quality and quantity may be injured.

2d. Since pit-coal coke became the staple fuel at the blast furnace, the density and quantity of air deemed necessary to ensure combustion and quantity, have been yearly increasing. The various qualities as to hardness or softness, purity and effect, have given rise to a multitude of opinions, which are the most appropriate quantity and density of air for respec-

tive qualities of coles. The blast of the furnace, in consequence, has at different places varied from $1\frac{1}{2}$ to 4lb. of expansive force upon the square inch of the air vessel. Most of the English works are blown with air not exceeding 2lb. upon the square inch, as being the most proper medium of density, and beyond which the materials would be over-blown. English coal, in general, is soft in its fossil state, but rich in carbon, and free from mixture. In Scotland, where the coal is found in dense strata, and forms heavy cok, the blast is used from 2 lb. to 4 lb. per inch. Those who have adopted dense blasts declare, that quantity of iron is incompatible with a column of air inferior to the measure of their standard. Either the prejudice is very general, or there really must exist a direct analogy between the nature of the blast and the density of the coal.

The operations of the charcoal pig manufactory were conducted with blasts of a trifling density, seldom exceeding $1\frac{1}{2}$ lb. upon the inch, and often under this. Dense blast, it was believed, over-ran the furnace, most probably by exciting too great a temperature, and frequently had a tendency to discharge the materials from the furnace top. There never yet have been any direct experiments made to ascertain upon what this variety of pit-coal depends; whether exclusively from its density, or from containing the carbonaceous matter in more purity or greater disengagement. Perhaps both are necessary to be taken into account, before any satisfactory explanation can be given of the facts now stated and generally admitted.

3d. The density of a column of air depends upon the power of the blowing machine, and the proportion of the area of the steam cylinder to that of the blowing cylinder. Tables of the powers of steam engines, and the diameters of cylinders requisite to condense air from $1\frac{1}{2}$ lb. to 4 lb. upon the circular inch, will be found under the article BLOWING MACHINE. It will appear evident from these tables, that steam cylinders of the same diameter, and working at the same power, when employed to raise air of various densities, do not discharge the same quantity of atmospheric air in any given time. The larger the area of the blowing cylinder, the number of strokes being the same, the greater will be the quantity of air discharged into the furnace. The reverse is the case with blasts progressively more dense; so that any part of an engine's power may be employed, not in raising the true principle of combustion—air, but in condensing a comparatively small body of air, so as to give it additional velocity.

To fix the point, or maximum, of the most profitable density, has hitherto been unattainable. The circumstances deemed intimately connected with coal, render it necessary to accommodate the blast to the combustibility of the fuel: were this not the case, it would be difficult to overturn the following reasoning, and to exhibit an instance where it might not be found generally applicable. Combustion in the furnace will be excited in proportion to the quantity of air introduced. A blowing machine, that with the same power of steam cylinder threw into the furnace double the quantity of air, though of an inferior density, would reduce a greater quantity of combustible matter than one oppositely constructed; or, in other words, 5000 feet of air per minute entering a furnace would produce greater effects than 3000 feet, although the latter were compressed into nearly half the bulk of the former.

The most plausible theory of blast is to fix upon the lowest density at which the air can be forced into the furnace, and then proportion the diameter of the air pump to the power of the steam end. Suppose that this could be effected at half the density usually employed, then that part of the engine's

engine's power used formerly to compress the air to 3 or 4 lb. would now be employed in a blowing cylinder of larger diameter, raising per minute, or indeed per stroke, from 100 to 200 cubic feet of air. Opposed to this there stand two formidable objections, resulting from the necessity of using blow-pipes or nozles of increased diameters, from which to discharge the additional quantity of air, making up in area what is wanting in velocity to discharge the air in a given time. The first is a re-action of the air, so powerful as to issue back from the tuyere with a velocity little short of that at which it enters. This, with nose-pipes of 2, 2½, and from that to 3 inches, is scarcely felt when the blast is soft, and may be entirely obviated by a judicious arrangement of the tuyere iron and nose-pipe; but with pipes from 3 to 4 and 4½ inches diameter, the recoil increases as the squares of the diameters of the blowpipes, and even in dense blasts the recoil increases with the diameter of the discharging pipe. It is therefore probable, that to blow with a nosepipe 4 or 5 inches diameter, so as to have no recoil, a velocity or density of air would be requisite beyond any thing yet in use.

Those who advocate for the use of a soft blast, either upon the plea of their materials, or as being the most advantageous method of using any given mechanical power, frequently feel the full effects of the recoil of a considerable portion of the whole blast. But to obviate this, and to gain the advantage of the whole air, the blowpipe is enclosed in a moveable frame or building, which is made air-tight at every cast, and completely prevents the return of the smallest portion of it. The combustion at these furnaces is carried on with equal effect, and the resulting products in iron equal in point of quantity and quality to those where blasts of double density are used.

Again, at other furnaces, where a soft blast had been originally preferred, the plan of forcing back the recoiled air, in order to make up in quantity what was now deemed to be deficient in density or velocity, has been in vain attempted. The tuyere irons have become immediately heated, and burnt back with violence. The materials would not admit of the tuyeres being raised sufficiently high to prevent the cinder from flowing back into the bag, which connects the large and small pipes, and destroying it. Even in more than one instance, the entire tuyere side of a furnace has been lost in endeavouring to establish this plan of blowing, where either the materials would not answer, or from some misconception in the mode of operating. Where a furnace works uniformly with a dark or honey-combed tuyere, this mode of blowing may be attended with the greatest success. In all new erections, however, the blast ought to possess of itself sufficient velocity not only to enter the furnace, but to ascend through the materials, without admitting of any important recoil.

The second objection, arising as a consequence of the want of velocity, and of being obliged to use pipes of a larger diameter to carry in the full complement of air, arises from a belief that a large pipe never makes the metal of a good quality. This deduction is perhaps not altogether correct; but it seems highly probable, that in the use of a comparatively loose blast, only a small portion of the air passes through the furnace without decomposition. The point of separation may by this means be changed, or perhaps be raised too high for the preservation of the metal, immediately previous to separation. As the increased temperature prevails upwards, the affinity between the particles of metal in the iron-stone, and the carbon of the fuel, may be earlier established, and no ultimate evil consequence, in point of reasoning, ought to ensue. It appears from numerous observations, that the quantity of iron-stone, which a given

weight of cokes smelts, and to the metal of which is conveyed the carbonaceous principle, is considerably dependent upon the diameter of the blowpipe. Supposing the ore of equal richness, the smaller the pipe, the greater burden will the coke carry, and the cheaper will the iron be made per ton, so far as materials are concerned. On the contrary, with large pipes, whatever the density of the air may be, the quantity of coals necessary to manufacture an equal quality of pig iron will be increased, and the cost of the iron is also enhanced. As an equivalent for this, however, the quantity is considerably increased with nearly the same amount of labour; so that it remains a question with the manufacturer, whether the additional cost of coal is compensated by the extra produce of metal he is enabled to bring to market.

4th. The quantity of air discharged into the furnace, under the appellation of blast, depends upon the number of strokes or cylinders which the engine makes per minute, and on the area and diameter of the air pump. This is independent of every consideration of density and increase of power in the steam cylinder, so long as the blowing or air cylinder remains the same, and the engine performs the same discharges; the measure of atmospheric air, which enters the furnace, will remain the same. The rapid improvements, which of late years have been made in the blowing machine, have increased the quantity from 1000 to 4000 feet per minute per furnace; and the quantity or produce in iron has been also considerably increased. We by no means, however, find that the increased manufacture of iron has been in the exact ratio of the quantity of blast thrown into the furnace. Many instances of late years have been noticed during the transition from the old to the improved modes of blowing, wherein the proportion has had little or no similarity.

Fifteen hundred feet of atmospheric air in one minute was found in most situations equal to the manufacture of twenty tons of melting iron; in the same situations, 3000 feet in the same time has never exceeded thirty tons per week; and in one particular trial for two weeks, the discharge of 6000 feet, being the whole produce in air of the engine, the produce in iron never exceeded 36½ tons. In the last case, the quality of the iron was irregular, and the quantity of cokes for each ton of metal thus produced was considerably increased, although the iron was of inferior carbonation.

Without recurrence to the diameter of the air cylinder, and the particular movements of the engine, the same facts have been frequently deduced from the diameters of the nose-pipes. We have frequently seen air discharged under a pressure of 2½ lb. upon each square inch, but with a pipe of 2½ inches diameter, reduce materials, and manufacture good melting iron to the extent of 20, 22, and 25 tons per week; and in the same furnace, and with the same materials, the air discharged by 2 pipes, each 2½ inches, under a pressure of 3 lb. upon each square inch, the produce never exceeded 30 tons of metal of an equal quality, but more frequently 25 to 28 tons. One observation still more direct, and made with a blast of a density equal to 2½ lb. per inch, and discharged by one pipe of 2½ inches diameter, frequently manufactured 22 tons fine melting iron weekly; another pipe was added to the opposite tuyere of the same diameter, and the quantity of metal weekly was never increased beyond 32 tons, and upon an average of six months only 27 tons. These are curious facts relative to the nature and effects of blast, and exhibit the investigation of its principles as a matter of singular importance in the economy of the manufacture.

One remark was made relative to the burden of ore in the last stated fact, that with the small pipe a given weight of cokes smelted and carbonated the metal in 3 cwt. of iron-stone;

stone; but after the two pipes were added, the weight of iron-stone to produce an equal quality of iron, was reduced to $2\frac{3}{4}$, and afterwards to $2\frac{1}{2}$; producing in the first instance per charge $1\frac{1}{2}$ cwt. of iron upon an average, but latterly not above 1 cwt. and 1 lb. of iron of equal qualities. Another observation, in the same case, with every attention paid as to velocity, quantity, and temperature of air, may be adduced as of equal importance, though somewhat different in its mode of application.

Under a pressure of 2 lbs. a $3\frac{1}{2}$ pipe was found upon the average of 18 weeks to manufacture 20 : 12 : 0 : 0 tons; a $3\frac{1}{2}$ inch pipe, 20 : 5. Upon an average of 11 weeks, and a $4\frac{1}{4}$ pipe, 22 : 5. Their respective areas, and iron produced, will stand in opposition thus :

$3\frac{1}{2}$ pipe,	area	10.6625	quantity of metal	20.12
$3\frac{1}{2}$	-	12.25	-	20.5
$4\frac{1}{4}$	-	18.0625	-	22.17

It is but fair to state that the effects of combustion, so far as it related to the reduction of a quantity of fuel, was not in the same unequal proportion as the quantity of metal to the measure of the air. The quantity of reduction was with the

$3\frac{1}{2}$ pipe	equal to	25
$3\frac{1}{2}$	-	31
$4\frac{1}{4}$	-	38

But the capacity of the fuel to carbonate the original quantity of iron, diminished in nearly the same ratio as the combustion increased; so that the same measure by weight which carbonated 140 lbs. of iron with the $3\frac{1}{2}$ pipe, was unable to carbonate more than from 96 to 100 lb. of the same quality with the $4\frac{1}{4}$ pipe. This observation was made previous to the one last mentioned, and reasoning upon the subject led to the practice detailed in that experiment. It will appear therefore conclusive, that the same body of blast may, with greater advantage and economy, be introduced through two pipes than through one, and this for two reasons. The reduction is equal, and the quantity of fuel reduced, smelts and carbonates a larger portion of metal per charge; but it will appear from both cases equally conclusive, that the capacity of the fuel to convey carbonation is in the ratio of the smallness of the pipe, or the reduction of the quantity of air.

This is in unison with what was stated under the particular "Combustion;" that a large volume of air, so far as it related to the institution of affinity between the coaly principle of the fuel, was probably more hurtful to the carbonation than otherwise; but that in so far as it hastened the completion of the affinities, the reduction of quantity, and above all increase of produce, though merely as an agent destroying the superfluous fuel, it may be considered as giving the manufacturer a superiority over his process by means, the extent of which he never could formerly command.

Tradition has, though rather imperfectly, conveyed to us some facts which our forefathers seemed to have understood and practised with better effect than their posterity. In operating with charcoal furnaces, and a blast proportioned to the scanty means then in use for the purpose of producing forge pigs, the whole air was conveyed into the furnace by means of a pipe 2, or at most $2\frac{1}{2}$ inches diameter; but when grey metal was wanted, the same body of air was divided and introduced by two pipes, whose joint capacity was equal to the former.

It appears therefore an inquiry of some importance to those embarked in iron founderies, to ascertain how far this tendency of the fuel to increase the carbonaceous principle proceeds in the ratio of the diminution of the blowpipe. If general observation confirmed the particulars here stated, the effects of

carbonation might be greatly increased, and the quantity perhaps little reduced, by introducing the same quantity of air by means of four, six, or eight small pipes, whose conjoint areas should be equal to the original column of blast.

5. From quantity and density of air, there may and do result peculiar properties of blast, which may affect the operations of the furnace, and which once fully understood may help to explain the facts hitherto unaccounted for, and which we before noticed. Facts resulting from accurate observation would prove an invaluable source of information upon this subject; and it is with regret that we can furnish no perfect aerological table of the different temperatures of air under different densities or degrees of compression. The following, we believe, contains the only collection of temperatures hitherto noted; and as it relates to only one degree of compression, the satisfaction it affords must be only partial.

TABLE of 30 observations made in summer upon various temperatures of air before and during the act of compression, compared with the thermometer in the shade. The air thus ascertained, was received into a magazine containing 2500 cubical feet, free from moisture or damp entirely.

Temperature of the air at the lower valves of the blowing cylinder.	Temperature of the air at the upper valves of the blowing cylinder.	Temperature of the air surrounding the receiving vessel.	Temperature of the air within the receiving vessel.	Thermometer in the shade at the time of making the observations.	Increased diff. of temp. between the included air, and average of the two first columns.	Increased diff. between the included air and the temp. of the external air in the shade.
57°	70°	73°	90°	63°	26 $\frac{1}{2}$	27°
59	61 $\frac{1}{2}$	75	87 $\frac{1}{2}$	64	23	23 $\frac{1}{2}$
61	71	70 $\frac{1}{2}$	91	62	25	29
54	68	70	94	66	31	33
57	73	75	95	65 $\frac{1}{2}$	30	29 $\frac{1}{2}$
57	72	69	92	64	27 $\frac{1}{2}$	28
53	70	69	96	64	34 $\frac{1}{2}$	32
54 $\frac{1}{2}$	74	70	95 $\frac{1}{2}$	62	31 $\frac{1}{2}$	33
56	68 $\frac{1}{2}$	71	93	61 $\frac{1}{2}$	30 $\frac{1}{2}$	31 $\frac{1}{2}$
57	69	73	97 $\frac{1}{2}$	65	34 $\frac{1}{2}$	32 $\frac{1}{2}$
56	70 $\frac{1}{2}$	70 $\frac{1}{2}$	91 $\frac{1}{2}$	64	28 $\frac{1}{4}$	27 $\frac{1}{2}$
52	68	72	88	61	28	27
54	69 $\frac{1}{2}$	74	86	59	24 $\frac{1}{4}$	27
51	71	71	90 $\frac{1}{2}$	62	29 $\frac{1}{2}$	28 $\frac{1}{2}$
57	73	79 $\frac{1}{2}$	94	64	29	30
55	69	73	93	61 $\frac{1}{2}$	31	31 $\frac{1}{2}$
56	72	71 $\frac{1}{2}$	96	65	32	31
56	72	74	97 $\frac{1}{2}$	66	32 $\frac{1}{2}$	31 $\frac{1}{2}$
53	71	70	99	68	37	31
51	73 $\frac{1}{2}$	70	98	69	35 $\frac{3}{4}$	29
52	75	72	96 $\frac{1}{2}$	65	33	31 $\frac{1}{2}$
55	72	73	94	62	30 $\frac{1}{2}$	32
47	70	76	94	63	36 $\frac{1}{2}$	31
51	70	77	91	58	30 $\frac{1}{2}$	33
49	71	75	93	61	33	32
52	74	74 $\frac{1}{2}$	98	67	35	31
52 $\frac{1}{2}$	72 $\frac{1}{2}$	74	101	69	39 $\frac{1}{2}$	32
51	73	71	100	74	38	26
54	70	73	102	75	40	27
57	71	74	99 $\frac{1}{2}$	68	35 $\frac{1}{2}$	31 $\frac{1}{2}$

TABLE of 30 observations of the same nature made in the winter months.

Temperature of the air at the lower valves of the blowing cylinder.	Temperature of the air at the upper valves of the blowing cylinder.	Temperature of the air surrounding the receiving vessel.	Temperature of the air within the receiving vessel.	Thermometer in the shade at the time of making the observations.	Increased diff. of temp. between the included air, and average of the two first columns.	Increased diff. between the included air, and the temp. of the external air in the shade.
36	58°	66°	49°	29°	2°	20°
33	54	64	55	30	11½	25
32	51	68	53	29½	11½	23½
33	57	61	50	29	5	21
36	55	60	51½	32	6	19½
31	52	63	50	28	8½	22
29	50	59	48	26	8¼	22
29	49	58	50	27½	11	22½
29	51	59	52	29	12	23
28	50	59	50½	27	11½	23½
30	53½	60	48	28	6¾	20
33	57	61	48	30	3	18
37	56	60	49½	31	3	18½
28	52	62	46	25	6	21
29	51½	59	47	24½	6½	22½
30½	53	59	49	28	6¾	21
33	55	60	53	29	9	24
34	55	60½	56	30	11½	26
32	55	62	54½	27½	11	27
35	56	64	55	30	9½	25
30	50	60	53	30	13	23
27½	50	61	50	28	11¼	22
28	50½	62	49	26	9¾	23
29	48	58	48	25	9½	23
28	47	58	49	11¼	24	25
28½	50	58	47½	8¾	21	26½
28	49	60	53	14	25	28
29	52	61	57	8½	24	27
31½	57	64	55	13¾	26	29
29	54	63	56	15¼	28	27

There can arise no doubt but that heat is extricated by compression from atmospheric air; and that it is further probable, that the quantity of heat disengaged is in proportion to its condensation. If, therefore, we are allowed to reason upon this subject, we should state the following as a considerable approximation towards truth. It is universally believed and felt, that combustion in the blast furnace in June, July, and August, is considerably diminished, as a consequence of the increased temperature of the air. The metal, in these months, is frequently debased in point of carbonation, and diminished nearly one-half in point of quantity. We shall suppose that this takes place at a temperature of 100, which has been proved to exist under a pressure of 2½ pounds. The reverse of this happens in the cool season of the year, and particularly in the winter months. The furnace then yields the largest quantity of iron, and in the most profitable manner. This, with the same probability, takes place at a temperature of 50 found in the table.

It would therefore appear to result from these, that two-thirds, or one-half of the iron only, is manufactured at a temperature of 100, than in winter at 50. The difference between these degrees of temperature amounts to 50, and most probably in combustion affects the operation as sensibly

as the human frame is affected by a transition of temperature equal or similar. It is not necessary now to state the difference between summer and the denser air of our winter, the circumstances of evaporation and aqueous solution; these shall be particularly attended to in the general process of manufacturing iron. The great difference of temperature arising simply from compression seems to us adequate to explain many phenomena regarding the blast furnace. Our knowledge, however, upon this subject, can only be forwarded by a general collection of facts well ascertained, shewing what are the various degrees of heat made sensible by the compression of the blowing machine under every density; what the difference in temperature, the densities being alike, when the air is received over water, in the air-vault, or in the regulating cylinder. From these it might most probably result, that the higher the density of the air, the greater would be the degree of heat manifested; and it might also follow, that in the ratio of this density, or temperature, when the air was received over water, so would be the evaporation or quantity of water suspended in the air, and of course discharged into the furnace.

This article may be concluded by the following remarks:—That all iron works are not alike affected by the heat of the summer months. Many iron works preserve the quality of the iron, though at the expense of fuel, and with loss of quantity; but at other places no extra quantity of fuel will compensate, either as to quality or quantity, for the want of cool air. Neither situation nor density of blast will explain this curious circumstance; for with blasts of equal density and quantity, works situated not 50 feet above the level of the sea have been found to manufacture a greater quantity of soft iron in summer, than at a similar work, not ten miles distant, situated at least 250 feet higher. At both of these works the air is received over water; and no material alteration in the use of that air is or can possibly be applied. The causes of this difference must be sought for in the nature of the coal and iron-stone used at both works, the investigation of which, however interesting, would prove a most laborious undertaking.

BLAST Furnace, a large conical or quadrangular building used at iron works for smelting iron-stones and ores.

BLAST Furnace, Description of.

Plate (Chemistry) II. fig. 1. represents a blast furnace, and part of the blowing machine constructed upon what at one time was the general plan at iron works.

A, the regulating cylinder, eight feet in diameter, and eight feet high. B, the floating piston loaded with weights proportioned to the power of the machine. C, the valve by which the air is passed from the pumping cylinder into the regulator; its length 26 inches, and breadth 11 inches. D, the aperture by which the blast is forced into the furnace. Diameter of this range of pipes 18 inches. The wider these pipes can be with convenience used, the less is the friction, and the more powerful are the effects of the blast. E, the blowing or pumping cylinder, six feet diameter, and nine feet high; travel of the piston in this cylinder from 5 to 7 feet per stroke. F, the blowing piston, and a view of one of the valves, of which there are sometimes two, and sometimes four, distributed over the surface of the piston. The area of each is proportioned to the number of valves, commonly they are 12—16. G, a pile of solid stone building, on which the regulating cylinder rests, and to which the flanch and stils of the blowing cylinder are attached. H, the safety valve, or cock, by the simple turning of which the blast may be admitted to or shut from the furnace, and passed off by a collateral tube on the opposite side. I, the tuyere by

by which the blast enters the furnace. The termination of the tapered pipe, which approaches the tuyere, receives small pipes of various diameters from two to four inches, called nose-pipes. These are applied at pleasure, as the furnace may be deemed to require an alteration in the volume or density of the blast. K, the bottom of the hearth, two feet square. L, the top of the hearth, two feet six inches square. KL, the height of the hearth, six feet six inches. L, is the bottom of the boshes, which here terminate of the same size as the top of the hearth, only the former are round, and the latter square. M, the top of the boshes, twelve feet diameter, and eight feet of perpendicular height. N, the furnace top, at which the materials are introduced, or, as it is commonly called, charged; three feet diameter. MN, the internal cavity of the furnace from the top of the boshes upwards, 30 feet high. NK, total height of the interior of the furnace, or working part, $44\frac{1}{2}$ feet. OO, the lining. This is done in the nicest manner with fine bricks, from twelve to fourteen inches long, three inches thick, and tapered to suit the circle of the cone. PP, a vacancy which is left all round the outside of the first lining; three inches broad. This is sometimes filled with coke dust, but more often with sand firmly compressed. This space is allowed for any expansion which might take place, either by an increased volume of the furnace itself in heating, or by the pressure and weight of the materials when descending to the furnace bottom. QQ, the second lining, similar to the first. The object of this is to guard against the entrance of the flame into the mass of common building, by rents which may take place in the first lining OO. R, a cast-iron lintel, on which the bottom of the arches is supported, eight feet and a half long, and ten inches square. RS, the rise of the tuyere arch, fourteen feet high on the outside, and eighteen feet wide. VV, the extremes of the hearth ten feet square. This and the boshing stones, are commonly made from a coarse gritted sand stone, whose fracture presents large rounded grains of quartz connected by means of a cement less pure.

Fig. 7. represents the foundation of the hearth, and a full view of the manner in which the false bottom is constructed.

AA, the bottom stones of the hearth. B, a stratum of bedding sand. CC, passages by which the vapour generated from the damps is passed off. DD, pillars of brick. The letters in the horizontal view of the same figure correspond to similar letters in the dotted elevation.

Fig. 8. AA, horizontal section of the diameter of the boshes; the lining and vacancy for stuffing at M. C, view of the top of the hearth at L.

Fig. 9. Vertical side section of the hearth and boshes, showing the tympan and dam-stones, and the tympan and dam-plates. a, the tympan stone; b, the tympan-plate, which is wedged firmly to the side walls of the hearth; c, dam-stone, which occupies the whole breadth at the bottom of the hearth, excepting about six inches, which, when the furnace is at work, is filled every cast with a strong binding sand. This stone is surmounted by an iron plate of a considerable thickness, and a peculiar shape, d; and from this it is called the dam-plate. The top of the dam-stone, or rather the notch of the dam-plate, is from four to eight inches under the level of the tuyere hole. The space under the tympan plate, for five or six inches down, is rammed every cast full of strong loamy earth, and sometimes even with fine clay. This is called the tympan stopping.

The square of the base of this furnace is 38 feet. The extreme height, from the false bottom to the top of the crater, measures 55 feet,

BLAST Furnaces, Construction of.

These furnaces are sometimes built of an external quadrangular form, entirely of sand stone, and lined, in contact with the fire, of the same materials; sometimes they are built conical, entirely of bricks, or with sand stone on the outside, and linings of both common and fine bricks within.

One great desideratum in the construction of furnaces, is to counteract the effects of a powerful expansion, which always take place, to a greater or less extent, after heating, and the introduction of the blast, and which has frequently proved fatal to the existence of the entire fabric.

In the general style of building, all are agreed that the pillars, which support the arches, and of course the whole fabric, ought to be done in the most substantial manner. But beyond the arches, a variety of methods has been adopted to ensure a complete fabric, free from large openings or rents after a few weeks blowing.

Some iron-masters are of opinion, that the same degree of firm building, that is bestowed upon the pillars, ought to be continued to the top, with the addition of binders of flat iron pressing with their edges against the body of the building, or with four screwed bars, still passing through the external building, and forming one square binder, if the shape of the furnace is quadrangular. Another species of binder is used for square piles, made of cast iron of a prodigious strength and weight. The individual pieces forming this binder, have, at their extremities, mortises, which mutually receive each other, with a considerable extra space for the expansion, which is invariably experienced afterwards. Other iron-masters, again, prefer rearing a substantial shell of building, and filling the interior space towards the linings, either with dry bricks, or stones loosely laid together. When the mass of building becomes thoroughly heated by the kindling of the fire, and the introduction of the blast, the interior of the furnace expands considerably, and the action is supposed to be merely confined to the wedging together of the loose parts of the building. By the time that this is effected, the expansion is supposed to have ceased, and the exterior shell of the furnace is preserved entire. Others, equally anxious to form a perfect building, have given an octagonal form to that part of the furnace above the arches, that the binding might be more happily effected. Some have assumed this form, with the addition of semi-circular recesses in the sides of the octagon; their convexes being strongly arched to resist the powerful pressure expected from within.

Still more determined to defy the all-powerful effects of expansion, others have hollowed furnaces from the solid rock, forty to fifty feet high, and lined these immense perforations with fine bricks in the usual form.

Where such a variety of form and of method exists in effecting the same purpose, and where the instances of experiment have been very numerous, every mode of construction can boast of a solitary instance of complete success, excepting in the case of the rock, which was only once attempted, and which, after the introduction of the blast, opened from four to six inches from top to bottom.

There are so many circumstances to be taken into the account, besides the mere form of the building, that unless these are all equally guarded against, the chances are in favour of the furnace opening considerably. If the building is constructed of sand stone, and if this material is carried from the quarry as it is wanted by the workmen, an immense proportion of water is thus introduced, which by a little foresight might have been avoided. Sand stones of common density as to fracture, contain, when taken immediately from the quarry,

from 8 to 10 per cent. of water, and coarser-gritted stones from 10 to 12. Taking the average 10 per cent., then in a furnace of equal dimensions to the drawing in *Plate II. fig. 6.* the sand stone of which will weigh upwards of 1200 tons, there will be introduced 120 tons of moisture. This quantity is always considerably increased by the portion of water necessary to reduce the lime to mortar, and frequently augmented by the moist state of the weather during building.

The evaporation of this immense body of water is the source of all the mischief which takes place in the shell of the blast furnace; nor is it much to be wondered at, where every precaution is not used to bring the heat forward in the most gradual manner, preserving the clearness of the vents, and allowing the moisture insensibly to pass away?

In situations where bricks can be obtained, the moisture of the sand stone is avoided, but the great extra quantity of lime, which is necessary to build with bricks, introduces through the medium of the mortar an almost equal quantity of water, as with sand stone. This has been obviated in part by using soft clay in the interior of the walls; but as clay seldom binds to any great extent, the general push of the furnace must be trusted to good binders from without.

In the construction of all blast furnaces, a complete vent-age ought to be preserved by means of narrow flues, or passages proceeding horizontally from the middle of the solid shell, or within two feet and a half of the interior to the outside. These ought to be connected with a circular channel, or gutter, of the same dimensions, proceeding round the circumference of the furnace; so that if any one vent were choked in the general expansion, the moisture conducted by it might easily vent itself among the other openings. The vents cannot well be too numerous; and as they seldom exceed four inches square, the building cannot be materially weakened by them.

In addition to the horizontal channel of communication, some builders carry up in the main building of the furnace four, six, or even eight perpendicular flues, which communicate with it and the openings that proceed horizontally to meet the external air. See *Plate VIII. figs. 1, 2, 3, 4.*

Either of these methods may be considered as just precautions to insure the existence of the furnace, but adopting them in the fullest and most complete manner, is not always accompanied with similar success. If circumstances formerly noticed concur in occasioning an extra degree of expansion, the pressure of the lining against the common building of the furnace often deranges the systematic order of the vents, pushes the bricks into contact with each other, and smothers for a little while, though to gain more fatal elastic effects, the increasing volume of the vapour.

After such a diversity of opinion upon a subject of such general importance, wherein each respective class of votaries can boast of complete success from its peculiar plan, it may be difficult to point out one more generally attended with good effects than another. The following, however, may deserve the serious consideration of the manufacturer of pig-iron.

Of whatever materials the furnace is constructed, let them possess no more moisture than is sufficient for their proper building. The thickness of the common building not to exceed, at its greatest breadth, $6\frac{1}{2}$, or 7 feet. In the middle of the wall, a space of four or six inches ought to be left clear all the way to the furnace top. Into this vacancy should be introduced small fragments of sand-stone, about the size of an egg and under. When the expansion, proceeding from the fire building of the interior, causes the bricks immediately in

contact to push outwards, the masses of sand-stone are immediately reduced in size, and filling the interstices occasioned by their former angular shape, actually occupy much less room; and now present to the flame or fire, should it be inclined to penetrate so far, a solid vertical stratum of sand, after having secured the expansion of the furnace to the extent of some inches. The effects of the pressure are thus diverted from the shell of the building, and lost in the pulverization of the fragments of sand stone.

The advantages resulting from this plan may be nearly doubled, by using a double lining of fire bricks, as represented in *Plate VIII. fig. 3.* betwixt each of which, and the common building, a similar vacancy should be left; but filled with sharp sand, containing no more moisture than serves to compact it into a firm body. As this moisture becomes gradually expelled in the slow heating or annealing of the furnace, the sand occupies less bulk, or, which is the same in effect, is then susceptible of a greater degree of compression when the general expansion of the furnace comes on. It is evident that the force is here also diverted against the sand in place of acting immediately, with a tendency to enlarge the circumference of the building.

Over and above all these precautions, the annealing or drying of the furnace in a progressive and regular manner ought to be carefully attended to and continued for two or three months at least. Many are blown much earlier, from an anxiety to get to work, and make returns for the great capital necessarily expended in these undertakings.

The same variety of opinions exists in the trade relative to the determined figure and dimensions of the blast furnace, as subsist, with regard to the best mode of building. Its height has, at different times, varied from 20 to 70 feet; and its diameter, at the boshes, or widest part, from 8 to 15 feet. It will be easy to trace the source of this indefinite mode of construction, and the uncertainty which must necessarily pervade operations of so much risk and importance.

At the time when charcoal of wood was the common, and indeed, the only fuel used in the blast furnace, the volume and extent of the blast were proportioned to the very imperfect state of the blowing machinery. Long experience had taught the manufacturer what were the proper size and dimensions of his furnace. Many of them were from 12 to 18 feet high, and some of them, where a good water wheel blast existed, reached as far as 28 feet in height.

When pitcoal was introduced into the blast furnace, in the state of coke, to produce similar effects to the charcoal of wood, it was soon found, that in furnaces of equal capacity and height the same effects could not be produced. The ore required to remain in contact with the ignited fuel for a longer space of time, in order, unquestionably, to produce, by attenuated contact, what was deficient in temperature, for the saturation of the ore with coaly matter. This would immediately suggest an increase of the height of the blast-furnace; and if beneficial effects once resulted from a step of this nature, it became a matter of difficulty to say where the progression of height would stop.

Hence, in a few years, arose furnaces of 40, 50, 60, and 70 feet in height. Of the last dimensions, one was erected in Wales. The size of the artificial crater was such, that the strength of the blast was scarcely sufficient to keep the existence of flame visible at the furnace top. After in vain endeavouring to ignite the immense body of materials contained in its vast capacity, the height of the furnace was reduced 30 feet by cutting a hole in its side, narrowing the mouth, and throwing in the materials at the height of 40, in place of 70, feet from the furnace bottom. This was at-
tended

tended with success, and the operations of the furnace proceeded with their usual facility.

After the application of steam-engines to raise and condense air, the quantity and strength of the blast became more a mechanical property in the hands of the manufacturer. It was soon discovered that an increased volume of air, by exciting a much higher temperature throughout the furnace, constituted the immediate action of those affinities, which the tall furnace accomplished by a long attenuated contact, and that iron equally carbonated and fitted for the purpose of melting, could be produced by 30 hours contact, as in four days.

The consequence of these gradual discoveries was a general predilection in favour of small furnaces, and at present the bias of the manufacturer seems inclined to this extreme.—Where the maximum will be found it is difficult to conjecture, for the ground which the manufacturer now occupies is materially altered from what it was when smelting with coke was first introduced. The perfection to which the blowing machine has attained, forms a striking contrast to the feeble and diminished effects of the bellows in the infancy of the trade. So far as the necessary affinity is increased, and more instantaneously produced in high temperatures, than in those inferior, the manufacturer is differently circumstanced, and commands an extent of means unknown to him in former times. That this superiority will produce equivalent effects in the modification of the blast-furnace, requires but little demonstration. Two facts illustrative of this may, however, be mentioned. Cast steel has of late years been formed directly from bar-iron, by a process which only requires an hour or two to complete, and with small quantities of matter the same may be performed in a few minutes. This is effected by presenting the carbonaceous matter to the iron at a melting temperature. In the usual mode of cementation, blistered steel, by a more attenuated contact and inferior temperature, requires six or seven days to complete, what is here produced in two hours. The difference of temperature in the two operations is equal to 60° or 70° of Wedgewood. The first operation will be considerably shortened, if the cast steel is required to hold much carbon; but if this requisite is necessary in the blistered steel, the length of the cementation must necessarily be protracted. Again, a piece of malleable iron may, by presenting it with a proper dose of carbon, at a high temperature, be converted, in a few minutes, into a mass of the richest carburated cast-iron, which, in a temperature inferior, would have required several months.

The same facts will apply, in part, to the manufacture of pig-iron in the blast-furnace; but an unanimity of opinion and action on this subject is precluded, as well by the prejudices of individuals, as from circumstances arising out of the nature of the materials operated upon in different places.

A furnace has lately been tried at Muirkirk in Scotland, only eight feet diameter across the boshes, in place of its former dimensions, which were ten feet, and 40 feet high. It was soon found, that with the same volume of blast which was formerly applied to the ten feet furnace, very inferior effects were now produced. The combustion apparently was carried to too great an extent, and the materials, owing to this circumstance, entered into fusion before the iron had imbibed a sufficient dose of the coaly principle from the fuel. Another great evil which resulted from this diminution of diameter, was a friction, or retardation of the descent of the materials upon the lining of the furnace. This evil was increased and the materials made more buoyant, by the usual volume of air elevating itself in a cone not much more than

half its former area. The consequences were, that the whole mixture of coke, iron-stone, and lime-stone, would have frequently hung for an hour together, or until the blast had cut all the hearth and boshes clear of materials, a slip would have then ensued, and brought with it a large proportion of newly introduced matter. The introduction of this into the fusing point before being properly heated, and long before any affinity had been established betwixt the particles of metal and the carbon of the furnace, invariably changed the quality of the metal, and caused frequent and sudden alterations from grey to white iron.

Upon the subject of height and width of blast furnaces, it may be finally remarked, that the average height in Britain may be taken at forty feet from the upper surface of the hearth bottom, eleven feet diameter at the greatest width or boshings, and three feet and a half for the diameter of the tunnel-head, or furnace-mouth.

If the proportions of height and diameter in the dimensions of the blast-furnace have given rise to a multiplicity of opinions, the internal structure and shape of the cavity have been no less an ample field for speculation and prejudice. At one time this was conceived so essential to the success of iron-making, that any particular furnace that had made a fortunate run of quantity and quality, was copied with the greatest accuracy of design. The fortunate iron-master ingeniously attributed to the mechanism of his own construction the rich and superior harvest he had reaped in metal, and saw, or fancied he saw, in the curvature of a line, or in the inclination of a slope, the talisman of his good fortune. By prolonging the one, or depressing the other, he immediately inferred that still superior effects would be produced, and that by obtaining the perfection of art in the mere fabrication of structure, every thing that was great and powerful would ensue. This rage continued for many years, and gave rise to an endless variety of shapes, many of which, in their eventual success, had only the merit of originality to boast.

In the establishment of this important and national manufacture, the great fluctuation of opinion as to structure seems to have been the prelude to a subsidence into approved forms, founded upon general principles; and though we may now smile at the indispensable forms which our predecessors, or even contemporaries, annexed to the blast-furnace, yet these alterations of shape and structure lay the strongest claim to our respect and gratitude. The path is now opened, and the ground already beat; from the labours of those who have already gone before us, result the happiest effects; we proceed towards our object, free from the interruption which inexperience always entails; and we may now, by the direct application of principle, proceed with facility what may still be deemed desiderata in this important branch.

The varieties of shape which custom and experiment, from time to time, had annexed to the blast-furnace, may be classed under four distinct kinds. *Plate VII. and VIII.* The following description, characterizing the resulting properties and dimensions in the form of each class, will be necessary for comprehending the subject thoroughly.

Plate VII. fig. 1. is the vertical section of the blast-furnace cut across the top of the boshes; the internal shape entirely conical; the external figure a quadrangular pyramid. The construction of this furnace is truly singular; and from this alone great advantages were expected to result. The originality of the principle consists in the double square, or throat. One immediately above the hearth, not represented in this figure, but similar to the square in *Plate IX. fig. 1. B.* and another half way up the cone, four feet in diameter; see *A.*

B L A S T.

B, the top of the boshes, 12 feet in diameter.

C, an inferior diameter of 10 feet, previous to the formation of the throat at A.

D, the top of the second row of boshes, of the same diameter as B.

E, the furnace mouth, or termination of the second cone, four feet diameter, and proportioned to A.

F, funnel top for carrying off the flame occasioned by the blast, so as not to interfere with the workmen in filling the furnace.

The dimensions, as to height, are as follow :

From B to C	height	-	-	-	-	12 feet	
C to A	ditto	-	-	-	-	6	
A to D	ditto	-	-	-	-	6	
D to E	ditto	-	-	-	-	13	
Height of the hearth, and first row of boshings,							
not shewn in the figure, but being the same							
as <i>fig. 1. Plate IX.</i> measure							15
Height of the bottom stones, packing, and							
false bottoms,							4
						56 feet	

Total height of this furnace from the foundation

GG, fire brick lining.

hh, space left for packing.

II, the common building either of sand-stone, or of bricks.

Fig. 2. plan and section of the same furnace taken across the boshes at B.

AAAA, square of the common building 29 feet upon the side, bound byBBBBBBBB, eight cast-iron binders; the number or sets of these requisite, being proportioned, both in strength and dimensions, to the height of the furnace. In common, a full binder is applied every six feet in the height.

The concentric circles represent the various diameters of the interior of the furnace, and are connected each by dotted lines, with their respective places in the elevation.

The reasoning which we believe led to the construction of this furnace, proceeded from a firm belief that the boshes and throat or square of a blast-furnace were of the greatest importance on two accounts. First, because they supported the weight of the materials; and secondly, because they concentrated the heat. These acting conjointly, permitted the least possible quantity of materials to pass, till they dropt away in a state of semi-fusion, or complete separation. In furnaces, however, the cones of which were 30 feet high and upwards, this was conceived impossible to take place for any length of time, to any considerable extent. The height and gravitating pressure of the materials were more than sufficient to counteract the most favourable construction of boshes; and as this could not admit of diminution, the suspension of the materials, and the concentration of the heat must be effected by some other means. This, at one time, was believed to have been completely effected by the scheme of an additional square, and an extra set of boshes; and there is little doubt but that, by converting perpendicular to lateral pressure, the suspension of the materials was reduced at least to one half of its former intensity.

It was not doubted but that the procefs of smelting and separation would commence, in part, at A; that what escaped fusion and separation in that quarter, would be easily resolved below; and that the procefs of combustion intensely at work in two different places at once, would greatly facilitate the general reduction, and add greatly to the produce in iron of the furnace. These sanguine expectations were unfortunately never realized, the solitary instance of one furnace only being constructed in defence of this theory, and

that only for a very temporary endurance, is the best proof of the inutility of the plan.

Fig. 3. is the elevated section of a blast-furnace, of which several were built, and from which it was at one time conceived that the greatest advantages were derived. The numerous minute gradations of diameter exhibited in the construction of this furnace, were at one time held in high estimation by many iron-makers; and a plan of the present furnace circulated from the domains of the lucky projector, with as much care and consciousness of rich acquisition, as an antiquary would remove from Heracleum or Egypt, the precious remains of antiquated obscurity.

It will be extremely easy to trace to its source this particular bias to form, so universally believed in at one time, but now consigned to that oblivion which experience has taught us it deserved at a much earlier period.

It often happens, that when repairing or re-lining a blast-furnace, the manufacturer avails himself of the time thus obtained, to overhaul and repair his engine and blowing machine. The former movements of the machinery may have discovered to him many errors both in movement and construction, which the constant requisite motion rendered impracticable for him sooner to remove. In this way, considerable improvements on the engine and blowing apparatus are frequently made; and when again in motion, may, by increasing the length and number of the strokes in a given time, or by conferring a higher additional working power on the steam piston, increase at the same time both the volume and density of the blast. If the produce of the furnace is increased, which it is highly probable will be the case, then the superior effects are attributed to a few unimportant circles and lines added to the interior of the cone, the acuteness and proportion of which do not survive the blowing of the furnace three days.

In like manner, if a work entirely new, commence operations with a greater advantage of blowing power, and with something original in the shape of the furnace, the consequent effects of the former are industriously attributed to the fortunate construction of the latter, and the grand essential blast is entirely overlooked, and its next important associates coal and iron-stone.

The dimensions of the present furnace are as follow :

Diameter of the cone at A	-	-	-	3 feet
ditto at B	-	-	-	4
ditto at C	-	-	-	8½
ditto at D	-	-	-	9½
ditto at E	-	-	-	10
ditto at F	-	-	-	11
ditto at G	-	-	-	10
From G to F, the distance in height measures				
				1 foot
Increase of diameter				1 foot
F to E, the distance is	-	-	-	12
Diminution of diameter				1 foot
E to D, the distance is	-	-	-	1½
Diminution of diameter				6 inches
D to C, the distance is	-	-	-	6
Diminution of diameter				1 foot
C to B, the distance is	-	-	-	2
Diminution of diameter				4½
B to A, the distance is	-	-	-	4½
Diminution of diameter				1
Height of the hearth and boshes not represented in the plate				
				13
Total height of the cavity of the furnace				
or place occupied by the materials				40 feet
The former descriptions will suffice and apply to this plate,				

B L A S T.

plate, with equal propriety as to the former, regarding the lining, packing, common building, &c.

Fig. 4. is a plan and section of the same furnace at F in the elevation.

The inner circles represent the various diameters of the interior of the cone, the letters in each corresponding. The two external circles describe the packing and lining; and the circle N exhibits the circumference of the common building of the furnace, which, at this particular section, is 26 feet in diameter.

Plate VIII. fig. 1. is the elevation of the interior of a furnace of a plain construction, and at one time very prevalent at founderies. This fashion was deemed to possess its peculiar merits, and still maintains its form unaltered at some iron-works where the regular tapering cone is not yet admitted. Its inferiority, as to height, is amply made up by an enlarged capacity arising from its diameter.

Diameter at the mouth of the cone	A	-	3 feet
ditto - at	B	-	11
ditto at the boshes	C	-	12
Height from C to B	-	-	12 feet
from B to A	-	-	14
Height of the boshings and hearth not represented in the figure	-	-	11
Total height of that part of the furnace occupied by the materials	-	-	37 feet

FF, represents a view of the vertical method of carrying off the moisture and steam from the mass of building, by means of vents. The number of upright flues vary from four to eight, and have regular communications by means of horizontal openings with the external air, GG. They are generally carried up parallel to the lining, and incline with the general diminution of the cone. The former, or vertical openings, are six inches square, and the horizontal communications four inches square.

Fig. 2. is a plan and section of fig. 1. in which are represented the lining, the vacancy for packing, and eight vents or openings corresponding to those in the elevation. The letters in each figure correspond, and the two dotted circles are meant to shew, that occasionally all the vents communicate with each other by means of a horizontal gutter or channel, carried quite round the building. This precaution is used lest any of the tubes were to fill up and choke the free circulation of the vapour, that its appropriate quantity may get easily discharged amongst the other openings.

Fig. 3. is an elevated section of a furnace, the interior shape of which has now almost become universal. The regular and uniform descent of the materials which follows, as a consequence of the gradual enlargement of the cone, fully justifies the general partiality in favour of this shape.

Diameter at the mouth, or opening	A	-	3 feet
Diameter at the top of the boshes	B	-	10
The height from B to A	-	-	31½
Height of the hearth and boshes not seen in the plate	-	-	11½
Total height of this furnace	-	-	43 feet.

This form of furnace is not only constructed with a double lining of fire bricks CCCC, and two openings for introducing sand for packing *bbbb*, but has also an opening DD, from top to bottom, about the centre of the common building. From this, in all directions, proceed small vents, which communicate at a short distance with the open air, as may be seen along the sides of the building.

Fig. 4. is a plan and section of fig. 3. cut across at B.

B, diameter over at the boshes 10 feet.

CCCC, the two circles of fire brick-lining, as seen in the elevation.

bbbb, spaces for receiving packing.

DD, circular vent, or general gutter, from which ramify the horizontal openings.

These are repeated at intervals of four feet in the height, as may be seen in the elevation. In building, DD is filled with fragments of soft sand-stone, which are easily reduced in the expansion of the furnace, and tend, by diverting its real pressure, to preserve the body of the building entire.

A similar want of unanimity of opinion subsists among iron-makers, relative to the general construction of the boshes, their particular height, and most beneficial range. Some contend for flat, others for boshes more vertical, while others again conceive the exertions of those equally successful, who adopt the mean of the two extremes. At different places, and to every possible range, have been attributed the most important consequences in the subsequent process.

Plate IX. fig. 1. represents boshes of the steepest construction.

Diameter at A	-	-	10 feet
Perpendicular height from B to A	-	-	8
Square at	B	-	2½

The opinion relative to this form is, that at first blowing, the boshes are productive of a very proper degree of suspension of the materials; but as the pressure of the descent bears in every direction upon the under or bottom part next the square at B, it becomes increased so much, that the weight of the incumbent materials early begin to press too much towards the bottom of the hearth, counteract the regular precipitation which should take place, and impede the ascent and full effect of the blast.

Fig. 4. is a section of boshes approaching to, or indeed may be considered as the opposite extreme. Here the reverse of the fact attributable to No 1. takes place. The pressure of the descending material is equally distributed over the very flat inclination of the boshes, and there is no more weight deemed to be on the square at A than is equal to a full column of the materials of similar dimensions, left by the direct tendency which the strength of the blast to keep them in a state of partial buoyancy. To counteract these advantages in part, very serious defects are here also imputed. If circumstances unite to increase the tear and wear at A in any uncommon ratio, either by *scouring*, or from a deficiency in the quality of the stone or bricks, the whole of the upper part of the hearth at BB is immediately exposed, and, though composed of a superior quality of sand, will soon follow the direction of the descending current. A pressure of materials then takes place, equal to the whole of the increased space, while the effect of the blast to bear them up is considerably diminished by the enlargement of the original diameter. It will be seen from the plate that the weakness of flat boshes at the top is ill calculated to withstand any accumulating pressure, and that by confining their part of the process to the hearth, the latter must soon, by a similar widening, be entirely destroyed.

Those who wish to steer clear of extremes, or profit by the more adventurous spirit of their neighbours, more generally adopt a mode of boshing that occupies the mean of the two former extremes. This is represented by fig. 3.

Diameter of the boshes at A	-	-	10 feet
Perpendicular height from B to A	-	-	5
Diameter of the square B	-	-	2½

In general, the boshes of blast furnaces are made of the same sand stone with the hearths, but of late fire bricks have been introduced with a considerable indication of advantage and

and permanency. When bricks are used, it is found of utility to make the whole part of the building solid, back as far as the external square of the hearth, so that if the boshes fail in part as to displace one layer of bricks, another surface, equally fresh and entire as the former, presents itself to the action of the fire.

Fig. 2. Ground plan of the top of the boshings of *fig. 1.* A A and B correspond to the same letters in the elevation. The dotted square C describes the form and dimensions of that part of the hearth immediately above the tuyere, as seen in the elevation CC. The large dotted square DD is the external size of the hearth, as seen also in the elevation DD.

Fig. 5. Ground plan of the square and boshings of *fig. 4.*

While we prosecute the detail and history of the construction of the blast furnace, the same diversity of plans formerly noticed comes under review, in every department of the erection. The importance of the hearth is admitted by every class of reasoners upon this subject; and to devise a form better calculated for smelting than another, has been an object of general concern with the manufacturer. Much as may be deemed to depend upon its form and construction, infinitely more benefit is derived from a proper quality of stone, to resist for a given length of time the powerful effects of a continued and unremitting blast. To both of these important desiderata much of the manufacturer's attention has been from time to time directed.

The first singularity that strikes us forcibly in the figure of the hearth, is, that in place of being circular, like the upper parts of the furnace, it is constructed of a square funnel-form, with angles as acute as represented in *Plate IX.*

fig. 1. This narrowing form is continued on three sides of the square to the bottom of the hearth, where it generally measures from 22 inches to 24 inches. The top of the hearth, at B or A, *fig. 1.* and 4. or as it is commonly called the square, is never less than 30 inches, nor more than 33. The height of the hearth from E to B, *Plate IX. fig. 1,* 7 feet, and none are made higher. From C to B, *fig. 3,* 6½ feet, which is now reckoned the most advantageous height; and from C to A, *fig. 4,* the hearth measures 6 feet, under which height there are no hearths ever attempted.

The structure of a hearth, properly speaking, consists of three solid sides only, the fourth, or front, is filled up by the tym, or key-stone. *Plate IX. fig. 1.* The block E. is generally in one piece, and from four to five feet long, according to the height of the hearth. It descends towards the bottom till within two feet or two feet four inches, and then leaves an opening of similar dimensions, as to height, into the centre of the hearth or funnel, as at letter F.

As the square form in which the hearth is finished cannot last a day after the blast is introduced, and is even frequently destroyed in the act of annealing, or heating, it cannot be essentially necessary to the making of iron. The hearths of all furnaces when blown out, are entirely round, or if wasted more upon the tuyere sides, oval. The general usage of the square must have been derived from long acquired habit, or perhaps from the conveniency of working and finishing those immense blocks of stone which are still deemed necessary to the perfection of a hearth. The interior of charcoal of wood furnaces was at one time entirely square from top to bottom, so that in the progress of the trade, from smelting with wood to the use of pit-coal, although the general shape of the furnace has been altered, the square figure of the hearth has been retained.

Whatever may have been the utility of this general pre-

dilection in favour of established forms, the advantages hitherto supposed to be derived from this source are now by many doubted, and all those nice speculations relative to the precise dimensions and figure of boshes and squares, threatened with total annihilation. This innovation is not confined to figure alone, but extends to dimensions, and to the nature and bulk of the material necessary for the construction of hearths.

Fig. 1. Plate X. is the section of a hearth and boshings, constructed upon an enlarged principle as to size.

Diameter of the boshes at A	-	-	10 feet
Diameter of the hearth at B	-	-	4
Diameter of the hearth at C	-	-	3

These enlarged dimensions, in place of being square as formerly constructed, are now entirely round, excepting where the tym stone forms the key to the front of the hearth, as may be seen in *Plate X. fig. 2.* where the external circle A A represents the diameter of the boshes, B, the termination of them, or the top of the hearth, and the form at C, a plan of the inside figure of the hearth across the bottom of the hearth at C, *fig. 1.* same plate.

The difficulty of always obtaining a sand-stone well calculated to stand the violent effects of the blast, the frequent great expence incurred, the immense loss of time sustained in cutting out old and putting in new hearths, and afterwards annealing them, has induced more masters to speculate upon the use of bricks of shapes larger than the common forms, made from good fire clay. No permanent advantage has hitherto been derived from this scheme, although it is abundantly obvious, that a successful experiment of this kind would lessen the expence of a hearth greatly, and save at least half the time now required to replace an old one.

Neither have any uncommon advantages resulted from the hearths laid down in *Plate IX. fig. 6.* and in *Plate X. fig. 1, 2,* and 3. While some approve, more are ready to condemn a measure, which has for its object the enlargement of a space before blowing, which too speedily becomes so afterwards. There cannot, however, be any objection to the circular, in place of the square form, unless a little additional workmanship is sustained as such. The matter rests with experience, accompanied by accurate observation, to prove the sanguine hopes of the projectors, or falsify the prophetic forebodings of those who now condemn the measure. The amount of our progress hitherto, in the making of pig-iron, is ascertained with certainty; to assign limits to its ultimate bounds would be presumption. Of one fact, however, we may rest assured, that the perfection of the steam engine, and the consequent command of blast, has alone done more for the manufacture of this article, than all those nice shades of distinction as to furnace taken collectively, which relieve each other in a successive train of minute gradation from one extreme to the other; to all, or to most of which, the most wonderful effects have been from time to time ascribed.

One subject of considerable importance still remains to be discussed, relative to the construction of the blast furnace; namely, the absolute and relative heights of the tuyeres, the dam-stone, and tym.

On the subject of tuyeres, the general opinion is, that the nearer the cinder the blast is introduced, the greater is the effect as to the absolute quantity of reduction. But this may be productive of consequences more than sufficient to counterbalance the doubtful advantage of accelerated reduction, either by blowing the cinder from off the surface of the iron, and de-carbonating it, or by the cinder rushing back through the blow-pipe at any stop of the blowing machine, and destroying the leather bag which connects the blow-pipe with the main laying pipes. This never happens

happens but a considerable portion of time is sacrificed, besides the expence of the bag.

In common, the surface of the tuyere plate is laid eight inches above the cinder, or, which is the same thing, above the level of the dam-stone. Some blow at a distance of four inches, others at six and eight, and some again as high as twelve and fourteen inches. However, under some circumstances, the height of the tuyere is determined by the nature of the materials. In these cases, if the tuyere is only raised one inch above its proper height, the bottom of the furnace lumps up immediately, and will invariably rise in the same progressive manner in which the tuyere is heightened.

Plate X. fig. 1. represents the relative proportions of height betwixt the dam, tuyere, and tym, in ordinary cases.

G, the dam, or notch of the dam plate, 17 inches above the level of the bottom at H.

I, the centre of the tuyere $26\frac{1}{2}$ inches from the surface of the bottom, and $9\frac{1}{2}$ inches above the level of the dam.

K, the bottom of the tym plate, 23 inches from the bottom of the furnace, and 6 inches above the level of the dam.

At iron-works where different opinions exist as to the proper or working height of the dam, very different relative heights ensue, regarding the tym and tuyere. The former should always regulate the other two. The height of it is seldom used less than 16 inches, nor more than 28 above the bottom.

Considerable advantages result from placing the tuyere, as to its horizontal position, at a judicious distance from the front or back wall. This is, as in the case of height often regulated by the nature of the materials. If the furnace, owing to this circumstance, tends to work cold and languid behind, with a propensity to lump at the back wall, the blow-pipe ought to be directed as near to the extremity of the hearth backwards as it is possible to get in the tuyere iron; *Fig. 4. Plate X. letter a*; but where the operations of the furnaces proceed with ease and facility, the centre of the tuyere should more generally approach the centre of the hearth, as at *b*.

Of late years a new mode of blowing has been introduced, which, from its great prevalency and good effects, seems to bid fair to come into general use. Furnaces till lately were only erected with one arch, or tuyere side, and the blast or column of air introduced by means of one blow-pipe; now most of the new furnaces are built with double tuyeres, with two sets of main conducting pipes, and the blast introduced by means of two pipes in place of one.

The general effects and supposed properties of this mode of blowing are attended to under the article blast.

In the mean time, the proper height and distance of the tuyeres, and their relative position to each other, have been subject to endless disputation. *Fig. 4. Plate X. a and b* shew how, in common cases, the tuyeres are placed to each other in their horizontal range: *a* is placed with its centre three inches from the extremity or back wall of the furnace, and *b* at the distance of nine inches from its centre. That there should be a difference of distance in their horizontal position none are inclined to dispute; but that this should take place in their vertical situation, is by some contended; while others insist that the difference ought never to be less than four inches. *Fig. 6. Plate IX. ee.*

Some less fastidious assert, and with many evidences of sound reasoning on their side, that if the blast is introduced into the furnace, and at a proper distance, to keep the back wall clear, those nice distinctions as to inches go for nothing,

in a region where an instantaneous increase of volume must destroy all repulsion or mechanical contact. This philosophical reason is flatly denied, and the contrary minutely and gravely asserted, that were two pipes placed every way immediately opposite to each other, the action of the opposite columns would retard the velocity of the air, and diminish the real elevated quantity in the furnace, by locking up in mutual opposition a portion of their respective quantities in the laying pipes. There might be some foundation for this conjecture, were the respective nozles or blow-pipes brought into actual contact, or inserted into each other; but to those who consider, that in most furnaces there is never less than four feet of distance between nozle and nozle, and the most of the intervening space filled with a column of semifused materials, ignited to the highest pitch of whiteness, this supposition will appear to rest upon very unsatisfactory grounds.

A less scrupulous class of observers and reasoners upon this subject even go the length to assert, that the tuyeres ought to be put in direct opposition, and that this, so far from being detrimental, would be found to possess unqualified advantages. This it is said would result from a certain degree of coolness which the extremity of each column of air confers upon its opposite tuyere iron, and prevent the same from heating and burning. To whatever cause it is attributable, the fact stands in many instances unquestioned, that not half the tuyeres are lost or burnt out, with the double blast, that was formerly destroyed, where the single blast was in use.

Fig. 7. Plate X. represents a tuyere iron, 16 inches wide, and 12 inches high at the wide end, 18 inches long and narrowing at the other end to 4 inches wide, and $4\frac{1}{2}$ inches in height. *Fig. 6.* is a plan of the under surface of the tuyere iron. *Fig. 5.* represents the size and dimensions of the tuyere plate, which when bedded receives upon its surface the tuyere iron, *fig. 7.* This plate is first laid upon a bed of fire clay, with its narrow end towards the hearth, and inclined to rise a little. The tuyere is then introduced upon its surface, height and distance being attended to in the disposition of the plate, and the space betwixt its surface, and the sand-stone of the furnace, rammed very perfectly with balls of good fire-clay mixed with small fragments of fire bricks. When about to blow, the nose or inner end of the tuyere is covered with a very plastic clay, to prevent it from heating and burning away. This is always carefully attended to, and the blast put off at any time to replace it. Should it be neglected at any time, the iron would inflame with such rapidity, that an opening would be instantly made, by which the cokes and ignited matter of the furnace would be recoiled with the greatest violence imaginable.

Fig. 2. Plate XIII. The dam-stone. This is actually the dam, or barrier, which prevents the fluid contents of the furnace from advancing, and making their escape into the sand of the casting hole. It is generally made from the same stone as the hearth, but is found still more difficult to stand for any length of time the action of the fluid iron, than the hearth to resist the ravages of the blast.

Fig. 3. dam plate. This is laid against the dam stone with a bed of fire clay interposing, and closes the front of the furnace. Its form is double, so that by turning it serves the purpose twice. It often fails, owing to the constant current of lava passing over the curvature *a*, and deepening it, till the iron flows over along with the cinder.

Fig. 4. the tym plate. This embraces the under end of the tym stone, and the sides of the hearth for three feet up. The thickness at bottom, called the heel, or cod, is preserved from the action of the fire by a strong stopping of clay.

This is replaced at least every cast, and prevents the flame and heated materials of the furnace from being blown forward.

Plate IX. *fig. 4.* is a ground plan of the arch pillars, hearth, tuyeres, and vents of a blast furnace.

A, the hearth, or particular spot where the fluid metal is collected.

B, the dam-stone.

c, the fall, or opening, by which the metal is discharged. After the cast it is filled with sand, which soon hardens and presents a very close texture to the fluid metal within. At the following cast it is cut carefully down, till the bar penetrates to the quick. A circular incision is then made, and the metal flows out of the orifice in a connected round stream, into the runner or channel made in the sand.

d d d d, four vents or openings which communicate with the false bottoms. *Plate I. fig. 2.* These serve to convey the damp from the furnace bottom, and by being run out into the external air, two in the front of the hearth, and one at each tuyere, indicate by their temperature, and the quantity of steam or vapour which they emit, the real state of the bottom below.

D D, the two pillars which support the front arch; they, at the same time, serve as abutments to one leg of each of the tuyere arches. The arch at the front is 15 feet wide and 15 feet high, and inclines to the centre of the furnace, in the same manner as the side walls of the pillars approach.

E, main or back pillar built entirely solid.

FF, vent holes six inches square, carried up from the foundation, and brought forward to meet the open air every four or five feet.

G G G G G, tops of the pillars covered with cast iron plates, for receiving three large cast iron lintels, 10 feet long, and 10 inches square. These serve to give solidity to the arch, and support the lining and boshes of the furnace. *Fig. 8, 9,* different forms of tuyere pipes.

BLAST-Furnace.—*History of its Origin and Progress.*

In detailing the progressive history of the blast furnaces, it is necessary to premise, that in this country it has undergone a revolution, of which we meet with no similar instance in other countries.

The most natural and abundant fuel which presents itself to mankind in their progress toward civilization, is that furnished by the numerous and extensive forests, which generally occupy the surface of a wide and uncultivated country. These, in the history of all nations, have been early appointed to domestic uses, and to the comfort of individuals. As a country became more populous, and the spirit of civilization increased, other advantages resulted from the general use of wood as fuel. The amelioration of climate, and the clearing of large tracts of land, making it subservient to the purposes of agriculture, were not the smallest benefits thus derived. As the progress of knowledge began to devise and establish regular manufactories, to supply the wants of the thriving community, the same sources of combustion were opened to the manufacturer and the artizan. These, as they became successful, were only preludes to other establishments more extensive, more lucrative, and entailing wants more difficult to supply. Among others the smelting of metals was no doubt of early origin, and equally dependent upon the woodland counties, in the immediate neighbourhood of the ores. In this class we can trace no metallurgical operation so hostile to the existence of wood, as an extensive manufacture of iron. If this manufacture, owing to the great and unexampled prosperity of the country, in place of remaining stationary, or exhibiting symptoms

of decline, arising from a want of consumption of the article, has increased in capital, in extent, and riches beyond all precedent, wood, the base of the manipulation itself, depending only upon a stock rapidly declining, the existence of which was frequently incompatible with the views and interest of the landed proprietor, must soon have been annihilated, and the art of making iron lost to the community.

In this singular situation was Great Britain placed from the reign of Charles II. to the middle of the last century. The increasing manufactures, commerce and general prosperity of the country called loud for an additional supply of articles fabricated from iron, while wood, the foundation of the whole art, was rapidly declining in point of quantity, without the most distant prospect of ever being again renewed. Pit coal had been long before the latter period suggested as a substitute, but prejudice, interred views of established capitalists, and above all, a want of command of mechanical power, had prevented any successful operation from being established in this new department of iron making. No sooner, however, were these barriers to improvement broken through, and a change of fuel in the blast furnace found to be attended with profitable effects, than the languishing state of the trade began to revive, and improvements succeeded each other, with a facility new and astonishing. In fifty years the revolution was complete whether the consideration regards the increase of the manufacture, the general use of pit coal in the blast furnace, or the almost total annihilation of the charcoal mode of making iron.

It is uncertain at what period the manufacture of iron commenced in Britain. It is probable, that the working of the tin mines of Cornwall, by the Phenicians, would introduce into the country a class of men skilled in all the then known metallic ores, capable of appreciating their true value, by converting the riches of an unexplored country, either to their own immediate necessities, or to the conveniences of the unskilful inhabitants. The invasion of England by the Danes, and their consequent establishment, would most likely add to the former stock of knowledge, in the art of mining and fusing iron ores. Whatever truth there may be in this conjecture, the fact stands unquestioned, that in several counties in England large heaps of scoria are found with an accumulation of soil sufficient to bear large trees. These have been from time immemorial called "Dane's cinders." So early as 1620, Dudley remarks, that large oaks were then found in a state of decay upon the tops of some of these hills of scoria. It is not, however, probable, that these cinders were the product of the blast furnace. At a period so remote as that, wherein these heaps of scoria must have been accumulated, the labours of the iron maker were chiefly directed to the fabrication of small portions of malleable iron in *foot blasts* and *bloomeries*. The art of moulding and casting in iron was either totally unknown, or so very rude, as to excite no interest in favour of prosecuting this fine branch of art. If pig or cast iron was at all formed, it was merely of the most infusible nature, for being speedily converted into malleable iron. It was not till long afterwards, when improvements had taken place in the rude machinery of the times, and a division of labour seemed to be productive of many advantages, that different furnaces existed: one for the making of pig iron, and another for the conversion of it into malleable iron. This first gave rise to the blast furnace, which, properly speaking, was an improvement resulting from the knowledge of the advantages derived from a division of labour. After the appropriation of the blast furnace to the exclusive manufacture of pig iron, the manufacturer would soon discover, that the products of

his furnace were frequently different from each other. Experience and observation would soon enable him to decide, from whence this had its origin. A small additional quantity of fuel, beyond that he formerly used for forge-pig-iron, he found, would confer a degree of fusibility upon the metal that immediately pointed out the practicability of casting it into shape. Moulding from thence would most likely ensue, and become equally an appendage to the blast furnace as was the bar-iron forge. As this new manufacture became familiar to the proprietor, he would immediately find his interest in dividing the product of his blast furnace into grey melting iron or into forge pigs, as the exigencies of his moulding shop, or forge required.

If credit could be given to the "Metallum Martis" of Dudley, in the 12th year of James, anno 1615, there were at that period not less than 300 blast furnaces for smelting iron-ore with charcoal, each of which had fuel, upon an average, for 40 weeks per annum. The average produce in pig-iron at each furnace of 15 tons per week, or 600 tons per annum, make, the total yearly quantity 180,000 tons, being a greater quantity than has ever since been manufactured in Britain.

However much this quantity may be exaggerated, yet it is highly probable, that even at this early period, the iron business in general, and the particular operations of the blast furnace, had obtained an eminent rank in the manufactures of the country. The progress of agriculture, and the increase of population under the reign of the peaceable James, had taught the husbandman and the proprietor the value of cultivated fields. The great consumption of wood for the navy and iron-works had greatly exhausted the principal forests of supply; tracts of country became cleared, and as the spirit of cultivation increased, the annual quantity of fuel for the manufacturing of iron diminished.

It is probable that Mr. Dudley, in estimating the quantities produced from each furnace, formed his average from the winter and spring months, when water was plentiful, and he seems not to have made sufficient allowance for the occasional stoppages in summer, during the time of cutting and collecting the wood for the ensuing wet season. If, therefore, in place of making 600 tons yearly, the furnaces of these days are supposed to have made each, upon an average, five tons per week, or making a little allowance, 250 tons yearly, which is surely nearer the truth, this still leaves an annual amount of manufactured pig-iron equal to 75,000 tons, which, exclusive of the operations of the forge, forms a very respectable staple at that early period of the history of our manufactures.

Pit coal had been long known before this period, and wrought at Newcastle prior to the year 1272. Annually vast quantities of it were exported to Holland and the Low Countries, for the use of the smithy, and other manufactures requiring an intense and continued heat. Yet in England prejudices ran so strong against its application to the manufacture of cast-iron, that the projectors of this original undertaking met with every obstacle which the narrow unenlightened minds of the established manufacturers could devise.

James granted several patents for the exclusive right of manufacturing iron with pit-coal. None of the projectors, however, were successful, till the year 1619, when Dudley succeeded in making coke pig-iron in a blast furnace, though only at the sparing rate of *three tons per week*. At this period many of the iron works were at a stand for want of wood, and the consequence was an advance upon the price of iron: this rendered it a lucrative business to those manufacturers whose supply of wood was still undiminished, and of course made them hostile to any innovation, whereby the present price of iron was likely to meet with a reduction.

This period of prejudice, so unfavourable to innovation in the iron business, was followed by one more general and more calamitous for the nation: amidst the distraction occasioned by civil war, neither innovation nor improvement could be expected. Patents, however, were granted to some during the common-wealth, for the exclusive manufacture in the new way, in one of which, it was at the time believed, that Cromwell was a partner: these partly shared the same fate with the first inventor, and none succeeded in establishing a manufactory either of extent or certainty. In 1663, we find Dudley applying for his last patent, and setting forth, that at one time he was capable of producing seven tons of coke pig-iron weekly, with an improved furnace 27 feet square, and bellows, which one man could work for an hour without being much tired.

It was not, till impelled by necessity, arising from the rapid decline of the annual growth of timber, that pit-coal became an object of universal estimation. When improvements on machinery had attained a pitch of certainty, and experience had taught the mechanic the manifold advantages of the steam engine; the adventurous manufacturer found he possessed an extent of means to which he was formerly a stranger. Small furnaces, supplied with air from leathern bellows, blown by oxen, horse, or human labour, became exploded, and an increase of size took place, together with an increase of the column of blast necessary to excite combustion.

At this eventful era in the history of the blast furnace, when the ameliorating hand of agriculture was progressively sweeping before it, what remained of the once immense tracts of woodland dedicated to the supply of the blast furnace; when the general improvement in machinery, and the introduction of the steam engine threatened to give new life and impulse to manufactures in general, the iron business seemed dwindling into insignificance and contempt. The demand of the country increased for the manufactured article, particularly bar-iron, while every year saw a gradual but steady diminution of the annual quantity. Recourse to foreign markets was had for a supply of that article, of which this country once was the greatest exporter, and the immense annual importations from Russia and Sweden may date their origin from that period. The flourishing and extensive detail of Dudley no longer existed, and the 300 blast furnaces of his day were now diminished to 59 in all; the total amount of whose annual produce was 17,350 tons, or nearly 300 tons to each furnace.

LIST of the Blast Furnaces in England and Wales immediately before the introduction of pit-coal, as a substitute for the charcoal of wood; the particular counties in which they were situated; the collective quantity of iron manufactured in each county, and the produce of each particular blast furnace.

Counties.	Furnaces in each county.	Names of the Furnaces.	Total num. of furnaces.	Iron made at each furnace.	Iron made in each county.
Brecon	1	Ynyskedwyn	1	200	600
	1	Lanthy	1	400	
	2	furnaces.			
Glamorgan	1	Neath	1	200	400
	1	Bersilly	1	200	
	2	furnaces.			
Carried forward			4		1000
			4 C		Counties.

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Counties.	Furnaces in each county.	Names of the Furnaces.	Total num. of furnaces.	Iron made at each furnace.	Iron made in each county.
		Brought forward	4	1000	
Carmarthen	1	Kidwelly	-	-	100
Cheshire	1	Valercyde	-	1	600
	1	Lawtone	-	1	600
	1	Dodington	-	1	500
	3	furnaces.			1700
Denbigh	1	Waddoch	-	1	300
	1	Ruabone	-	1	250
	2	furnaces.			550
Derby	1	Staveley	-	1	150
	1	Foxbrooke	-	1	150
	1	Wingworth	-	1	200
	1	Wanely	-	1	300
	4	furnaces.			800
Gloucester	1	Blabney	-	1	600
	1	Elmbridge	-	1	500
	1	Flaxley	-	1	700
	1	Redbrooke	-	1	600
	1	Ditto	-	1	200
	1	Sidney	-	1	250
	6	furnaces.			2850
Hereford	1	St. Waynarde	-	1	300
	1	Bingwood	-	1	450
	1	Bifhopwood	-	1	600
	3	furnaces.			1350
Hampshire	1	New Forest Firne	-	1	200
Kent	1	Lamard	-	1	100
	1	Barcline	-	1	100
	1	Horfden	-	1	100
	1	Handberft	-	1	100
	4	furnaces.			400
Monmouth	1	Pontypool	-	1	400
	1	Ditto	-	1	500
	2	furnaces.			900
Nottingham	1	Kirkby	-	1	200
Salop	1	Salop	-	1	400
	1	Bowlden	-	1	400
	1	Willy	-	1	450
	1	Ditto	-	1	200
	1	Leighton	-	1	400
	1	Kimbrotten	-	1	250
	6	furnaces.			2100
Carried forward			37		12150

Counties.	Furnaces in each county.	Names of the Furnaces.	Total num. of furnaces.	Iron made at each furnace.	Iron made in each county.
		Brought forward	37	1000	12150
Stafford	1	Bradley	-	1	400
	1	Winlicath	-	1	600
	2	furnaces.			1000
Worcester	1	Bewdly	-	1	200
	1	Hated	-	1	500
	2	furnaces.			700
Suffex	1	Afshburnam	-	1	500
	1	Bublely	-	1	100
	1	Bread	-	1	100
	1	Robert's bridge	-	1	100
	1	Bery	-	1	100
	1	Darwille	-	1	100
	1	Heathfields	-	1	100
	1	Crunfuple	-	1	100
	1	Lord Pelham	-	1	100
	1	Ditto	-	1	100
	10	furnaces.			1400
Warwick	1	Alton	-	1	400
	1	Pooliband	-	1	300
	2	furnaces.			700
York	1	Band, upper,	-	1	200
	1	Band, lower,	-	1	200
	1	Barnby,	-	1	300
	1	Rofsley, upper,	-	1	200
	1	Ditto, lower,	-	1	200
	1	Chappel	-	1	300
	6	furnaces.			1400
			Furnaces	59	17350

Tons. cwt. qr.
Annual average for each furnace 294 1 1

By this statement it is evident, that the manufacture of pig-iron had diminished during one hundred to one hundred and thirty years preceding, upwards of 50,000 tons annually. Fortunately for the existence of the trade, the application of good going, and what, at that time, would be reckoned powerful, steam engines, about the year 1750, for raising and compressing air, were introduced at some places where abundance of materials was found without water for turning machinery. The manufacturer now found that his produce could be increased by enlarging the diameter of his steam cylinder, or perfecting the vacuum under the piston; and it was soon discovered, that these increased effects alone were requisite to the formation of pig-iron, in profitable quantity from the coke of pit-coal; nor is it to be wondered that this secret remained so long a mystery. The small quantity of air that was formerly requisite to ignite a charcoal furnace, whether from the great inflammability of the fuel, or the smallness of its capacity, was constantly before the eyes of the manufacturer. He had more often felt the effects of over-blowing, than under-blowing his furnace; and it is highly probable, that pit-coal, being deemed every way inferior,

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inferior, an unusual timidity would precede any movement that might have for its object the enlargement of the column of air or the increase of its density.

This, however, once done away, there seemed no end to the quantity of air that a coke blast furnace could with propriety receive before any bad consequences ensued. Density, however, was found inimical to quantity, and the same law was at last discovered to hold good regarding pit-coal as with wood, that the softer qualities could be over-blown, while the more dense and compact strata remained undiminished before a heavier blast.

The celebrated foundry of Carron was begun about the year 1760, and as was the custom of the times, the operation of blowing was performed by large bellows moved by means of a water-wheel. Pit-coal was the staple fuel in view, but the scanty supply of air, and its want of density, seldom permitted the produce of the furnace to exceed 10 or 12 tons weekly, and frequently in summer, the quantity was reduced even below this. The company collected immense quantities of charcoal wood, and found their blast much better calculated for the operation of smelting with it, than the unflammable pit-coal obtained in their neighbourhood. Experience, however, gradually unfolded means of adopting machinery, more calculated to the nature of the coal fuel, more powerful wheels were constructed, the bellows was abandoned, and in their place large iron cylinders were introduced blowing both up and down. A larger column of air of triple or quadruple density was obtained, and effects equivalent to these great improvements followed at the blast furnaces. The same furnaces that formerly yielded 10 and 12 tons weekly, now sometimes produced 40 tons in the same space, and on the average in one year not less than 1500 tons of metal.

From the period (1750 to 1760) that pit-coal coke was applied as a substitute for wood charcoal in the blast furnace, the iron trade began immediately to revive, and its progress in England and Wales, in a period of 30 years, was truly astonishing. The general use of pit-coal, most unquestionably, occasioned an earlier relinquishment of many of the charcoal works, than would have otherwise been the case, but the collective manufacture had so much increased, as to render this an object of trifling importance.

The following is a correct statement of the annual manufacture of pig-iron in England and Wales in the year 1788:

Charcoal Blast Furnaces.	No. of Furnaces.	Tons at each.	Total in each County.
Gloucestershire	4	650	2600
Monmouthshire	3	700	2100
Glamorganshire	3	600	1800
Carmarthenshire	1	400	400
Merioneth	1	400	400
Shropshire	3	600	1800
Derbyshire	1	300	300
Yorkshire	1	600	600
Westmoreland	1	400	400
Cumberland	1	300	300
Lancashire	3	700	2100
Suffex	2	150	300
Total of charcoal furnaces	24		13100
Average produce from each furnace		545	16 2
Former average produce		294	1 1
		251	15 1

Increased produce per furnace, from the year 1750 to 1788, attributable entirely to the general improvement of machinery, and the introduction of the steam engine, 251 tons, 15 cwt. 1 qr.

	Tons
About the year 1750 the annual quantity of charcoal pig-iron manufactured in England and Wales amounted to	17350
In 1788 the same was	13100

Decrease in charcoal iron betwixt 1750 and 1788 4250

attributable chiefly to the decrease of wood, but also in part owing to the use of pit-coal as a substitute in the furnace.

Coke Pig Blast Furnaces in 1788.	No. of Furnaces.	Tons at each.	Total in each County.
Shropshire	21	1100	23100
Staffordshire	6	750	4500
Derbyshire	7	600	4200
Yorkshire	6	750	4500
Cumberland	1	700	700
Cheshire	1	600	600
Glamorganshire	6	1100	6600
Brecknockshire	2	800	1600
Staffordshire 3 new furnaces expected to blow same year	3	800	2400

Total furnaces and coke pig-iron manufactured in 1788 } 53 48200

An article entirely new, which though not discovered, was rendered a profitable and highly useful manufacture in the last 30 years.

Average produce at each furnace 907 tons.

	Tons.
Total of charcoal iron	13100
Ditto of coke pig-iron	48200

Total of pig-iron manufactured in England and Wales annually } 61300

At the same period in Scotland there were erected, and in blast, charcoal furnaces in the west Highlands, viz.

	No. of Furnaces.	Tons each.	Total.
Goatfield	1	700	700
Bunawe	1	700	700
Coke pig furnaces, viz.			
Carron	4	1000	4000
Wilsontown, or Cleugh	2	800	1600

Total quantity of pig-iron manufactured in Scotland } 8 17000

Average produce for each furnace annually 875 tons.

Total quantity of pig-iron made in England and Wales } 77 61300

Annual quantity manufactured immediately preceding the introduction of pit-coal for furnace fuel } 59 17350

Annual increase in 30 years } 26 50950

The period of 1788 or 1790 may be called a new era in the manufacturing of pig-iron. The double power engine of Mr. Watt had now become more general, and was yearly

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yearly finding its way into blast furnace works. The regular and increased effects of this very powerful machine were soon felt in most of the iron counties. The produce of the furnaces in metal greatly increased as to quantity, and as they became more prosperous, stimulated others to engage in similar undertakings. New works were yearly projected, and several blowing furnaces annually added to the former list: so that in eight years the manufacture of pig-iron had nearly doubled itself.

The following table is a curious illustration of this fact. It was drawn up as an authentic document of the returns made from all the blast furnace proprietors in Britain, of the number of their furnaces, and the annual quantity of pig-iron manufactured at their respective founderies. These returns were made at a time when it was in the contemplation of the legislature to impose a tax upon pig-iron, and are copied from Dr. M'Nab's letter to the chairman of the committee of the house of commons upon the subject of the coal trade.

NAMES of all the FURNACES in Great Britain, with the Excise Return of the Quantity of Pig Iron made in 1796; the Quantities supposed and calculated upon; and the Returns of the Quantities really made.

NAMES OF FURNACES.	No. of Furnaces.	Division.	Excise Return.	Supposed Quantity.	Exact Return.	From whom this Information was received.
Apedale, - - -	1	Chester	2100	1000	728 $\frac{1}{2}$	T. S.
Silverdale, - - -	1	Do.	2600	1200	1230	Ditto.
Bear post, - - -	1	Cumberland	2080	1200	240	W. R.
Dudden, - - -	1	Do.	1664	400	325	E. K.
Newland, - - -	1	Do.	700	700	700	Excise.
Backbarrow, - - -	1	Do.	700	700	769	E. K.
Dale Abbey, - - -	1	Derby	474	474	443	A. R.
Morley Park, - - -	1	Do.	728	728	728	Excise.
Butterby, - - -	1	Do.	936	936	936	Do.
Flaxley, - - -	1	Gloucester	360	360	360	Do.
Forest of Dean, - - -	1	Do.	20	20	20	Do.
Abbey Tintern, - - -	1	Hereford	70	70	70	not exactly known
Bishopwood, - - -	1	Do.	500	500	947	E. K.
Cornbrook, - - -	1	Do.	1000	1000	482	W. R.
Bringwood, - - -	1	Do.	500	500	250	Do.
Leighton, - - -	1	Do.	780	780	780	Excise.
Bowling, - - -	2	Leeds	2000	2000	2000	J. H.
Wibsey Moor, - - -	2	Do.	2000	2000	2500	Do.
Shelf, - - -	1	Do.	1000	1000	1140	Do.
Birkenshaw, - - -	1	Do.	780	780	846	Do.
Renishaw, - - -	2	Lincoln	500	500	705	J. W.
Old Park, - - -	3	Salop	11332 $\frac{1}{2}$	6240	5952	W. R.
Horsehay, - - -	1	Do.	4927 $\frac{1}{8}$	2080	1458 $\frac{4}{10}$	Do.
Lightmoor, - - -	3	Do.	8946	6240	3498 $\frac{1}{10}$	Do.
Coalbrook Dale, - - -	3	Do.	7175	4162	2659 $\frac{1}{10}$	Do.
Madely Wood, - - -	1	Do.	3777 $\frac{1}{2}$	2080	1856 $\frac{8}{10}$	Do.
Jackfield, - - -	2	Do.	7086	4160	1820	Do.
Benthal, - - -	1	Do.	2367 $\frac{1}{10}$	1600	1334	Do.
Willey, - - -	1	Do.	3702 $\frac{1}{2}$	1600	1554 $\frac{1}{2}$	Do.
Brofely, - - -	1	Do.	1775	1400	1076 $\frac{1}{2}$	Do.
Ketley, - - -	3	Do.	7590	6240	5068 $\frac{1}{10}$	Do.
Snedshill, - - -	2	Do.	4730	3400	3367 $\frac{1}{2}$	Do.
Donnington Wood, - - -	2	Do.	4720	4160	3323	Do.
Chesterfield, - - -	1	Sheffield	940	940	940	Excise.
Little Brampton, - - -	2	Do.	1800	1800	1560	Messrs. S.
Winger Worth, - - -	1	Do.	1274	1274	1274	Excise.
Stavely, - - -	1	Do.	1000	1000	761	W. W.
Park, - - -	1	Do.	1092	1092	853	J. W.
Chapel, - - -	1	Do.	1456	1456	1456	Excise.
Horncliffe, - - -	2	Do.	1092	1092	712	J. W.
Elthar, - - -	1	Do.	800	800	950	Do.
Brelton, - - -	1	Do.	250	250	250	Excise.
Holmes, - - -	3	Do.	6000	6000	2000	J. W.
Ashburnham, - - -	1	Suffex	172 $\frac{3}{4}$	173	173	Excise.
Clydach, - - -	1	SouthWales	1820	1820	1625	E. K.
Carried forward -	63		107,318 $\frac{1}{4}$	77,905	61,722 $\frac{17}{10}$	

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NAMES OF FURNACES.	No. of FURNACES.	Division.	Excise Return.	Supposed Quantity.	Exact Return.	From whom this information was received.
Brought forward,	63		107,318 $\frac{1}{3}$	77,905	61,722 $\frac{17}{26}$	
Blandare, - - -	1	South Wales	1404	1404	1500	E. K.
Blanavon, - - -	3	Do.	5460	5460	4318	Do.
Sirhowy, - - -	1	Do.	1820	1820	1930	Do.
Beaufort, - - -	1	Do.	1560	1560	1660	Do.
Penyca, or Ebbervale, - -	1	Do.	1560	1560	397	Do.
Hirwain, - - -	1	Do.	1400	1400	1050	Do.
Melynicourt, - - -	1	Do.	648	648	503	Do.
Ennifygedyr, - - -	1	Do.	1352	1352	800	Do.
Caerfilly, - - -	1	Do.	600	600	695	Do.
Cyfartha, - - -	3	Do.	6000	6000	7204	R. C.
Plymouth, - - -	1	Do.	2000	2000	2200	E. K.
Pendarron, - - -	2	Do.	4000	4000	4100	Do.
Dowlais, - - -	3	Do.	4100	5400	2800	Do.
Llanelly, - - -	1	Do.	1664	1664	1560	A. R.
Dovey, - - -	1	Mid Wales	200	200	150	E. K.
Ruabone, - - -	1	North Wales	1560	1560	1144	W. R.
Brymbo, - - -	1	Do.	834	Silent		Do.
Brymbo-gate, - - -	0	Do.	728	None		Do.
Penyvron, - - -	0	Do.	1498	Lead work		Do.
Pentrobn, - - -	0	Do.	1560	Do.		Do.
Carmarthen, - - -	1	W. Wales	1056	1056	290	E. K.
Level, - - -	1	Staffordshire	1560	1560	1391	T. S.
Brierly, - - -	1	Do.	1300	1300	1046 $\frac{1}{2}$	Do.
Deepfield, - - -	2	Do.	2600	2600	2526	Do.
Bilfton, - - -	2	Do.	2340	2340	1429	Do.
Bradley, - - -	3	Do.	3640	3000	1920	Do.
Grave yard, - - -	1	Do.	1260	1336	213	Do.
Dudley port, - - -	1	Do.	1040	1040	869	Do.
Tipton, - - -	2	Do.	2080	2080	2203	Do.
Gospel Oak, - - -	1	Do.			1613	Do.
Neath Abbey, - - -	2	South Wales	3120	3120	1759	E. K.
	104		167,312 $\frac{1}{3}$	133,965	108,993 $\frac{7}{8}$	

S C O T C H F U R N A C E S .

NAMES OF FURNACES.	No. of Furnaces.	Excise Return.	Supposed Quantity.	Exact Return.	From whom this information was received.
Carron, - - -	4	5200	5200	5616	T. E.
Wilfontown, - - -	2		2080	2080	A. H.
Muirkirk, - - -	2		3120	2878	T. E.
Clyde, - - -	3		3640	2216	Do.
Omoa, - - -	2		3000	2396	Do.
Devon, - - -	2				
Goatfield, (Charcoal) - - -	1		1600	300	E. K.
Bunawe, Do. - - -	1				
	17		18,640	16,086	
Manufactured in England and Wales,	104		133,965	108,993	
Grand Total, - - -	121		152,605	125,079	

Average Produce of each of the English and Welsh furnaces, 1048 Tons per Annum.
 Ditto of each of the Scotch Furnaces, - - - - 946

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The demand for iron articles of all kinds in this country not only continued unabated after the period of 1796, but kept increasing in a greater ratio than formerly; so that in the short space of five years, situations were occupied for nearly 50 additional furnaces, or additions made to established works of that extent. Betwixt 1801 and 1802, it was ascertained that the following new furnaces were either building or actually in blast, in England, Wales and Scotland.

	Furnaces.	Tons.	
England and Wales, in 1796,	104	108,933	
Ditto, since that period,	40	40,000	
	— 144	— 148,993	
Scotland, in 1796	17	16,086	
Ditto, since that period,	7	7,000	
	— 24	— 23,086	
Grand total in Britain,	168 making	172,079	

In England and Wales.

	Blowing.	Building.
Silverdale, - - - - -	1	0
Snedhill, - - - - -	2	0
Wibsey Moor, - - - - -	1	0
Ketley, - - - - -	1	0
Madely Wood - - - - -	1	0
Burnet's Leafow, - - - - -	1	0
Newcastle, Staffordshire - - - - -	0	1
Cyfartha, South Wales, - - - - -	1	0
Llanelly, Do. - - - - -	1	0
Sirhowy, Do. - - - - -	1	0
Beaufort, Do. - - - - -	1	0
Plymouth, - - - - -	1	0
Union, - - - - -	0	1
Aberdare, - - - - -	0	3
Tipton, near Bilton, - - - - -	1	1
Bloomfield, - - - - -	0	1
Longacres, - - - - -	0	1
Wednesbury, - - - - -	0	1
Staffordshire, - - - - -	1	0
Coleford, Gloucestershire - - - - -	1	0
Jackfield, - - - - -	1	0
Old Park, - - - - -	0	1
Donnington Wood, - - - - -	0	1
Deepfield, Staffordshire, - - - - -	1	0
Gornall Wood, Do. - - - - -	1	0
Brierly Hill, - - - - -	1	0
Bilton, - - - - -	1	0
_____ , near Wolverhampton,	0	1
Dudley Wood, - - - - -	0	5
Billingsly, Shropshire, - - - - -	0	1
Newcastle upon Tyne, - - - - -	0	2
	— 20	— 20

In Scotland.

	Blowing.	Building.
Muirkirk, - - - - -	1	0
Glenbuck, - - - - -	1	0
Calder, - - - - -	0	2
Markinch, - - - - -	0	2
Shotts, - - - - -	0	1
	— 2	— 5

Total of new Blast Furnaces 22 25

Blowing and building in Great Britain; the produce of which, supposing them all to have gone to work at the rate of 1000 tons per annum, from each furnace, would amount to, from 47 furnaces, 47,000 tons,
 Manufactured at, and previous } 121 furnaces, 125,079
 to 1796, in } 168 furnaces, 172,079 tons

The respective proportions of this astonishing produce in pig iron manufactured in England and Wales, and in Scotland, will stand thus:

In recapitulating the interesting facts which will result from a review of the gigantic progress of this manufactory, the regular progressive quantity made at a furnace is remarkable, or, which is the same, a diminution of the number of furnaces to perform the same quantity of labour.

Dudley represents, that in his day, 1620, there existed, in England and Wales alone, 300 blast furnaces, for the sole making of pig-iron, to each of these have been assigned the yearly produce of 250 tons.

At a period considerably after this, and before the use of pit-coal was found profitable in the furnace, 59 furnaces produced yearly 17,350 tons of charcoal iron, or each furnace average, 294

In 1788, there still existed in England 24 charcoal furnaces, which yearly manufactured 13,100 tons of metal, or from each furnace, on an average, 545

At the same period, in England and Wales, 53 blast furnaces, at which coke was used, manufactured yearly 48,100 tons, which upon an average was nearly, from each furnace, 907

The same year in Scotland, 8 furnaces produced 7000 tons of iron, or from each furnace, 875

In 1796, the number of furnaces in England and Wales amounted to 104, and yielded 108,993 tons of metal, which from each furnace was equal to 1048

The same year, in Scotland, 17 furnaces manufactured 16,086 tons of pig-iron, which is from each furnace, 946

These are by no means sufficient data to form an accurate opinion of the real progress or improvement of our blowing machinery in Britain. In the collection of furnaces in 1796, a number of charcoal blasts were included, which, from their general small produce, blowing only four, six, or nine months a year, reduces the average considerably on the whole. It may now be safely asserted, that the average produce in iron at pit-coal blast furnaces in England and Wales, is at melting iron works, 1200 tons

Do. at forge pig works, 2000

This bears a very striking contrast to the early exertions of the manufacturers in the sixteenth and seventeenth centuries, and exhibits a wonderful example of the general and rapid improvement of machinery in the last 50 years. With the improvements of machinery, the advancement of the manufacture of iron in general, and particularly of coke pig-iron, has kept equal pace. Nor have we sacrificed quality to quantity, but the reverse; for the melting pig-iron of our time is much more calculated for every variety of casting, than iron, equally saturated with the coal principle, made with wood charcoal.

By comparing the value of a ton of pig-iron at different periods for the last 200 years, a pretty accurate opinion may be formed of the increased price of labour at iron works, and of the increased value of an object of universal utility in all our arts and manufactures.

About

B L A S T.

About the year 1620, charcoal pig-iron sold for 6l. per ton.	-
1788, ditto for melting, -	8l.
1798, ditto - - - - -	9l. 10s.
Coke pig-iron, when first invented by Dudley, } was sold at - - - - - }	4l.
In 1788, it sold for - - - - -	5l. 10s.
1798, ditto - - - - -	7l. 10s.
1802, melting iron was - - - - -	8l. 10s.
And smooth-faced N ^o 1. sold at - - - - -	9l. 10s.

One thing is here worthy of remark, that in a period of 170 years one ton of coke pig-iron rose in value only 30s. i.e. betwixt 1620 and 1788; but that in the short period of 14 years following 1788, an advance of 4l. per ton took place. One thing only may be offered in extenuation of this immense rise, that part of it was owing to the misunderstanding that took place betwixt this country and some of the Baltic powers, which was no sooner adjusted than pig-iron fell in price. The article still, however, maintains itself at 8l. 10s. per ton, being double the rise in point of value in fourteen years that took place in the one hundred and seventy preceding the commencement of that period.

To point out proper channels, whereby to account for the annual consumption of such an immense quantity of raw materials, would prove a satisfactory source of information. The endless detail into which the foundery trade has now branched itself, the almost universal fabrication which it embraces, and the extensive diffusion of the scites of manufactories themselves, preclude the possibility of obtaining this with strict accuracy. The following statement, however, will tend to throw some light upon the subject.

It is reckoned, that the bar iron forged in Britain manufactured annually from pig-iron 40,000 tons of finished bars, which at the rate of 35 cwt. of pigs for every ton of iron bar produced, will account for - - - - -	70,000
Consumed yearly in the erection of new furnaces, forges, machinery, &c. - - - - -	5,000
Purchased by the board of ordnance in the state of cannons, mortars, carronades, shot, and shells, &c. on an average of 1794, 5, 6, 10,935	
Waste in melting from the pig, boring, &c. - - - - -	1,300
	12,235
Purchased by the navy board in the state of ballist, &c. - - - - -	2,664
India Company's annual supply in guns, shot, shells, carcasses, &c. - - - - -	5,000
Waste melting, boring, &c. - - - - -	700
	5,700
Merchant guns, carronades, shot, &c. for arming trading vessels, 10,000	
Waste in melting and boring, 1,000	
	11,000
Ballast for Merchantmen and India men, - - - - -	5,000
	Tons 111,599

For the difference betwixt this and the total manufacture, recourse must be had to the large exportation to Ireland, and to the numerous and extensive casting founderies of London, Liverpool, Manchester, Birmingham, Workington, Newcastle, Edinburgh, Glasgow, &c. none of which melt under 2000 tons yearly, and many of them from 4 to 5000 tons of melting pig-iron.

We shall now leave this interesting subject with some ge-

neral observations upon the origin and progress of the pig-iron manufacture, and its early use in the fabrication of castings.

It appears from Dudley, that towards the close of the reign of queen Elizabeth, blast furnaces had been constructed of size, and with machinery sufficient to produce upwards of two tons of charcoal iron per day. Such great products in iron were most probably confined to situations where there was abundance of water, and where water-wheels and bellows of a considerable magnitude were used. The more common modes of operation were confined to furnaces of an inferior size, which were supplied with air by means of hand-bellows, excited by cattle, or the labour of men. At the same period England enjoyed a considerable export trade, arising from her superior manufacture of iron guns, mortars, &c. As pit-coal had not been applied in any branch to the manufacturing of iron, it is probable, that these articles would be cast from the large blast furnaces; the flame of wood possessing but feeble effects compared to that of pit-coal, would render the application of the reverberating furnace, if then known, of no use in the casting of guns and mortars.

The non-application of pit-coal in every department of the melting foundery, would greatly retard the perfection, or even improvement of the art of moulding, and casting smaller and more general articles. The want of it, as the smelting fuel in the blast furnace, was long severely felt by the general backward state of the art of moulding and casting in this country, and allowed other nations with fewer advantages to get the start of us. It is highly probable, that long before the period formerly alluded to, the application of pit-coal had been speculated upon, either as an auxiliary, or as a substitute in every branch of the iron business. Its well known inflammability and tendency to form a cinder, and the general decay of wood, would furnish ample grounds for what, to many at the time, would be considered as idle and visionary speculations. The advantages arising from the trade, as it was then situated, had been rigidly ascertained, and fully appreciated by the established manufacturers. The business, in point of extent, seemed only limited by the supply of wood. New erections, for want of a proper supply of materials, became impracticable; those already engaged were more anxious to preserve their supply, however much circumscribed, than listen to innovation, which, by substituting pit-coal for the charcoal of wood, would likely give to the speculatist a great superiority in the market. It is also highly probable, that many of the iron works then established were at a considerable distance from pit-coal, the general introduction of which would prove fatal to their interests.

In this view of the subject, the adventurer with capital had every thing to hope, the established manufacturer every thing to fear, by change. Under these circumstances, the discovery, or rather the assertion of the practicability of making iron with pit-coal, was announced by Simon Sturtevant, esq. in the year 1612, who, upon application, was favoured with a patent from king James, for the exclusive manufacture of iron with pit-coal, in all its branches, for the long period of thirty-one years. In return, the said Simon Sturtevant bound himself to publish a faithful account of his discoveries, which afterwards appeared in quarto, under the title of his "Metallica." It is uncertain to what causes his failure was at the time attributed, but in the execution of his discoveries upon a large scale, he had found difficulties amounting to utter impracticability; for in the year following, he was obliged to make a surrender of his letters of monopoly.

The second adventurer in this unexplored path we find to have been John Ravenson, esq. who, like Sturtevant, was successful in obtaining a patent for the new manufacture; but, like him also, was inadequate to the completion of it upon a profitable scale. Ravenson was also enjoined to publish his discoveries under the title of his "Metallica," which was printed for Thomas Thorp, anno 1613. Several other adventurers stepped forth, all of whom had the mortification of resigning their patents, without having contributed to the success of their arduous undertaking.

In 1619, Dudley obtained his patent, and declared, that although he made only at the rate of three tons per week, he made it with profit.

This discovery was perfected at his father's works at Pen-fent, in Worcestershire. This gentleman's success in the various manufactures of iron with pit-coal, had united not only all the proprietors in the charcoal iron trade, but many new adventurers, who wished to share in the emoluments, or to acquire part of the fame of the new discovery. Their interest was sufficient to limit the duration of Dudley's patent from 31 to 14 years. During the greatest part of this period, according to his own statement, he continued to make pig and bar iron, and various castings; all of which he sold much lower than the charcoal manufacturers. In the article of castings he must have had greatly the start of the charcoal founderies, as the quality of melting coke pig-iron is far superior to that of charcoal, particularly that made in this country for the general purposes of casting. Nor was the superior genius of Dudley always an object of passive indifference in the narrow estimation of the new adventurers and the established manufacturers. The envy occasioned by his uncommon success, produced at last a spirit of combination, which terminated in a hostile attack upon his devoted works. His improved bellows, furnace, forge, &c. all fell a prey to a lawless handitti, betwixt whom and its furious leaders no shades of distinction were visible, but those of avarice, ignorance, and the most contemptible prejudice.

To evade the mode of operation discovered by Dudley, or to introduce the making of coke pig-iron with greater advantages, a new plan was adopted by captain Buck, major Wildman, and others, in the forest of Dean, where they erected large air-furnaces, into which they introduced clay pots resembling those used at glass houses, filled with the necessary preparations of ore and charcoal. The furnaces were heated with the flame of pit-coal; and it is probable, that by tapping the pots below, it was expected that the separated metal would flow out. This rude process of assaying on a large scale, was in the end found utterly impracticable; the heat was inadequate to perfect separation; the pots cracked; and, in a short time, the process was abandoned altogether.

The misfortunes which befel the sanguine, but unfortunate Dudley, were an irreparable loss to the perfection of the coke pig process. The hostile rivalships he had to encounter in consequence of the new ground he had occupied [as a manufacturer, together with a zealous attachment to the royal cause during the civil war which followed his discovery, completely prevented his improvements from attaining a pitch of permanency and general utility. The refusal of a new patent after the restoration, prevented him from again entering the laborious paths of discovery and improvement, although it appears, that his former application to the perfecting of this branch of manufacture had not been unsuccessful, for in place of three tons of coke pig weekly, in his petition praying for a renewal of his ancient rights, he states, that he could now manufacture seven tons by means of a large furnace, and an improved bellows.

No greater pitch of improvement took place for nearly one hundred years after this period. The practicability of the manufacture was discovered; but the mode of obtaining quantity, to ensure in general a profitable return, depended upon other circumstances than the proportioning of the raw materials together. Had machinery received the same improvements in the time of Dudley, it is more than probable that the rapid progress of the coke pig trade would have dated its origin from that period. But this great era in the history of our manufactures was reserved for a much later date; and in the improvements of the steam engine, we see new life and existence conferred upon every species of art that can be made subject to motion or mechanical control.

Blast Furnace Works, are large and expensive buildings for the manufacturing of pig iron. An erection upon the smallest scale must consist of a furnace, casting-house, bridge-house, and blowing engine. The latter is sometimes, though seldom, worked by means of a water wheel. The most universal mode of blowing is by means of a steam engine. See *BLOWING Machine*.

There is no general plan laid down for building a blast furnace work. The singular situation which should be occupied, to insure every conveniency, renders this dependent upon the nature of the ground.

It is always reckoned a great advantage to place the blowing machine at as short a distance as possible from the furnace or furnaces, that the air may have the least possible travel in the conducting pipes. When this cannot be conveniently effected, the diameter of the pipes ought to be made sufficiently large to admit of the blast passing without any material friction.

The usual appendages to blast furnaces are mines of coal, iron-stone, and lime-stone. And these form no inconsiderable portion of the whole expence.

In situations where blast furnace building materials are at a moderate price, and when no uncommon difficulty occurs in the progress of the general operations, 15000*l.* of sunk capital may be deemed requisite for one furnace; and for every furnace after this, 10,000*l.* may be added.

This great capital for many years kept the trade in the hands of a few; but of late, since capitalists have become more common, the number and extent of the blast furnace erections have become truly astonishing.

The following descriptions of plates illustrative of the plan and arrangement of blast furnace works will convey a tolerable idea of the nature of these buildings.

Plate XI. Blast Furnace Works, represents the ground plan of an entire fabric, consisting of

- A Steam-engine for blowing two furnaces.
- 2 Blast furnaces.
- 2 Bridge-houses.
- 1 Casting house.
- 1 Boiler-house.
- 2 Boilers.
- 1 Chimney for boiler flues.
- A, Engine-house, 40 feet long, 18 feet wide.
- B, Pedestal for steam cylinder: 7 feet square at base, and 4 feet at top.
- C, Pedestal for blowing, or air cylinder. Base 10 feet square, top 7 feet square. These are generally built of solid hewn stone, and bedded with the greatest accuracy. From centre to centre of the two pedestals is 24 feet, which is also the distance betwixt centre and centre of the steam and air cylinders.
- D, Door or opening through the lever wall. This wall at bottom is built 5½ feet thick, but is occasionally reduced

in point of thickness to $3\frac{1}{2}$ feet at top, as may be seen at the corresponding letter in the section.

F, Door or opening from the engine into the boiler-house. An opening above this serves to conduct the steam pipe from the boiler to the steam apparatus at the cylinder.

E, Door or opening for carrying through the blast pipes from the top and bottom of the air cylinder to the water receiver below.

G, The boiler-house, 40 feet by 30 within the walls. As this is excavated from the solid hill to the depth of 30 feet, it is requisite to have the walls uncommonly strong. Those in the plan are 6 feet thick at bottom, and are reduced at three different heights in thickness, as represented by the interior lines.

HH, Two boiler-seats for boilers, 18 feet long, 9 $\frac{1}{2}$ feet high, and 7 feet wide.

II, Fire-places, 6 feet square.

KK, Dead plates before the bars or grates.

LL, Openings where the furnace doors are hung.

MM, Semi-circular openings formed beyond the dotted line or termination of the boiler, in which the flame from the grates rises to enter the iron flue or tube, which is placed in the centre of the boiler.

N, Chimney, 2 $\frac{1}{2}$ feet square within, and 50 feet in total height; from the bottom of the flue 42, and 8 feet from the foundation.

OO, Coal pits for containing small coals for the engine's supply. These are 8 feet by 6 at bottom, and widen gradually as they approach the surface of the coke yard. The coals are there emptied from the cart into the receivers, and the engine-man easily supplies his wants from the small openings which communicate with O into the boiler-house.

PP, Bridge-houses for containing coals, iron-sloae, and lime-stone, for filling the furnace. Measurement within 42 by 40 feet.

QQ, Doors or entrances from the coke yard into the bridge-houses.

RR, Openings from the bridge-house, which is here connected with the furnace, by means of an arch and parapet walls. This is more fully seen in the elevation section P. Along this bridge the materials are carried or wheeled into the mouth of the furnace.

SS, Two blast furnaces, 34 feet square in the base.

T, Casting-house 102 feet long by 48 in width from the front wall or arch of the furnace, or 88 feet wide from the front wall of the engine and bridge-houses, and 24 feet high in the side walls.

W, Water receiver for receiving and equalizing the column of blast. Length 40 feet, and breadth 18 feet.

V, The space in which the equivalent column of water rises, 3 feet wide. The exterior line denotes the inverted iron chest; the interior lines, the different basements formed by the stone work laid upon the chest to prevent it from rising when the engine is at work.

Y, Termination of the blast conduct pipes from the air cylinder into the iron receiver, 2 feet 6 inches diameter.

Z, Position for the horizontal range of pipes to branch off, which are meant to convey the blast to the opposite tuyeres, *aa*, betwixt the back wall of the furnace, and the bridge-house.

bb, The two tuyere sides next the water pressur. From Y proceeds a straight pipe along the centre line *b*, for conveying the blast to that side of the furnace.

cc, Front arches, under which the furnace workmen perform all the labour of tapping, casting, and cleaning the furnace.

dd, The spaces included within these dotted lines are called pig beds. They are kept constantly filled with sand, and in them the operation of moulding and running the pig metal is constantly performed.

Plate XII. Blast Furnace Works.

Elevated section of the ground plan, *Plate XI.* through N F B D C E and X.

A, Inside of the blast engine-house.

B, Steam cylinder pedestal.

C, Blowing or air cylinder pedestal. Both of these are built upon 4 or 6 inch planking, laid upon strong logs, which are again supported upon the solid stone buildings, *a a*, running from the lower wall along the side wall of the engine-house, to the wall perpendicular to E. The binding down bolts that pass through the flanges of the cylinders are strongly keyed upon the under side of the logs, and are at all times easily accessible.

D, The lever wall and opening of communication betwixt the steam and blowing end of the engine-house.

F, Door or opening into the casting house and water regulators.

E, Door to the boiler-house.

G, The boiler-house.

H, One of the boiler seats.

I, One of the boilers, 18 feet long, by 9 $\frac{1}{2}$ wide, by 7 high.

K, Man-hole door for entering the boiler.

L, Thorough arch in the foundation of the chimney.

M, Throat, or opening into the chimney, for the passage of the flame and smoke.

O, Coal pit for containing fuel for the engine.

P, Arched passage of communication betwixt the bridge-house and furnace mouth. The opening in the bridge-house is more distinctly seen at R, *Plate XI.*

S, Side view of one of the blast furnaces, as connected with its corresponding bridge-house.

W, Water vault, or cistern, for receiving the inverted chest. In rocky foundations this is cut out of the rock, but in soft ground the excavation is made and lined with well jointed mason work, puddled behind with clay to prevent the loss of water.

T, Casting-house and roof.

b, The tuyere arch.

c, The fow, or lintel of cast-iron, 12 inches square.

d, The orifice at which the blast enters, called the tuyere.

e, Spring beams of the engine-house, A. These are composed of two logs 14 inches square. The main gudgeon, seat, and beam rest upon these.

f, Stay logs for the steam cylinder.

g, Ditto, for the blowing cylinder.

Description of Plate XIII. Blast Furnace Works.

Cross section and elevation of *Plate XI.* through S Y S.

SS, Section of two blast furnaces, and their situation as connected with the blowing apparatus.

Y, The branch pipe for communicating the air to the inside tuyeres of the furnace. This pipe has another branch of communication behind, which connects it to the blast pipes which descend from the blowing cylinder at A, and to the double column of pipes which are carried round behind the furnace to the opposite tuyeres.

C C, View of the pipes which convey the air to the opposite tuyere, where double blasts are in use.

D, Front wall of engine and bridge-houses.

X, Iron chest inverted in the water receiver, and connected with the blast pipes.

VV, Opening all round for the water to ascend, as it becomes expressed from the chest by the impelling force of the blast.

O, Logs on which the chest is inverted, to preserve it from the floor of the water receiver, from 12 inches to 18 of space.

Description of *Plate XIV. Blast Furnace Works.*

Ground plan of an extensive blast furnace foundery, consisting of four furnaces and two blast engines. The peculiar construction of this plan is, that only one furnace may be erected at a time, and afterwards the whole number; still preserving that regularity and uniformity of design which will at any time make the blowing machinery of one part subservient to the whole, in case of accidents, stoppages for repairs, &c.

A, Engine-house, with cylinder, pedestals, lever wall, openings, &c.

BB, Two boiler-seats and boilers.

CC, Water regulators for the blast, which conveniently communicates, by means of pipes, with the blowing cylinders, placed upon the pedestals behind A, I.

DD, &c. Centre line of the whole blast pipes. This extensive column may be so arranged, as to enable the furnaces to be blown each with two tuyeres; and the blast of one engine made to pass through the whole. The general communication is effected by carrying the chief column either behind the furnaces, or, as in the plate, through the main pillar of the furnace, by means of an arched opening 3 feet wide.

E, Ground plan of the hearth, squares, and pillars of four blast furnaces.

FFFF, Bridge-houses for materials, and filling or charging the furnace.

GGGG, Openings into the furnace top.

H, Casting-house.

I, Second blast-engine, upon the same plan as A. Each of these two engines ought to be calculated to blow two furnaces, and occasionally, when any thing goes wrong with one, the blast of the other could be easily distributed for a time among all the furnaces.

BLASTED, in *Antiquity*, something struck with a *blast*.

Among the Romans, places blasted with lightning were to be consecrated to Jupiter, under the name of *bidentalía*, and *putealia*. It was also a ceremonial of religion to burn blasted bodies in the fire.

BLASTING of *stones*, in *Agriculture*, the operation of tearing asunder large stones or rocks, which are in the way of the plough or other instruments employed in breaking up ground, by means of gun-powder. The method of performing this business is by boring a large hole, eight, ten, twelve, or more inches deep, according to the nature and size of the stone or rock to be blasted, by means of a chisel for the purpose, and then introducing a sufficient quantity of gun-powder, and afterwards carefully ramming the hole up with small fragments of stone or other solid materials, only leaving a very small aperture, by placing a steel pricker of sufficient length and suitable dimensions, with a handle at the top, at first into the powder, and frequently turning it round while the hole is ramming up. After the hole is quite filled, by forcing the hard materials in with a proper instrument, the pricker is withdrawn, and the aperture left by it filled to the top with gun-powder, and then a match of tow, straw, or other light inflammable material laid to it, and set on fire.

It is observed by Mr. Headrick, in the second volume of "Communications to the Board of Agriculture," that in order to perform this operation properly some experience is necessary, and that a skilful workman can frequently rend stones into three equal pieces, without causing the fragments to fly about. This, he says, depends upon the depth and

position of the bore. It is also remarked, that a small portion of quick-lime, in fine powder, is found to increase the force, and consequently to diminish the expence of blasting stones. On these grounds the following is offered as a substitute for gun-powder, which is now become very expensive, though, as is freely confessed, without any experience of its effects. Supposing *fig. 1, Plate III. (Agriculture)* to be a large stone to be blasted or rent; *ab*, a bore sent down into it in the usual manner. This bore being then well cleaned out and dried, is to be filled from *b* to *c* with the purest quicklime, or such as swells most in slaking. That it may be perfectly quick it should be taken red hot from the kiln, or the small furnace where it has been burnt; being then rammed in hard with the jumper or punch *a c*, the upper part of the bore is to be crammed with rotten rock in the ordinary way. The pricker being removed leaves the aperture at *b*, *a b*, a small pipe of copper, of less diameter than the needle or pricker, having an orifice about the dimensions of the straw, used to convey the fire down to the gunpowder, with a funnel *d* to receive water, is introduced into the aperture. Perhaps a straw or small reed stuck in the lower part of the funnel, among tallow or bees wax, might serve the purpose of a copper pipe. Things being thus prepared, pour water into the funnel *d*; and if the pipe be not too high, so as to prevent the air from escaping from the aperture, left by the pricker, it will descend and cause the lime to flake in the bore *c b*. Every one knows how irresistibly the purest quick lime attracts water, and with what prodigious force it expands in slaking into three or four times its former bulk. From these data it is therefore inferred, that the slaking of lime, in such circumstances, would burst or rend the stone *f* in pieces; but the success of such an experiment, it is observed, must depend entirely upon using lime of the utmost purity, and having it very hot, and perfectly caustic when it is put in.

It is further remarked that if the bore *c b* were filled with water, and the aperture afterwards rammed up, the water being made to freeze by cold, would rend the stone; for when water passes from a fluid to a solid form, it expands with irresistible force, though frost cannot be depended upon in this climate.

BLASTOLOGY, from *βλαστος*, *bud*, and *λῆνω*, *I gather*; the regular and stated pruning of vines.

BLATNA, in *Geography*, a town of Bohemia in the circle of Prachalitz, near which is an inland lake, which is the source of the river Uflava.

BLATTA, in *Middle Age Writers*, denotes a purple in the wool or silk, dyed with the liquor of the blatta.

This was otherwise denominated *blatta serica*, or *blatto sericum*: whence also *blattarius*, used in ancient writers for a dyer in purple.

BLATTA, in *Entomology*, a genus of *hymenopterous* insects, called in England *cock-roaches*, or *black beetles*. The head is infested; antennæ setaceous; feelers unequal and filiform; wing-cases and wings smooth, the former somewhat coriaceous; thorax flattish, orbicular, and margined; legs formed for running; abdomen terminating in two articulated appendages above the tail.

The blattæ, considered in a collective point of view, are a very troublesome race of insects. Certain kinds, that are happily for us still peculiar only to the hotter parts of the world, are so formidable both in respect of number and talents for doing mischief, that they are really considered as a pest to society in those countries which they infest. These noxious creatures enter houses and commit various depredations on the furniture, devour provisions of every kind, tear or gnaw holes in clothes, torment the inhabitants with their bite, and otherwise do considerable injury. The sort of blatta most abundant in England

England was originally a native of the eastern parts of the globe, or, as some suppose, of America, from whence it was long since imported into Europe, and is now completely naturalized to our climate. This is the *blatta orientalis* of systematic writers. Another creature of this kind, *blatta Americana*, was also introduced with the raw sugars brought some years ago to Europe from America.

All the known species of *cock-roaches*, whether in the larva, pupa, or perfect winged state, secrete themselves in the day-time, and wander about during the night in search of food. In allusion to this circumstance, the ancients called them lucifugæ, insects that shun the light. The common cock-roach will eat almost any sort of provision, preferring, however, bread, meal, sugar, and stale meat, either of which it is observed to devour with the greatest eagerness. Except in being completely destitute of wings and wing-cafes the larva resembles the perfect insect, and in the pupa state nothing more than the rudiments of the wings are perceptible. In the dark they are remarkably active and brisk in all their motions, and on the least disturbance, or the return of light, retreat again to their lurking places with timidity and precipitation. They can fly swiftly, but they seldom use their wings for this purpose; even when most closely pursued they are known to trust rather to their legs, with which they are able to run with no small celerity. The fumes of charcoal, we are told, may be employed with success in destroying these unwelcome inmates.

The following species of the *blatta* genus, are described by Linnæus, Fabricius, Gmelin, &c. viz. *gigantea*, *maderæ*, *ægyptiaca*, *occidentalis*, *surinamensis*, *americana*, *australasie*, *erythrocephala*, *capensis*, *indica*, *nivea*, *irrorata*, *viridis*, *brasiliensis*, *petiveriana*, *orientalis*, *cincla*, *picta*, *variegata*, *lapponica*, *germanica*, *ruficollis*, *maculata*, *marginata*, *oblongata*, *nitidula*, *fusca*, *densa*, *chlorotica*, *latissima*, *aterrima*, *perispicillaris*, *asiatica*, *schæfferi*, *sylvestris*, *pennsylvanica*, *livida*, *rufa*, *grisea*, *minutissima*, *aptera*, *punctulata*, *ocellata*.

Blatta, according to some writers, was also used for a particular kind of kermes, or chermes; or, according to others, for "the purple-worm," by which the *coccus cacti*, or cochineal insect was most likely meant. But both of these acceptations are suspicious. We know that the word *blatta* was anciently used for a kind of moth, whose fat was reputed excellent for the ears. This luit was called the book-worm moth. See BOOK-WORM.

BLATTA Americana of Catesby is of the *Silpha* genus with modern entomologists. Gmelin speaks of it under the name of *Silpha americana*.

BLATTA byzantina, in *Physiology* and *Pharmacy*, the *operculum*, or lid of a turbinated shell, whose fish yields a purple dye.

The *blatta* differs from the lid of the *buccinum* or *purpura*, in figure; the first being oblong, the latter round; but in the shops they are ordinarily confounded, and sold for each other. The *blatta byzantina* is also confounded by apothecaries with the *unguis odoratus*, from which it ought to be distinguished, as belonging to another kind of shell-fish.

Dr. Lister takes the *blatta byzantina* to have succeeded the *unguis odoratus*, and to have been brought into the shops in its place. In Dioscorides's time, the belt was brought from the Red Sea, viz. the palest and fattest; the blacker and less, from Babylon, or the Persian gulf: but it seems, latter times took up with those found about Constantinople; whence the present shop *blatta* had its name.

The name *blatta* seems to have been given to this *operculum* from the colour; as being of a dark hair-colour, as the

common *blatta orientalis*, or common *cock-roach*, so frequent in London, is.

The *blatta byzantina*, when exhibited internally, renders the body soluble, softens the spleen, and dissolves peccant humours. When used externally, by way of fumigation, it restores epileptic patients, and women labouring under a strangulation of the *uterus*. In other disorders its effects are the same with those of most testaceous substances.

BLATTARIA, in *Botany*. See *CELSIA*, *LYTHRUM*, *PENTAPETES*, and *VERBASCUM*.

BLATTERIÆ, *AFFINIS*. See *LYSIMACHIA*.

BLATTINUS, in *Entomology*, a species of *staphylinus* that inhabits Austria; the colour is black; thorax broad; wing cafes and the legs testaceous and glossy. Shranck. Inf.

BLATUM-BULGIUM, in *Ancient Geography*, a promontory of Britain, mentioned in Antonine's Itinerary, concerning the situation of which antiquarians have entertained different opinions. Camden, Gale, Baxter, and some others, have fixed it at Boulness, on the south coast of Solway firth, at the end of Severus's wall; yet Mr. Horsley assigns its situation at Middleby in Annadale. Here, as at the most remote limit of the province of Britain, Antonine commences his second route. A military way led from *Blatum-Bulgium* to *Luguvallium*, or *Carlisle*.

BLAU, in *Geography*, a river of Germany, in the circle of Swabia, which rises near the foot of a hill in the *Blautopfe*, as it is called, and runs into the Danube at *Ulm*.

BLAUBEUREN, a town of Germany, in the circle of Swabia and duchy of Wirtemberg, in a small district of the same name, seated on the river *Blau*, 7 miles W. of *Ulm*.

BLAUDRUSELUS, in *Zoology*, (*olaffen* isl.) *phoca cristata* of Erxleben and Gmelin, and *hooded seal* of Pennant.

BLAUENTHAL, in *Geography*, a town of Germany, in the circle of Upper Saxony.

BLAUER-Bock, in *Zoology*, one of the names given by authors to the blue antelope, *antelope leucophaea*. Vide *KOLBE VORGEB*.

BLAVET, in *Biography*, a celebrated performer on the German flute, the first, perhaps, who greatly distinguished himself by that instrument after it superseded the common flute, and became in general use. He was born at Besançon, and coming to Paris in 1723, soon acquired a great reputation. The prince of Carignan, who knew his merit, enlisted him in his service; gave him an apartment in his hotel, and a pension. He was afterwards appointed superintendent of the comte de Clermont's band, and remained in that nobleman's service to the end of his life.

To his admirable talents, *Blavet* joined the respectable virtues of society; his manners and conduct were blameless, his temper tranquil, and his probity scrupulous. He married at eighteen, and lived upwards of fifty years with his wife in uninterrupted harmony and affection. We are always glad when to great professional abilities, such an estimable character can be joined.

Blavet's excellence on the German flute had been heard of all over Europe, before the character of *Weideman* was established in England, or that of *Quantz* in Germany.

About the end of 1765 he was attacked with the stone, which was a malady then more dangerous than it became afterwards, by the skill, experience, and success of eminent surgeons; but determining too soon, like our poor countryman, *Dr. Worgan*, to submit to the operation, he died under it in 1768, leaving behind him the esteem and regret of all who knew him.

BLAVET, in *Geography*, a river of France, which runs into the sea opposite *Belle Isle*. This forms a good harbour and spacious road.

BLAUFELCHEN, in *Ichthyology*, the name under which *Salmo Wartmanni* of Bloch and Gmelin is described by Wartmann Besch. Berl. Naturf. Fr. 3. p. 184.

BLAVIGNAC, in *Geography*, a town of France, in the department of the Lozère, and chief place of a canton in the district of St. Chely d'Apcher; 6 miles south of St. Chely.

BLAUKOEFIGE ROTHE AMSEL *Frisch*, one of the synonymous names of *lanius minor*, Gmel.

BLAUMEISE, in *Ornithology* (*Frisch*, Hist. of Birds), the blue titmouse of English writers, and *parus caruleus* of Linnæus.

BLAUSLUYS, in *Geography*, a town of Holland, 2 leagues west of Gertnefsdenburg.

BLAUSPECHT, in *Ornithology*, the name of the common nut-hatch; *sitta Europæa* in *Frisch*. Hist. of Birds.

BLAYE, **BLAVIA**, or **BLAVUTUM**, in *Geography*, a sea-port town of France, in the department of the Gironde, and chief place of a district of the same name seated on the Gironde, or Garonne, near its conflux with the Dordogne. Its citadel is situate on a high rock, and it is defended by a fort constructed on an island in the river, which is here 1900 toises wide; and on the other side of the river, in the country of Mendoc, is another fort. All ships that are going up the river to Bourdeaux, deposit their arms and cannon at Blaye, before they pass the river, and take them up on their return. The town contains 3580, and the canton 13,819, inhabitants. The territory comprehends 160 kilometres, and 14 communes. It is distant 20 miles north from Bourdeaux. N. lat. 45° 9'. W. long. 0° 45'.

BLAYMARD, or **BLEYMARD**, a town of France, in the department of Lozère, and chief place of a canton, in the district of Mende. The place contains 546, and the canton 11,802, inhabitants. Its territory comprehends 347½ kilometres, and 11 communes; 3¼ leagues east of Mende.

BLAZE, in the *Manege*. See **STAR**.

BLAZEGNIES, in *Geography*. See **MALPLAQUET**.

BLAZEY BAY, a bay in the English channel, on the south coast of Cornwall, between Fowey and Deadman point.

BLAZING STAR. See **COMET**.

BLAZON, or **BLASON**, in *Heraldry*. To *emblazon* is a term signifying the description of things borne in coat-armour, in such manner as they ought to be represented, according to the rules of heraldry. To *blazon*, originally signified the blowing or winding of an horn by the heralds, at justs and tournaments, when they proclaimed and recorded the achievements of the combatants.

BLEA, in *Vegetables*, is that part of a tree, which lies immediately under the bark, and between that and the hard wood, and is the first progress of the alteration of the bark into wood by the natural growth and strengthening of the fibres. See **BOTANY**.

While the blea remains yet soft, and retains something of the nature of bark, it may maintain a feeble vegetation; but when it is grown absolutely hard and woody, it can contribute nothing to the growth of the tree. The vegetation of the young branches of trees is the most lively and vigorous, and the only one that goes as far as the flowers and fruit, because these branches are little else but bark.

BLEACHING. The art of bleaching consists in removing the coloured matters intermixed with vegetable and animal substances in their natural state, or such as they have subsequently imbibed by accident, or some artificial process. Edward Huffey Delaval, esq. F.R.S. has shewn, by a number of accurate experiments on the cause of the permanent colours of opaque bodies, published in the second volume of

the second edition of the Memoirs of the Literary and Philosophical Society of Manchester, "that when the colouring matter of plants is extracted from them, the solid fibrous parts, thus divested of their covering, display that whiteness which is their distinguishing character. White paper and linen are formed of such fibrous vegetable matter, which is bleached by dissolving and detaching the heterogeneous coloured particles." He further observes, "it appears that the earth, which forms the solid substance of plants, is white; that it is separable from the colouring matter by several means; that whenever it is either pure and unmixed, or diffused through transparent colourless media, it exhibits its whiteness, and is the only vegetable matter which is endued with a reflective power; that the colours of vegetables are produced by the light reflected from this white matter, and transmitted from thence through the coloured coat or covering, which is formed on its surface by the colouring particles; that whenever the colouring matter is either discharged or divided by solution into particles, too minute to exhibit any colour, the solid earthy substance is exposed to view, and displays that whiteness, which, as before noticed, is its distinguishing character."

He states that in all those animal matters which do exhibit colours, the colouring particles are endued with the same properties, and are regulated by the same laws, which prevail in vegetable substances.

A reference to the original paper can only do justice to the observations of this excellent philosopher, confirmed by numberless experiments; but what is already said will be sufficient to give an idea of the nature of the process of bleaching, and that it depends on the removal of the matter interposed betwixt the air and this white substance.

The national importance of bleaching is so great, that it comprehends nearly the whole of the cotton and linen manufacture, and goes to an extent beyond most other arts.

Its operation in these branches may be considered under two points; viz. 1st, the separation of extraneous substances from linen and cotton, which is effected by steeping, fermentation, or weak alkaline leys; 2d, the separation of the constituent or inherent colouring matters of those substances, which is effected by different modes, and by various modifications of each method, as exposure to the air, light, the use of alkaline leys, soap, oxygenated muriatic acid, combinations of oxygenated muriatic acid with other matters, sulphuric acid, hepar sulphuris, &c.

To impress upon the mind the nature of the bleaching business, it will be proper first to describe the vessels used in the sundry operations of steeping, boiling, bucking, washing, souring, &c. then proceed to shew the management of each process, with some observations on its effects; and, lastly, how to make or procure the articles necessarily employed in this art, and the method of ascertaining the qualities of each, adding some observations on the theory of the operations.

BLEACHING of goods, particularly cotton manufactures.

1st, On Steeping.

The vessels generally used in bleaching are made of such wood as will not communicate any colour to the liquors they are to contain, and therefore deal or fir wood is preferable to most others. The vessels employed for steeping the goods when received from the loom are usually of the form A, fig. 1. Plate I. Bleaching. The goods when received from the weaver contain not only the natural colouring matter of the cotton, which is of an oily nature, and which prevents the cloth from easily imbibing water, but also a substance called sowins, being a paste made of flour and water, used during the weaving, and applied with brushes upon the warp, in order to give a firmness to the threads by glueing

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or passing together the loose fibres of the threads, and thus allowing them to pass more freely through the reed and harness. To remove this substance, and to open the fibres of the cotton, so as to give full effect to the subsequent operations, it is proper to steep the goods in a vessel of the above form in lukewarm water, till a gentle fermentation takes place, which will usually be effected in 24 hours. The cloth should then be taken out, and well washed in a current of clear water, which will thus separate a considerable quantity of filth without the expence of using alkaline leys; and the cloth is then ready to be boiled or bucked as may be preferred by the bleacher.

2d, On Boiling.

For boiling, a copper vessel is to be preferred, and the goods prepared, as above mentioned, by steeping and washing, are put into the vessel containing hot water only, or warm alkaline ley; a winch is placed over the vessel, and the piece goods attached to the ends of each other, are, when put in motion by the handle of the winch, dragged or rolled over it till the whole are passed; the winch is then turned with a retrograde motion, and the cloth gradually thus returned back, in order that every part of each piece may be thoroughly impregnated with the liquor, which is raised to and kept at a boiling heat, as long as it appears to extract any colouring matter from the cloth; the goods are then taken out and well washed in water.

Fig. 1. Plate IV. shews a section of the boiling pan A, of copper, set in brickwork B; the winch C, with its handle D; E, uprights of wood, on which the winch turns; F, a cock to empty the pan; G, the fire-place; H, the ash-hole.

The use of this process depends upon the properties which alkaline salts have of uniting with the oily and resinous matters which are either attached to or are a constituent part of vegetable fibres, and which contain their colouring particles, forming with them a saponaceous matter, soluble in water, and by that means easily extricated from the cloth.

3d, On Bucking.

As this is one of the most general operations in bleaching, it will be necessary to describe it more particularly. *Fig. 1. Plate I.* under the word *bucking*, shews at A the form of the bucking tub or kier, in which the goods are to be laid; B is an iron boiler, in which the alkaline salts, as pot-ashes or pearl-ashes, are to be dissolved in boiling water; C is the fire-place, in which a fire is constantly kept up; D is the ash-hole; E, a cock through which the boiling ley is let out upon the goods closely placed together in the bucking tub, A. A sufficient quantity of boiling ley is let into the bucking tub, till all the goods in the tub are thoroughly impregnated with it; the ley liquor is then allowed to pass by a cock at H into an iron vessel placed in the ground at F, and from thence raised by the pump G into the iron boiler B, and thence returned hot again upon the cloth. This operation is continued for several hours, till the ley, by the separation of the colouring matter in the cloth, acquires a colour almost black, a very offensive smell, and nearly the consistence of molasses or treacle. The cloth is then taken out, well washed from its impurities, and, in the old mode of bleaching, it is then laid upon the ground to be whitened by exposure to the atmosphere, but, in the new mode of bleaching, is submitted to the action of the oxygenated muriatic acid, to procure a similar whiteness. It may be proper here to notice, that the old and new methods of bleaching are yet much the same as formerly, only in the substitution of the use of the oxygenated muriatic acid in those parts of the process, where a long exposure to the atmosphere was formerly employed after the alkaline leys.

The operation of bucking acts on a similar principle to that of boiling, but in a much more forcible manner, as a greater quantity of ashes is added in proportion to the water made use of, and more heat is received and retained in the large bulk of cloth placed in the bucking tub, which expands the fibres of the cotton, and admits the more powerful action of the alkali, as is easily demonstrated by observing the very dark colour of the alkaline leys which have been used in bucking, in comparison with those which have been employed in boiling goods. To those persons who wish for a full and minute account of the absorption and power of heat, we recommend a perusal of count Rumford's interesting essays on the subject of heat.

The black alkaline ley which remains after bucking should be preserved, as it will answer, after evaporating and calcining, as hereafter mentioned, to form again fresh alkaline salts of good quality. With a view to preserve as much of the ley as possible, it will be advisable to wring it out into a tub from the cloth or yarn, after it is bucked, by the method shewn in *Plate IV. fig. 3.* where R R are two strong posts, fixed firm in the ground, S T two wringing hooks, upon which the cloth U is twisted, to force out the liquor, by W, a winch handle, which turns the hook round on the post R. The two hooks are kept at a proper distance from each other, one by a collar at X, the other by an iron pin at Y, which runs through a hole in the square part belonging to the hook T, which square has several holes in it to bring this hook nearer to the hook S when required.

4th, Souring.

This process consists in immersing, for the space of twelve hours, or more, the yarn or cotton in a mixture of water and sulphuric acid (vitriolic acid), well incorporated; the proper strength of which mixture is about the acidity of lemon juice, and is usually directed by the taste. The four kettle should be made of lead, of a form which can be heated; the heat of the liquor should not be greater than the hand can bear with ease. This four kettle should be half sunk within the ground, as shewn in *Plate IV. fig. 2.* where M is a section of the souring vessel; N, the level of the ground; O, the brickwork; P, the fire-place, which is a half circle, or arch, without any grate; I I I, a space filled with dry ashes, betwixt the lower part of the four vessel and the brick-work, in order to preserve the heat of the liquor in that part of the vessel below the surface of the ground; K, a brick hearth, on which part of the fire is made; L, a cast iron plate, bending in the form of the four kettle, which is intended to prevent the fire placed on the floor at P K, from acting upon the lead of the four vessel; Q, the space betwixt the vessel and brick-work, through which the smoke goes to the chimney.

The construction of this apparatus is upon the same principle as the warm vats made use of by the blue dyers, the intent not being to make the liquor boil, but to keep it at a degree of heat which the hand can long and easily bear. There are no grate or bars necessary in this fire-place as the coals will burn with sufficient rapidity without them.

The goods may be put into this acid liquor either in a wet or dry state. The best plan is to immerse the goods in the evening in the acid liquor cold, let them remain covered with it all night, then in the morning make a fire and bring the liquor to a blood heat, in which state having a winch over the vessel, similar to that represented at C, *fig. 1.* give the goods a few turns over it, that every part of them may be exposed to the action of the liquor. The goods may then be lapped round the winch to drain a little, to prevent an unnecessary waste of the acid liquor, and afterwards carried to the wash-wheel, or river, to be well washed from

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the acid, so that the cloth may be perfectly tasteless to the tongue. It is a remarkable circumstance, that cloth may remain immersed a very considerable time in a strong acid liquor without rotting, but that if exposed to the air or heat of a stove, if a very small portion of acidity remains in the cloth, it becomes so concentrated by heat, as to damage the cloth immediately; therefore too much attention cannot be paid to this point.

The use of the acid liquor above-mentioned is to dissolve any earthy or metallic matters inherent in the cloth, or which may have been communicated to it accidentally, or which it may have derived from the impurity of the alkaline salts used in the bucking or boiling.

A considerable quantity of the acid liquor may be preferred by passing the goods which have been soured through a tub of clean cold water, previous to washing them, and replenishing the four kettle with this acidulated liquor, rather than water only.

5th, *Washing.*

After every operation in which acids or alkaline substances are used in bleaching, it is necessary that the goods should be well washed in clear water; it is therefore of the greatest consequence that the water of a bleach ground should be pure, and in considerable quantities, such, for instance, as is perfectly transparent, will not curdle with soap, nor yield any degree of blackness with powdered gall nuts, or, which is a more accurate test, with a tincture of galls by infusion in spirits of wine.

Various methods have been invented for the purpose of washing out the impurities of the articles to be bleached; such as cleansing them in a large current of water by shaking them with the hand in the stream, beating them on blocks of wood with a flat paddle, or hand brush, beating them on a large flat stone with long wooden levers, flatted underneath, passing them over winches placed above vessels of water, or rivers, as *fig. 1. and 3. Plate II.* passing them betwixt plain or fluted rollers, as *fig. 5. and 6.* putting them under falling mills, or fulling stocks, as *fig. 7.* or within wash-wheels, as *fig. 1. and 2.* and by many other modes, few of which are equal, and perhaps none superior, to those of which engravings are here given, for doing the business simply, effectually, and with ease to the workmen; the latter point of which is of consequence to be attended to, as it will be universally found in every mechanical employment, that if the least additional labour or care is required from the workmen, however great the effects produced, prejudice or indolence will prevent their doing justice to the invention. Under these circumstances, the wash-wheel represented in *Plate II. fig. 1, 3, 4,* is the best machine for general use, and the least liable to occasion damage to the goods. The front of the wash-wheel represented at *A, fig. 1.* is supposed to be eight feet diameter, exclusive of the buckets *B,* shewn by dotted lines on its periphery, which give it motion from the water falling into them. This wheel is divided within into four parts or quarters, by the strong arms projecting from the shafts *D,* to the outer circle; in each of these separate quarters or boxes, represented by dotted lines, one or more pieces of goods which require washing, are put loosely folded together through one of the holes *C,* of 14 inches diameter.

Fig. 2. shews the back part of the said wash-wheel, which is made of solid planks, excepting a grate of slender iron bars marked *R,* which encircles the wheel underneath the separation boards or bottoms of the buckets; the use of this grating is to admit within the wheel a current of clear water from the pipe *Q.* When an equal number of piece goods have been introduced into each of the four divisions of the wheel by the holes, *C,* &c. above mentioned, a current of clear water

is permitted to run through a cock from the pipe *Q,* against the grating *R,* which allows it to flow freely through into the boxes, or those parts of the wheel which contain the goods; a valve is then opened from the trough *P,* communicating with a large reservoir or stream of water, a sufficient quantity of which is let into the outside buckets from the valve, to give the proper motion to the wash-wheel containing the goods. In every revolution of the wheel, the goods in each quarter of it are thrown twice, by the simple motion of the wheel, with great force against the arms which form the four divisions of it; viz. once in going down, and once in rising up. The ear can distinguish by the firmness of the found when the wheel moves with proper velocity; and a greater or less quantity of water is allowed to act upon the buckets till that is attained, which usually is when the wheel makes 15 or 16 revolutions in a minute. During the whole time the wheel is in motion, the stream of clear water from the pipe *Q* flows upon the goods within the wheel in every direction; and the dirty water, produced from thus washing the goods, runs out of the wheels from a number of holes bored through the wood-work near the axle, and a few made in the front near the outer circle of the wheel. *Fig. 4.* shews an end view of the wash-wheel, about thirty inches wide, with the manner that the bucket-work is made.

It has been found to answer equally well to make use of a greater number of wash-wheels of a smaller size, as six feet diameter and two feet wide, of which several may be put in motion at once by a large water-wheel, horses, or a steam engine.

The goods, when taken out of the wash-wheel, are to be unfolded, and taken to the river to be streamed, or may be washed from any impurities which may remain in the folds by means of a winch *N,* *fig. 1. and 3. Plate II.* where six pieces of cloth are represented in the action of washing in a large wooden hack divided into six partitions, to prevent the pieces of goods entangling with each other. *Fig. 1.* is a side view of the operation, where the dotted lines represent the partitions which separate the goods; *I,* a trundle wheel, which being put in motion by the cogs, *H,* of the wash-wheel, turns the winch on its axle, which winch may at any time be detached from it by the handle *M* drawing the catch *K* from the hook, as is shewn in the top view *fig. 3.* where also is explained, at the letters *OOOOO,* the manner in which each piece of goods is kept in its proper place on the winch, by the partitions above mentioned, and by angular slips of wood nailed to the back and partitions.

To assist the drying of the goods after washing, they are usually passed betwixt two small rollers, commonly called squeezers, represented at *fig. 5,* where *G* is a solid wooden frame, containing two wooden rollers, each from 10 to 16 inches long, on an iron axis, which rollers receive a proper pressure by means of the two screws *T* acting on an iron bar *V,* which rests on the two ends of the axis of the top roller, as shewn by the dotted lines. In proportion as the screws press the iron bar upon the axle of the top roller, it brings that roller closer in contact with the bottom roller, and occasions more water to be pressed out of the cloth, which is passed betwixt them loosely drawn together, something like a rope, and the goods therefore require less time in the subsequent drying. In this plate the squeezers are connected with the wash-wheel above mentioned by a square iron socket, which, as is shewn at *F,* slides occasionally upon the squares of both axes. *Fig. 4.* shews at *S* the buckets of the wash-wheel, on which the water falls to give it motion; *H,* the cogs round its axle, which work the trundle wheel *I.*

Fig. 6. Plate II. shews two views of another machine used for cleansing cotton goods, consisting of two fluted or grooved

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grooved rollers, in the section of which *a* represents the hills, or bottom timbers; *b b*, the two supports or side pieces; *c*, one of the upright pieces in which the axles of the rollers are placed; *d d*, the two cross pieces to secure the frame work below; *e e*, the two rollers with grooved channels which fit to each other; *h*, one of the levers, which, from a point *i*, shewn by dotted lines, presses on the round end of the axle of the top roller, more or less, according as the weight *k* is placed on the lever further from or nearer to the axis of the roller.

In the geometrical elevation of the same machine, *ee* shews a front view of the two rollers; *f g*, the winch to turn it, with a hollow wood handle upon the iron work; *l*, the axis of the upper roller projecting beyond the side timber, so as to admit one of the levers *b* above mentioned to press upon it.

The wet goods, by being passed backwards and forwards through these fluted rollers, which are constructed at a much less expence than wash-wheels, are considerably cleaned, but not so perfectly as by the wash-wheels above mentioned.

Fig. 7. Plate II. explains another mode of cleansing goods, and is applicable to cotton, linen, or woollen goods, but more generally to the two last, as, without great care in its management, it is very apt to tear or damage cotton goods. This machinery is usually termed falling stocks, or falling hammers. *N^o 1.* is the axle of the water-wheel, in which are fixed tappets at 2, to raise alternately the levers 3, 4, furnished with large wooden mallets or hammer heads 6, 8, channelled at the lower part as at 8. These lever hammers or fallers, work from a pin fixed in the upright at 7; 9 is a strong piece of timber hollowed out at 10, to receive the goods to be cleansed; 11, a piece of timber fixed a-slant to keep the fallers in their proper place, and direct their motion; 12, a chain fastened to each faller, serving by means of the hook 13, to suspend the faller whilst the goods are put in or taken out of the cavity 10.

When the goods to be cleansed are placed in a loose bundle in this cavity, the hammers are let down upon them, and put in motion alternately by the tappets 2, in rotation, which raise the levers to a certain height, and then quitting them, the hammer heads by their great weight, fall with great force on the goods in the cavity below them; and a current of clear water being admitted upon the goods from a cock above them, the dirty water runs out at a hole in the bottom of the cavity. The falling of the hammers gives a slow circular motion to the goods in the cavity, so as to expose the several parts in rotation to the action of the hammers.

Having noticed the vessels made use of in bleaching, and the general nature of the several operations, we shall now proceed to mention the origin of the several improvements made in this art, and their application to practice.

Under the operation of steeping, we have shewn the method of removing the colouring matters not natural to the vegetable, but acquired in the manufacture, and which may probably be best done by water alone, though sometimes some of the old leys, which have been previously used to other cloth, are employed to this purpose. After the steeping, and indeed after every application of bleaching agents, it should be laid down as a general rule, that the cloth or goods be carefully washed in cold water.

In the old method of bleaching, alkalies, such as pearl or pot-ashes, were, after steeping, applied by bucking or boiling, with alternate exposure to the atmosphere.

Alkalies acting so important a part, it is necessary to describe the bleachers' mode of using them, which consists in dissolving them in clean water, and thus forming what is

termed an alk-ley. To which the more intelligent bleacher, if he does not make use of American pot-ash, or that of a similar quality, adds $\frac{1}{4}$ of quicklime, whereby the ashes are rendered caustic, and their power materially augmented. But in order that no inconvenience may arise from causticity, after mixture, the whole is allowed to settle, and from the pure liquor thereof the work is afterwards supplied; the bleacher, in drawing it off, reducing it by the addition of water to the different strengths which the goods may require.

The ley being prepared, the bleacher proceeds to apply it to the cloth by bucking or by boiling.

In bucking, the alkaline ley is put into the boiler before described, near to and below which is the wooden vessel called a kier, in which the goods are loosely and regularly arranged. After this, a fire is put under the boiler, and beginning whilst the ley is yet cold, it is made to circulate through the cloth in the kier, from which it runs into the iron vessel placed in the ground, from this it is pumped up into the boiler, and again returned upon the cloth in the kier; and this circulation is maintained, and the heat at the same time increased, until the ley be so far concentrated by evaporation, as at last to remain almost wholly in the cloth. This is generally the operation of a day, and the cloth is allowed afterwards to remain thus impregnated with the concentrated ley until next morning.

In boiling in alkaline leys, the mode of which has been before described, the operation is continued from one hour to five or six hours, but it is more tedious and less effectual than bucking, where much business is to be done.

After bucking or boiling, the goods were, by the old bleaching process, exposed for at least a week to the air, before they were again submitted to the action of alkaline leys, and this process alternately repeated many times, till the goods were perfectly white, and the goods at last soured and washed off.

To explain the *old method of bleaching* more particularly, we shall add the following process for bleaching linen cloth.

Steep your raw linen cloth in a wood vessel all night, then change the water, and add fresh till you perceive the water to be no longer discoloured by it; rinse, wring, and lay it on the ground, and water it if you have opportunity. When it has thus lain on the grass three or four days, and is dry, take hold of each piece one after the other by the selvedge, and draw the cloth to you, still holding it in the most even manner you can, until you get the further end, with the corners of which further end you tie the cloth very loosely in the middle of the folds, and so lay it in the bucking tub, with the two selvedges upwards.

Thus proceed till you have placed as much cloth in your tub as will cover the bottom of it, taking care not to pack the cloth so close but that your ley may penetrate every part equally. When you have laid the first range of cloth in your tub, pour upon it as much milk-warm ley as will sufficiently soak through all parts of your cloth. Then lay another range in the same manner upon the first, and pour on more ley till that be soaked as the other was, and continue so to do till your bucking tub be full of cloth.

That done, you must begin to buck for twelve hours together, the remainder of your ley having been put in the pan with a slow fire underneath. For the first five hours the ley should not be of a boiling heat; you must from time to time allow some of the ley to run out of the pan upon the cloth in the bucking tub; then increase your fire gradually and slowly, so as in four hours more to bring it to a boil, continuing to put on the ley, and draw it off your cloth in small quantities at a time. When your ley begins to boil, you must let it boil on for three hours, during the whole

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time pumping your ley up to the boiler from the reservoir, into which it runs from the cloth, and returning it boiling hot upon the cloth, so that the hot ley may act powerfully and equally upon every part thereof.

After each bucking your cloth must be laid upon the grafs in the bleach-field for some days. The bucking, and exposure on the ground, must be repeated about ten times successively, according to the nature of your cloth; it should then be dried up, soured, and washed well in clean water; if the water is rather warm, the better.

Your two first buckings ought to be from a strong caustic ley of pot-ashes; but afterwards you should abate of that strength, lest it should injure your cloth. Mild ley, or pearl-ash, should be used for the latter buckings, as the cloth becomes nearer white.

This was the management during the summer months; but for four months in winter bleaching was suspended, the operations being periodically interrupted, and the capital of the manufacturers or proprietors of the goods locked up. Even during the bleaching months, their property was long in preparing for sale; as cotton goods, which required from four to six applications or repetitions of alkaline leys, consumed so many weeks in bleaching, whilst linens, which could not be bleached by less than from twelve to twenty applications, could not be brought in a marketable state to the proprietor hardly in six months.

Such was the state of bleaching till Mr. Scheele, a Swede and eminent chemist, discovered the properties of oxygenated muriatic acid, procured by mixing manganese with marine acid, in rendering vegetable matter white; and M. Berthollet, the celebrated French chemist, improved this operation, and actually applied its powers in bleaching cotton goods by interposing its action between the different alkaline operations instead of the tedious exposure of the goods to an uncertain atmosphere; the same effect being produced by immersion of the cloth in this acid, as by laying the goods upon the grafs in the bleach-field, exposed to air and light.

Discovery of and Variations in the Mode of procuring the Oxygenated Muriatic Acid.

By the addition of vitriolic acid to common salt, an elastic aeriform fluid, or muriatic gas, is disengaged, from which with water a marine acid is produced. The mineral substance manganese, or what the modern chemists call oxyd of manganese, contains what was formerly denominated vital air, pure air, or dephlogisticated air, but now named oxygen. Manganese yields oxygen, when marine acid is added to it, and submitted to distillation; the liquor produced by the contact of this oxygen with water, is the oxygenated marine or muriatic acid discovered by Mr. Scheele, about the year 1774, when he observed and applied its effects in rendering colourless vegetable substances of various kinds, more as a matter of curiosity than use.

M. Berthollet, in the year 1786, improved the process of its preparation, applied its power to bleaching or destroying the vegetable colours natural to cloth, the result of which experiments he gave to the world in the year 1789; but, without derogating from the merit of this excellent chemist, it is justice to state, that, previous to any publication by M. Berthollet, Mr. Scheele communicated to M. Kirwan the properties of the dephlogisticated marine acid in whitening vegetable substances, and Mr. Kirwan, then residing in Newman-street, London, suggested to Mr. C. Taylor, the present secretary to the Society of Arts, &c. the probability of its use in bleaching; and a whole piece of callico, in the state received from the loom, was, in the spring of 1788, actually bleached white, printed in permanent co-

lours, and produced in the Manchester market ready for sale, having undergone all these operations in less than 48 hours, by the joint efforts of Mr. Cooper, Mr. Baker, and Mr. Taylor, which is perhaps the first entire piece, either in France or England, that fully ascertained the real merits of the new mode of bleaching, and a certainty that it might be generally useful in commerce. This experiment was immediately followed by the establishment of a large bleaching concern by Mr. Cooper, Mr. Baker, and Mr. Horridge, at Raikes, near Bolton, in Lancashire, and before any considerable bleaching work was actually at work in France.

The ingenious Mr. Watt we believe to be the first person who simplified the process of preparing the oxygenated muriatic acid, by means of a mixture of common salt and manganese, previous to the addition of the vitriolic acid. Soon afterwards the operations of the bleacher were further facilitated by the substitution of large and commodious stills of lead, instead of glass vessels, and both these improvements have since been in general use.

We shall now proceed to mark the various treatment of the oxygenated muriatic acid when obtained, and the different means which have been adopted to fit it for application in bleaching.

It having been found in the earlier stages of distillation, that common marine acid was produced instead of the dephlogisticated or oxygenated muriatic acid; and from the violence of the ebullition, that manganese itself was sometimes thrown over from the still, M. Berthollet had recourse to an intermediate vessel, containing water, to absorb the marine acid gas, and stop other impurities which might contaminate the oxygenated muriatic gas in its passage through this vessel to the receiver.

It will here be necessary to discriminate the various modes in which the oxygenated muriatic gas has been treated, after passing the intermediate vessel last mentioned.

Mr. Scheele seems generally to have operated with the acid in the state of gas; but M. Berthollet sought to condense it in water, with which he filled his receiver, or wooden vessel, and which water he kept agitated during the distillation, to accelerate the solution or combination of the gas.

The oxygenated muriatic acid, thus prepared, was drawn from the receiver into kiers, or large wooden vessels, where its strength was regulated by the addition of water; after which, the goods to be bleached were immersed therein from six to twelve hours, but most frequently during the night; and though these periods may seem short, they were sufficient to allow the cloth to become more white than could be done by as many days' exposure to the atmosphere and a summer's sun, and were then ready for a fresh application of the alkaline leys.

Such was the bleaching liquor of M. Berthollet; but it was found in practice yet defective, as the volatility of the gas occasioned its speedy separation from the aqueous solution; a decomposition even by light alone in glass vessels took place; a rapid loss in the strength of the liquor when exposed; and much danger to the health of the workmen from its suffocating quality; at the same time, that in extracting the natural colours of the cloth, it also tended to discharge the colours dyed in the yarn, and were along with the gray cotton an imperfection which precluded its use in an infinite variety of British manufactures.

Similar circumstances probably led some bleachers resident at Javelle, in France, to add a solution of caustic alkali to the water in the receiver, and by this means to remedy many of the defects complained of.

But M. Berthollet continued to recommend his process, considering such substance as impairing the bleaching powers;

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an idea that was generally maintained by the chemists, but contradicted by the bleachers, whose experience taught them, that though the acid thus combined whitened with somewhat less rapidity, yet it was not eventually in an inferior extent; and the advantages of preserving the colours dyed in the yarn, compelled them to have recourse to the expensive addition of pot-ashes, in preference to M. Berthollet's mode.

Here we shall observe, that, according to the doctrine of the modern chemists, the oxygenated muriatic acid bleaches in consequence of yielding to the colouring matter of the cloth that oxygen which, in the distillation, the acid absorbed from the manganese; or, in the language of Stahl and Becher, that the dephlogisticated marine acid absorbed the colouring matter from the cloth, and was restored to its original state of common marine acid, by regaining that phlogiston which it had, in its preparation, yielded to the manganese.

In the mixture of an alkali with the acid, we have noticed that the bad consequences arising from its volatility have been corrected, and the requisite protection afforded to dyed colours, yet still that its power of whitening cloth was not diminished, nor much more time taken up by the operation; yet, in part from deference to M. Berthollet's opinion, and in part owing to the expense of the alkali, other means to produce the effect were attempted.

One of the first of these, practised by the bleachers of cotton-hose, at Nottingham, was to receive the dephlogisticated muriatic gas into a small air-tight chamber, in the upper part of which the goods were suspended from a frame, whilst at some distance below was water, sometimes impregnated with ley of pot-ash, and sometimes with lime-water, or water mixed with lime. The gas was introduced betwixt the fluid and the goods, amongst which it ascended and mixed; at the same time, by occasionally immersing the goods in the fluid below, it was sought to modify the action of the acid. This was effected by means of a pole, or long lever, connected with the frame on which the goods were suspended, the centre of which pole moved on a swivel fixed in a hole in the partition, occasionally stopped with clay, and enabled a person to let the goods down into the fluid, not always however without inconvenience, which occasioned it the name of the *Bedlam Process*.

Respecting the above process it must be observed, that the acid is much more powerful or active in the state of gas than in any other way; and though the occasional immersion of the goods into the fluid below, corrected in some degree its violent effects, yet the dyed colours disappeared more rapidly in this than in any other process, and the fabric itself was sometimes injured.

The next process attempted by the bleachers, was to put into the receiver, filled with water, a quantity of pulverized lime, then the goods themselves, and the whole agitated during the admission of the gas; the consequence of which was, that the goods thus mixed with lime were partially coated with it; and this coating being unequal, the action of the acid upon it was irregular, leaving at the same time the parts uncoated to receive the whole action of the bleaching powers; hence inequality of bleaching ensued, and an insurmountable difficulty in preserving the dyed colours of the goods to be bleached.

Having noticed the imperfections of the two last processes, we shall observe that lime-water, or a pure chemical solution of lime in water, has been sometimes substituted instead of a solution of alkalies in the receiver, but was not, when used in that manner, found to answer so well as the alkaline solution.

That lime-water could produce no valuable effect beyond what was derived from M. Berthollet's mode, or from simple water, must be evident, when it is considered that water can dissolve no more than $\frac{1}{75}$ th part of its weight of lime, a quantity wholly insignificant in neutralizing the oxygenated muriatic acid for the purpose of the bleacher; nor could pulverized lime, merely thrown into the water of the receiver, serve a better purpose, since, from its being specifically heavier than the water, all beyond the quantity in chemical solution subsided and remained nearly useless at the bottom of the receiver.

It has been already mentioned, in noticing the application of alkaline leys in bleaching, that the more intelligent bleachers, in preparing their ash-leys, made use of quicklime to augment the power of the alkali, when such alkali was in a mild state, or, in other words, combined with fixed air, or, as it is now termed, carbonic acid; the attraction of caustic lime for the carbonic acid being stronger than that of ashes. Hence, on caustic lime being thrown into mild ash-ley, the carbonic acid, by which the ashes were rendered mild, abandons the alkali to combine with the lime, leaving the ashes in their caustic state.

But, although the attraction of carbonic acid is stronger for lime than for alkali, the contrary is the case with the oxygenated muriatic acid, as it abandons lime to combine with ashes, leaving the lime to precipitate.

This observation is made in order to guard the ignorant bleacher from mistakes, who, from having mixed lime with his ash-ley in the receiver, in the preparation of the oxygenated marine acid, may suppose it acts in a similar manner; but not a particle of lime is acted upon by the acid, whilst ashes remain to combine with it; the only effect of the lime there, being to abstract from the ashes any fixed air they may contain, and so dispose the alkali to absorb more of the oxygenated muriatic acid.

Besides the processes above mentioned, the bleachers attempted to unite the oxygenated muriatic acid with clay; but as the clay has scarcely any affinity with it, the liquor thus made was little, if at all, superior to that of M. Berthollet.

Such were the attempts made from the year 1786; and the oxygenated muriatic acid combined with pot-ash was in general use by the bleacher until 1798, when Mr. Tennant, of Glasgow, by a well conducted series of experiments, formed what may not improperly be called a new era in bleaching.

Mr. Tennant, having seen so long a period elapse without any material improvement in bleaching, and the alkali, though an expensive ingredient, regarded by the bleacher as an indispensable article to unite with the oxygenated muriatic acid in the receiver, made some trials with the earths stromtites and barytes, and with success. Their solubility in water enabled him to combine them with a sufficient quantity of oxygenated muriatic acid to serve the purpose: but the scarcity of stromtites, and the difficulty of separating barytes from the vitriolic acid, with which it is usually found in combination, rendered these discoveries rather objects of curiosity than use.

Mr. Tennant had previously made experiments to combine the oxygenated muriatic acid with lime and lime-water, in the modes above-mentioned, but found they were not adequate to the purposes intended; the lime in general remaining at the bottom of the receiver uncombined with the gas, which was the necessary consequence of the lime being specifically heavier than the water, and the gas much lighter; the water, by its interposition betwixt the two substances which ought to be combined, namely the oxygenated muriatic gas and the lime, preventing their union. To bring the pulverized lime into contact with the gas as quickly as

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it entered the receiver, became then the object of his attention; and for this purpose he found it was necessary to keep the lime floating, or diffused through the fluid, which he succeeded in accomplishing by two different methods; one of which was by increasing the specific gravity of the water in the receiver, by the addition of common salt, and thus retarding the lime from subsiding; the other mode was by constant agitation of the lime in the water in the receiver, to keep the lime diffused through the fluid, during the time the oxygenated muriatic gas was introduced; and by this means he succeeded in uniting and retaining a much greater quantity of gas with the mixture, than by any method heretofore used, and without the addition of any ashes or alkaline substances.

A very material advantage was gained by this discovery; namely, that it uniformly afforded security to the dyed colours in a superior degree to the alkaline ley.

It is well known, that in the alkali of commerce, such as pot-ash or pearl-ash, a large and very irregular proportion of neutral salts is intermixed, which are soluble along with the alkali in water, thereby so far contaminating the ley, that the bleacher is always uncertain what quantity of pure and active alkali it contains. In bucking or boiling cotton goods, the detriment from these neutral salts is not so great, as a repetition of the process may compensate for those admixtures in the ley; but in the bleaching liquor formed by the mixture of the oxygenated muriatic gas with such ley, if there is a deficiency of alkali, the uncombined oxymuriatic acid immediately attacks the dyed colours of the goods, and discharges them, and thus considerable damage frequently occurs before the real origin of the evil is ascertained and corrected. The bleacher is kept in a constant state of alarm respecting the quality of the ashes he makes use of, besides the great cost of their purchase. In using lime for the same purpose, the expence is a mere trifle; what is not combined with the oxymuriatic acid precipitates, after the agitation is over, leaving a pure liquor free from all uncombined acid.

Simple as the combination of the lime with the oxygenated muriatic acid may now appear, yet it was a long time attempted in vain; but this, perhaps, will not be such a matter of surprize, when we reflect that the French chemists, whose opinions were regarded generally as law by the common bleachers, and whose treatises on the subject of bleaching were almost the only accounts published, considered lime as no farther useful in bleaching, than in absorbing the carbonic acid or fixed air usually combined with alkalies or ashes; and thus rendering the alkaline ley more disposed to unite with the oxygenated muriatic gas, when exposed to its contact in the receiver, to form, as it is called, the liquor de Javelle; or when intended for use as a mere alkaline ley, to render its action more powerful on the oily particles in the vegetable fibre, on a similar principle to the formation of soap.

An excellent treatise on the subject of bleaching, in the English language, viz. "The Report on Experiments made by order of the right honourable the trustees of the linen and hempen manufactures to ascertain the comparative merits of specimens of oxygenated muriatic bleaching liquors," published at Dublin in the year 1791, in claim of a bounty offered by the trustees, appears to convey no further knowledge of the use of lime in bleaching at that time than in promoting the separation of the carbonic acid from the leys, whether they were afterwards to be used alone, or in the preparation of the oxygenated muriatic acid. Mr. Rose's experiments in this report contain, however, much useful information, which we shall further notice.

The simplicity of Mr. Tennant's invention of retaining a greater quantity of the oxygenated muriatic gas, by agitation of a sufficiency of lime in the water of the receiver, should be no derogation to its real merit. In substituting lime for pot-ash, an article, not only of foreign produce, but expensive, he has benefited this country, to an extent almost beyond conception; it having been proved upon oath, that by the use of Mr. Tennant's process, the consumption of ashes at a single bleaching-green has been reduced three thousand pounds sterling in value in one year. A patent for Mr. Tennant's invention was granted him in the year 1798; but as frequently happens in patent causes, on a late trial of its validity, some circumstances arose from which the jury thought themselves justified in reversing the patent; we have therefore with considerable pains collected for the public benefit an account of his process, and the most approved mode of putting it in practice, either on a small or an extensive scale, as will be seen by a reference to *Plate I.* of *Bleaching* hereafter described.

Mr. Tennant's method of using calcareous earth for neutralizing the muriatic acid gas, and forming the oxy-muriat of lime employed in bleaching is as follows; viz.—In a receiver capable of containing one hundred and forty gallons wine measure, dissolve thirty pounds of common salt, which appear useful only in giving an additional degree of specific gravity to the water, and by that means making it easier to keep the lime to be afterwards added, in suspension; when this salt is dissolved, add sixty pounds of finely powdered quicklime, and into the retort of the apparatus put thirty pounds of powdered manganese, mixed up with thirty pounds of common salt, upon which pour thirty pounds of sulphuric acid (oil of vitriol), previously diluted with its bulk of water, and the usual precaution of luting the vessel being taken, proceed to distillation. When the gas begins to appear, the agitation of the lime and water in the receiver must commence, which should be continued by means of a wooden paddle or rake, or similar contrivance, without intermission, until the materials in the retort, after heat being employed as usual, will not yield any more oxygenated muriatic acid gas. Then the whole should be allowed to remain at rest for two or three hours, when the clear liquor in the receiver, may be drawn off for use, and mixed with water in such proportions as may be found necessary, previous to the immersion of the goods to be bleached.

The principal point of attention in preparing this oxygenated muriat of lime is, to obtain a complete diffusion of the lime through the mixture, or a mechanical suspension of it in the water during the operation, so that every particle of the lime may, by agitation, be exposed to the action of the gas, instead of merely its upper surface, as had been formerly practised. By the present means, the oxygenated muriatic acid gas is absorbed with ease, and meets with a sufficient quantity of lime to produce a strong solution of oxygenated muriat of lime, without any uncombined oxygenated muriatic acid; a thing which could not be otherwise effected. The addition of the common salt in the receiver may even be omitted, without prejudice, if the agitation of the lime be well managed.

Plate I. fig. 2. of *Bleaching*, shews a longitudinal section of a method, which has been practised in Ireland for distillation of the oxygenated muriatic acid, and the formation of the oxygenated muriat of lime. *a*, the ash-hole; *b*, the fire under the iron pot or vessel; *c*, the aperture through which it is supplied with coals; *d*, the entrance to the ash-hole, which may be provided with a stopper of burnt clay, or earthen ware, to regulate the draught of the fire, by means of the handle shewn by dotted lines; *e*, a cast-iron pot or vessel,

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vessel, nearly filled with water, in which the leaden retort is placed; *f*, a tripod of iron, on which the retort stands; *g g*, the leaden retort, from which the gas is to be distilled; *b*, a tunnel of bent lead, through which the oil of vitriol (sulphuric acid) is to be introduced into the retort; *i*, a leaden cover, fitted and luted to the neck of the retort, having three apertures, viz. for the introduction of the tunnel, the rod of the agitator, and the tube of the condenser; *k*, the agitator, formed of a rod of iron coated with lead, having some arms at its lower end to stir the materials within the retort. At the part where the rod passes through the cover, a leaden collar or cap is soldered, to prevent the agitator from descending too low; these two parts are made in a conical form, to fit exactly, and thus prevent the escape of the gas; *l*, a leaden tube or pipe, of three inches bore, to conduct the gas into the tubulated reservoir; *m*, the leaden reservoir, formed upon the principle of Wolfe's apparatus; the tube, *k*, descends by the first aperture, *m*, to the bottom of the reservoir, which is about two thirds full of water. The small portion of sulphuric acid, which rises in distillation, unites with this water; the oxygenated muriatic acid, which traverses this water, passes by the pipe, *n*, into the receiver or condenser, *o o*, which is a wooden vessel, in the middle of which is placed an agitator, *p*, the arms of which raking up the lime cause it to combine with the gas, in proportion as it arises in bubbles from the lower extremity of the leaden pipe, *n*.

The projections of wood, *q q q q*, fixed to the staves within the tub, counteract the rotatory motion of the arms of the agitator, and thus assist the combination of the gas with the lime and water. The cover of this tub is fixed close upon the edge of it at *r*; the cover having a groove in it to unite them tighter together; *s*, a cock to draw off the liquor, when sufficiently impregnated for use; *t*, a wooden handle to give motion to the agitator. The joints may be luted with clay, to prevent the escape of the gas.

Fig. 3, and 4, shew Mr. Tennant's improved machinery for preparing the oxy-muriat of lime. The outline, *A*, (*Pl. 1.*) is the still, made of lead, of a circular form, having a double flange at the top, which is filled with water, to prevent the gas from escaping in that direction. *B*, the leaden cover of the still, having a flange on the under side, which goes into the double flange of the still, and having a double flange on the upper side, which is filled with water; the inner part of this double flange consists of a short tube, which goes quite through the cover, opening by this means a communication with the still, and allowing the gas to escape through the long leaden pipe inserted into it, and from thence into the receiver, as explained at *fig. 4*, where there is a section of the still, furnace, and receiver; *a*, the still; *b*, an iron pan in which the still is placed on an iron stand; this pan is then nearly filled with water; *c*, the fire-place; *d*, the furnace door; *e*, the ash-hole; *f*, double flange filled with water; *g*, the cover, with flanges on the upper side filled with water. *D*, the receiver, made of wood, and lined with lead; *i*, a double flange filled with water, the interior pipe communicating with the inside of the receiver, and bent horizontally as at *k*, from whence the gas issues into the receiver; *l, l*, two short pipes inserted in the top of the receiver, through which the rods of the agitators have a free motion; *m, m*, a stopper in the top of the receiver, closed when the receiver is at work, but sufficiently large, if removed, to admit a person into the inside to repair or cleanse it, when necessary; *n, n*, two paddles, or agitators, generally of a square form, and of a similar construction to the head of a churn staff; *o, o*, the rods of the agitators attached by iron pins to the lever, *q*, which lever has slits at

the place of junction, to allow the rods to rise and fall perpendicularly; *p*, the fulcrum or support of the lever; *q*, the lever, which, by a proper motion communicated to it, alternately raises and depresses the agitators in the receiver; *r*, a rod connecting the lever *q*, with the lever *s*, which last lever is put in motion by the wheel *E*; *t*, a balance weight placed at the other end of the lever; the beam supporting the fulcrum of the lever being near the letter *s*. *E*, the wheel to be put in motion by water, or in any other way, having a crank, *u*, communicating by an upright shaft with the lever *s*.

It will be found that the flanges, filled with water, preclude the necessity of the application of any lute, and occasion the operation to be conducted in a cleaner, cheaper, and more expeditious mode, than formerly employed.

To describe the proportions of the several articles used in the process of bleaching, would carry us far beyond the bounds which can be allotted in the present publication; we shall, therefore, give the following short but clear account of the mode we recommend to be practised, to procure the most perfect and durable white on cotton goods, after their being taken from the weaver; which is, first, to wet them thoroughly in cold water; then to allow them to steep in cold, or lukewarm water, from 12 to 36 hours, according as they are of a strong or thin fabric; then to wash them well in clean cold water; afterwards to buck or boil them in a caustic alkaline ley; then to wash the goods well in clean water, and afterwards immerse them in diluted oxymuriate of lime; and wash them, repeating the operations of the alkaline leys, and the oxymuriate of lime, till the goods are perfectly white; then to pass the goods through the diluted sulphuric acid liquor, washing them well afterwards; lastly, to pass them through a weak ley of pearl-ashes, or of soap, and again through clean water, before drying and finishing them; which finishing of the goods consists in starching, blueing, rolling, or callendering them as fashion directs, or the particular market for which they are intended, may require.

It is to be remarked, that the immersion of the goods in the vitriolic fours, and also in pearl-ash, or soap liquor, is necessary at the end of the process, to prevent a brown hue which the cloths that are bleached white from the oxygenated muriatic acid, without such precaution, are apt to revert to.

By experiments made at Rouen on cotton thread, with a view to ascertain whether the old or new mode of bleaching was more prejudicial to the fabric, it was proved that the cotton thread bleached in the new mode bore, without breaking, considerably more weight than that bleached in the old method, and was less injured in texture.

In the report on experiments, made by order of the trustees of the linen and hempen manufactures at Dublin, in the year 1791, with a view to ascertain the comparative merits of several specimens of bleaching liquors sent for their examination, the following mode of bleaching appeared to be the best for linens, and though executed on a small scale, will convey the principal necessary information.

May 11th, 1791. The linen was steeped, in the state received from the loom, in to water of a heat sufficient to bear the hand, and left in the vessel.

May 16th. The linen was washed out of the liquor, in which a pretty strong fermentation was observed to have taken place.

May 17th. Finished making a mother-ley, which was made in the following manner: three pounds and a half of lime were slaked, and mixed with ten gallons of water; fourteen pounds of Danzig pearl-ash were dissolved in some of this water; then mixed the whole; when it had settled, it

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was filtered through a coarse cloth, and the residuum washed repeatedly in four gallons of water, to obtain the whole strength of the alkali; the whole fourteen gallons being then carefully mixed, the ley proved, by very accurate weighing, to contain twelve ounces of caustic alkaline salt to the gallon. From this, a ley was made from the work, by adding six parts of water to one of the mother ley; thus each gallon of the working ley contained one ounce, five drachms, and forty-three grains of caustic alkali.

The boiler being charged with this ley, the linen, which had been spittle washed, was steeped in it cold for one hour; then brought up by a very gentle heat to a simmering boil, which was continued for three hours; the cloth was then well washed out, and left in steep for that night.

May 18th. Washed out the above linen in fresh water; hung it on cards in the open air, watering it several times in the day.

May 19th. Finding the cloth not so well cleared as could be wished, the boiler was again charged with one of mother-ley, to four of water, which made the strength two ounces, three drachms, twelve grains of caustic alkali to the gallon. In this was boiled another piece of linen which had been spittle washed as the others; and after it was boiled, it was well washed out.

May 20th. Steeped the whole of the linens for six hours in the liquid prepared with the oxymuriatic acid of the several claimants; afterwards washed them well out, and left them steeping in cold water all night.

May 21st. Washed out all the above linens, and when dry, boiled the whole parcel as before in one of the mother-leys, to five of water, containing two ounces of caustic alkaline salt to the gallon; washed them well out of the ley, and left them to steep in pure water till Monday morning, the 23d instant.

May 24th. Steeped the linens for the second time in the oxygenated muriatic acid for six hours; then washed them out, and left them to steep all night in cold water.

May 25th. Having charged the copper with a ley made from one of mother-ley, to six of water, containing one ounce, five drachms, and forty-three grains of caustic alkaline salt to the gallon, the linens were boiled in this for the third time, with a very gentle simmering heat for three hours; they were then washed out, and left to steep.

May 27th. Steeped all the linens for the third time six hours in oxygenated muriatic acid as before; washed them out, and left them in water all night.

May 28th. Immersed all the linens which had been steeped yesterday in the oxygenated muriatic acid, in a weak vitriolic acid for four hours; then washed them out, and left them steeping in cold water.

May 29th. Washed and dried the linen cloth which had been soured yesterday.

June 1st. Boiled all the linen which had been soured in a strong lather of soap.

June 2d. Soured and washed out all the linen which had been boiled in a soap lather yesterday. This operation finished that experiment, in which the above linens were first steeped in water; then boiled in caustic alkaline ley, and steeped in oxygenated muriatic acid alternately four times; then soured in vitriolic acid, soaped and soured again.

The above experiments were made, with various others, by Mr. John Arbuthnot, and Mr. John Clarke; and on the trials of the different specimens of the oxygenated muriatic acid, the preference was given to that prepared by Mr. Robert Roe, of Bing's End, on the principle of the javelle liquor mentioned by Mr. Bartholles, by adding a solution of alkali in water in the receiver. Mr. Roe's best prepara-

tion, of which was made by adding thirty-eight pounds of quicklime to 114lb. of pearl-ash, which made a caustic ley of about nine pounds weight per gallon; he found caustic ley more susceptible of imbibing the gas and retaining it, than mild ley of equal strength.

From the different experiments made to bleach various articles at the above time, the following inferences may be deduced, viz. that allowing cotton or linen, when raw from the loom, to ferment, by steeping in warm water a considerable time before boiling the cloth in an alkaline ley, is of considerable service.

That cloth or yarn is not injured by steeping for six hours together in oxygenated muriatic acid.

That strong alkaline leys answer better than weak ones, at the commencement of using the leys.

That the white colour of bleached cloth can be better judged of wet than when dry.

That very minute attention in excluding light and air is not absolutely necessary in bleaching with oxygenated muriatic acid.

That purging or clearing yarn or cloth in an alkaline ley, previous to steeping in oxygenated muriatic acid, is absolutely necessary.

That the bleaching liquids made from oxygenated muriatic acid, in which alkaline salt is blended in the composition, require the cloth to be frequently steeped in vitriolic acid; and that the oxygenated muriatic acid made with water only, make more frequent boilings of the cloth in alkaline leys necessary.

That the loss of the cloth in weight, when bleached by the new method, is only one fourth, but by the old method one third.

That steeping in warm water is infinitely better to extract the sown and dirt from the raw cloths, than boiling them with soap or ley immediately as they come from the loom.

The liquors of the oxygenated muriatic acid, and also those made from the vitriolic acid, may be repeatedly used without detriment, till the whole strength is exhausted.

The cloth or linen, in the acid bleaching liquors, should be moved in the liquor every hour, that every part may be equally cleared.

It is difficult to ascertain the strength of the leys proper for use in bleaching cotton or linen, as the alkalies or ashes differ so greatly in purity, and the admixture generally found in them of neutral salts prevents the hydrometer from being a regular test. The common allowance for bleaching linens in Ireland, is stated by Mr. Higgins, in his ingenious memoir in the Transactions of the Dublin Society, to be for sixty gallons of water, six pounds of barilla, or four pounds of pot-ash at the least, and most bleachers use more than this.

To discover adulterated pot-ash, Mr. Higgins recommends the following method. The specimen of ashes being first weighed, is digested for a few minutes on a sand-bath, in twice its weight of water, in a heat of about 212 degrees, and instantly stirred. It is then removed from the sand-bath, and before it is cooled to the temperature of the atmosphere, it must be filtered through paper. When all the liquor has passed through the filter, a small quantity of cold water is gradually poured upon the saline residuum or the filter, in order to wash through the whole of the alkali. The undissolved salt sulphate of pot-ash (vitriolated tartar,) remaining on the filter, is afterwards dried and weighed, to ascertain the quantity.

To determine whether any common salt is suspended in the liquor which has been filtered, evaporate the clear solution a little on a sand-bath, and set it in a cold place for 24 hours.

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hours; at the end of which time, any common salt it contains will be found crystallized in regular cubes at the bottom of the vessel; pour off the clear liquor, and repeat the process, till no more cubic crystals are produced. If it is desired to be very accurate in the analysis, before the common salt (muriate of soda) thus procured is weighed, some muriatic acid may be poured upon it, in order to take up any of the pure pot-ash which may have adhered during its crystallization. The muriatic acid, with such of the alkali as it has dissolved, may be then drained off and thrown away, and the muriate of soda dried and weighed.

The sum of the impurities being then subtracted from the weight of the specimen, the quantity of the pure pot-ash is ascertained.

To shew what quantity of mere alkali is contained in 100lb. avoirdupois of several different alkaline salts examined by Mr. Kirwan, we shall add the following table, published by him in the Irish Transactions, in 1789.

One hundred Pounds.	Mineral Alkali.
Crystallized soda - yielded	20lbs.
Sweet Barilla - - -	24
Mealy's cunnamara kelp - - -	3.437
Do. desulphurated by fixed air - - -	4.457
Strangford kelp - - -	1.25
One hundred Pounds.	Vegetable Alkali.
Dantzic pearl-ash - yielded	63.33lbs.
Clarke's refined ash - - -	26.875
Cassup - - -	19.76
Common raw Irish weed-ash - - -	1.666
Do. slightly calcined - - -	4.666

It is much to be regretted that, considering the immense quantities of pure marine alkali which could be procured at a cheap rate from the East Indies, so little attention should be paid by the East India company to an article which would be so profitable a branch of commerce to them, and prevent a considerable sum being paid to other nations. The mineral alkali procured from the East Indies, is much purer than what is obtained from Barilla; and a preparation exactly similar in appearance and quality to the Alicante Barilla, may be made with great advantage to the manufacturer, from a mixture of the East India mineral alkali with the common Scotch kelp, for the purposes of the bleacher, the soap-maker, or the Turkey-red dyer. To shew the importance of this object, the following table of the imports into Great Britain are annexed for seven years.

	Barilla.	Pot-Ashes.	Pearl-Ashes.
1796	86.723 cwt.	62.829 cwt.	45.290 cwt.
1797	51.185	57.826	36.674
1798	123.990	81.482	60.691
1799	146.163	77.246	51.792
1800	179.629	135.40	45.161
1801	63.210	90.523	54.835
1802	151.796	48.054	64.288

When it is considered that 20 pounds of the mineral alkali brought from India in a powdery state, as it usually is, will, by mere solution in water, yield 100lbs. of the crystallized soda fold in the shops, it will be seen, that the purchase of the mineral alkali from the East India company, will be an object well deserving the attention of the bleachers and soap-boilers; and far preferable to the use of Spanish kelp or Barilla.

Mr. Kirwan, by means of muriatic acid, precipitated the colouring matter from an alkaline ley, saturated with the colouring matter of linen yarn, and found it to possess the following properties. When suffered to dry for some time on a filter, it assumed a dark green colour, and felt somewhat

clammy, like moist clay. His observations in the Irish Transactions for 1789, are as follow:

"I took, says he, a small portion of it, and added to it 60 times its weight of boiling water, but not a particle of it was dissolved. The remainder I dried in a sand-heat; it then assumed a shining black colour; became more brittle, but internally remained of a greenish yellow, and weighed one ounce and a half."

"By treating eight quarts more of the saturated ley in the same manner, I obtained a further quantity of the greenish deposit, on which I made the following experiments:

1st. Having digested a portion of it in rectified spirits of wine, it communicated to it a reddish hue, and was, in a great measure, dissolved, but by the effusion of distilled water, the solution became milky, and a white deposit was gradually formed; the black matter dissolved in the same manner.

2d. Neither the green nor the black matter was soluble in oil of turpentine or linseed oil, by a long continued digestion.

3d. The black matter being placed on a red-hot iron, burned with a yellow flame and black smoke, leaving a coal residuum.

4th. The green matter being put into the vitriolic, marine and nitrous acids, communicated a brownish tinge to the two former, and a greenish to the latter, but did not seem at all diminished.

"Hence, it appears, that the matter extracted by alkalies from linen yarn, is a peculiar sort of resin, different from pure resins only by its insolubility in essential oils, and in this respect resembling lacs. I now proceeded to examine the powers of the different alkalies on this substance, eight grains of it being digested in a solution of crystallized mineral alkali, saturated in the temperature of 62°, instantly communicated to the solution a dark brown colour; two measures (each of which would contain eleven pennyweights of water), did not entirely dissolve this substance. Two measures of the mild vegetable alkali dissolved the whole."

"One measure of caustic mineral alkali, whose specific gravity was 1.053, dissolved nearly the whole, leaving only a white residuum."

"One measure of caustic vegetable alkali, whose specific gravity was 1.039, dissolved the whole."

"One measure of liver of sulphur, whose specific gravity was 1.170, dissolved the whole."

"One measure of caustic volatile alkali dissolved also a portion of this matter."

The colouring matter of cotton is much more soluble in alkali, than that of linen: hence the greater facility with which cotton is bleached.

The theory of bleaching vegetable matter, as we have before observed to have been described by Mr. Delaval, depends on removing the colouring matters, whether natural or accidental, which cover their solid fibrous parts, which are the only parts endued with a reflective power.

Raw cotton or linen, boiled in a diluted solution of caustic alkali, gives to the liquor a deep brown colour, and destroys its causticity; and fresh portions of clear ley applied a second or third time, will produce a similar effect, but in an inferior degree. If the cotton or linen be now plunged into the oxymuriatic acid, and allowed to remain a short time, they will become white; and if they are then plunged into an alkaline ley, the liquor will again become brown, and lose its causticity.

On saturating either the first or last of the alkaline solutions with an acid, a similar precipitate is obtained from each, of a dark coloured matter, almost insoluble in water, but soluble in caustic alkali.

Hence

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Hence it appears, that after raw cotton or linen has been acted upon by alkalies for two or three times, they have no further effect upon it, till the cloth comes in contact with oxygen or pure air, either by immersion in the oxygenated muriatic acid, or by exposure to the atmosphere; and it is on account of the speedy action of the acid, in comparison with that of the atmosphere, that the new mode of bleaching is now generally adopted.

M. Berthollet, and the modern chemists suppose, that the colouring matter of linen is composed principally of carbon and hydrogen; and they conclude, that linen, bleached by the oxymuriatic acid, becomes yellow on this principle, that when the oxymuriatic acid renders linen white, a quantity of oxygen has combined with the colouring particles; but that this oxygen gradually enters into a combination with the hydrogen, and forms water which passes off; that then the carbon becomes predominant, and the linen, in consequence, assumes a yellow colour.

The old chemists, on the principles of Stahl, would say, that a part of the dephlogisticated marine acid, (oxymuriatic acid,) after the cloth had been acted upon by the alkali, absorbed such phlogistic colouring matter from the cloth, as the alkali had no affinity for; and thus became diluted common marine acid, which has a great attraction to cotton or linen, and, if exposed to a moderate heat, will act upon the texture of the cloth, and render it of a yellow colour.

We notice this circumstance in two different points of view, that the bleacher may be aware of the necessity of applying, in either case, a weak ley of pearl-ash, ultimately after the use of the muriatic acid, to prevent this yellowness from occurring; and also that the reader may comprehend the reasoning of Home, and other persons who have written upon the subject of bleaching, previously to Mr. Scheele's discovery.

To recover the pure alkali from the black coloured leys, which have been used in bleaching, and to render them equally proper for the same purpose, has been for a considerable time a material object in the neighbourhood of Manchester, and practised with great success.

To effect this, the black or brown strong leys, which have been left after bucking linen, or cotton yarn, or goods, or saved after wringing them, is put into an oblong flat shallow iron pan, made of plate iron, rivetted together. (See *Plate IV. fig. 4, 5.*) Under this pan a fire is made, and the old leys gradually evaporated, till they become of a consistence nearly resembling tar; the matter is then put into casks, and carried to the reverberatory furnace, *Plate IV. fig. 6, 7.* where it is laded or poured into the cavity or bed within the furnace; the fire being then made, acts powerfully on the alkaline mass; gradually dries the water left amongst it; then acts on the colouring matter the ley has abstracted from the cloth, which is partly dissipated in a black, offensive smoke, and partly destroyed by combustion; the calcination of the ashes is assisted from time to time, by raking them up with a long iron rod, in order to expose fresh surfaces to the flame; the heat is continued and increased till the inflammable matter amongst the alkali is dissipated, and the ashes brought to a perfect fluid state; they are then let out by an aperture in the side of the furnace, into an old iron pot put into the ground, and when cold, broken into small pieces for use, being frequently in a purer state than when first imported.

Fig. 4. Plate IV. is a section of the evaporating pan for the waste leys, where A represents a flat iron pan, of an oblong square form, about six inches deep, and of a size proportionate to the quantity of leys to be evaporated; B, the fire-place; C, the ash-hole; D, the flue in which the fire

acts under the pan; E, the chimney for the smoke; F, the brick work.

Fig. 5. Plate IV. is a bird's eye view of the same evaporating pan, which is made of plates of beaten iron rivetted together, as shewn in the plan; the fire-place underneath it is marked by dotted lines at B, and the chimney flue at E.

Fig. 6. Plate IV. represents a longitudinal section of the reverberatory furnace used in the preparation of ashes, or solid alkaline salts from the old leys after evaporation, to a proper consistence; *a* the brick work; *b*, the ash-hole; *c*, a channel, or passage under the furnace, to admit a free current of air; *d*, the fire-grate; *e*, the fire-place; *f*, the inner part of the furnace; *g*, the bed of fire proof brick, on which the matter is calcined; *h*, the alkaline ley to be calcined; *i*, a door through which the ley is introduced by an iron ladle into the furnace, and through which door the matter, during calcination, is stirred from time to time; *k*, the passage for the smoke, or chimney, which chimney should be from 20 to 30 feet high; *l*, the upper part of the furnace, arched like an oven; *m*, the separation wall between the fire and matter to be fluxed or calcined.

Fig. 7. Plate IV. represents the upper plan of the furnace, of which *fig. 6.* is a section; *a*, the outer walls; *b*, the ash-hole and draught-hole; *c*, the iron grate of the fire-place; *d*, the basin in which the leys are calcined; *m*, the door through which fossil coal is thrown into the fire-place; *n*, an iron tube through which the ashes in fusion flow out of the furnace when sufficiently calcined; *o*, an iron pot into which the melted ashes flow, and where they are suffered to cool; *p*, a wall of fire-brick between the fire-place and basin, over which wall the fire passes; *r*, the steps leading down to the ash-hole.

It is necessary to remark, that all the interior part of the reverberatory furnace should be made of Welsh brick, or such as will withstand the action of a strong fire; the whole building should be well bound together by iron bars, or cramps. If so constructed, it will last for several years; and when it then wants repair, the ashes, which will be found accumulated in the interstices of the brick-work, will defray the expence of such repairs.

Having shewn the methods generally used in bleaching linen and cotton, we shall notice a process lately discovered by Mr. W. Higgins of Dublin, for using the sulphuret of lime, as a substitute for pot-ash in bleaching. The sulphuret is prepared in the manner following, viz. sulphur or brimstone in fine powder, four pounds; lime well flaked and sifted, twenty pounds; water sixteen gallons; these are all to be well mixed, and boiled for about half an hour in an iron vessel, stirring them briskly from time to time. Soon after the agitation of boiling is over, the solution of sulphuret of lime clears, and may be drawn off free from the precipitate, which is considerable, and which rests upon the bottom of the boiler. The liquor, in this state, is nearly of the colour of small beer, but not quite so transparent.

Sixteen gallons of water are afterwards to be poured upon the remaining precipitate in the boiler, in order to separate the whole of the sulphuret from it; the matter is then well agitated, and must, when settled, be drawn off, and mixed with the first liquor; to these again thirty-three gallons more of water may be added, which reduce the liquor to a proper standard for steeping the cloth.

Though either lime or sulphur, separately, is very little soluble in water, yet this sulphuret of lime is highly soluble.

This preparation has been applied, in the following manner, to the bleaching of linen in Ireland.

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The linen, as it comes from the loom, is charged with the weaver's paste or dressing, to discharge which, the linen must be steeped in water for about 43 hours, and afterwards taken out and well washed; in order to separate the resinous matter inherent in the vegetable fibre, the linen must then be steeped in the cold solution of sulphuret of lime (prepared as above), for about 12 or 18 hours; then taken out and well washed; when dry, it is to be steeped in the oxy-muriate of lime, prepared by Mr. Tennant's process, for 12 or 14 hours, and then washed and dried. This process is to be repeated by six alternate immersions in each liquor, which are sufficient to whiten the linen.

Though we must confess, that we have some doubts respecting the application of sulphuret of lime to supersede the use of ashes, in bleaching goods intended to remain perfectly white, yet we think it incumbent upon us to state, that for goods previously bleached for dyeing, it possesses advantages over those where alkalies have been used, and which has been actually proved above 30 years ago, by the practice of Mr. Peter Henry Otterfen, communicated by him to the late Mr. John Wilson, of Aisworth, near Manchester. Mr. Wilson's memory deserves every mark of respect from the cotton manufacturers of England, for his numerous improvements in the bleaching, dyeing, and finishing of cotton goods.

For the use of private families, where the linen is dirtied by perspiration or grease, it will be of great service towards rendering it white, to steep it for some time in a clear liquor, made by mixing one quart of quicklime in ten gallons of water, letting the mixture stand 24 hours, and then using the clear water drawn from the lime. After the linen has been steeped in this liquor, it should be washed as usual, but will require much less soap to be used.

Cotton goods, after bleaching, were formerly dried in the open air, on frames or tenter-rails, or on rails in covered buildings, or in large rooms or stoves heated for the purpose, all which modes were attended with great delay and disadvantages.

These difficulties were removed in 1797 by an apparatus, simple in its construction, easily managed, and of singular use in facilitating the process of the bleacher. For this useful invention the public are indebted to John Burns, esq. of Paisley.

By this discovery the bleacher can erect a drying machine, equally useful at all seasons, and in all weathers, at less than one-tenth of the expence of former constructions, for doing business to the same extent. There is no risk of damage from wind or rain, less chance of injury from servants, owing to the simple manner in which the goods are prepared. They receive a fine gloss during the process of drying, the colour is as well preserved as if dried in the open air, and they cannot be injured by the heat.

A contrivance so obviously beneficial and complete, was soon introduced into general practice in the west of Scotland; and so undoubted were the claims of the above gentleman on the originality of invention, that the bleachers in the neighbourhood presented him with a handsome donation of silver plate, suitably inscribed, in testimony of their sense of his merit, and as some reward for communicating his plan to the public.

We are more particular in noticing this circumstance, as some other persons have subsequently taken out a patent for the same principle, with a little variation in the construction of the machine, but which alteration has not been found to answer the purpose as expected. We shall therefore now more particularly describe Mr. Burns's apparatus for drying.

Fig. 1. Plate III. A is the boiler or steam vessel; B, the

safety valve; C, the hollow leaden pipe which conveys the steam from the boiler to the rollers; D, a brass cock hollowed to receive the pivot of the roller, represented in *fig. 2*, one of which cocks is fixed to the pipe under each roller, and by opening which the steam is admitted into the roller; E represents twelve rollers placed upon the cocks, one of which, next to D, has the cloth upon it in the operation of drying; FFF, the wood frame in which the machinery is placed; GGG, the supporters of the leaden steam-pipe, and of the trough H H, which trough is 15 inches broad at top, to receive the water formed by the condensed steam as it drops from the bottom of the rollers, E, and to conduct it to I, a small pipe extending from the trough, H, to the funnel, K, which funnel has its lower pipe reaching to within eight inches of the bottom of the boiler, to prevent the steam from issuing out at its mouth, and which funnel keeps the boiler supplied with water to its proper height, or skews when any is wanted, as the steam would arise through it if water should be wanting in the boiler.

Fig. 2. Plate III. shews one of the rollers separate from the frame. It is usually five feet long, one foot in diameter, and made of double tinned sheet iron, and hollow in the middle, for containing the steam; *a* is the lower pivot of the roller, which is an open tube at the end for receiving the steam conveyed through it from the cock. This pivot rises a foot within the roller, at the under part of the roller; at *d* is a small hole for allowing the condensed steam to drop into the trough placed below it as above-mentioned; *b*, the other pivot or axis of the roller, which is fastened to the top bar of the frame by a latch, as represented in *fig. 1*; *c*, a row of teeth fixed into a small slip of tinned sheet iron, soldered to the roller, and thereby elevated to prevent the teeth from tearing the cloth.

Fig. 3. Plate III. a machine about three feet in height, for the purpose of lapping the cloth upon the rollers. A, the box in which the cloth is first laid; B, the farthest wooden roller, over which the cloth passes from A, and from thence under the wooden roller C, to the tin roller D, on which it is lapped by turning it with the handle E; F, the cloth passing under the roller C, to the tin roller D, on which, when it is lapped, it is ready to be carried and placed in the drying machine; G, a weight hung from the projection in the frame at H, over the roller B, to keep the cloth sufficiently tight as it passes from the box A, over that roller to be lapped on the drying roller D.

Fig. 4. Plate III. shews another method of lapping the cloth on the tin roller, previous to its being dried. A, a perpendicular frame, in the front of which is placed the tin roller B, with a handle for turning it at C; the cloth D extends from the roller B over the wooden roller E, in a frame F to G, where its other end is attached by a wire run across it to some wrapper or linen cloth, fastened to a board H, fixed below the roller B. LL are upright posts fixed to the outer side of the bottom frame KK, having wooden pegs NN in them, on the side nearest the tin roller B. Rails or rods are laid across from these to similar pegs opposite, to prevent the cloth touching the ground when it is adjusting in the beginning of the operation, and the number of these posts necessary, therefore, are in proportion to the length of the cloth.

At the commencement of lapping the cloth on the tin roller B, the frame F, moveable on small rollers II, running in grooves on the frame KK, is drawn so far back, that when the cloth is fastened to the wrapper G, one half of the piece reaches to the roller F, the other half passed over that roller, reaches to the tin roller B, to which it is then to be fastened. On turning the handle C, the cloth is gradually lapped round

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the roller B, the moveable frame F being drawn forward by the cloth; for as the cloth is lapped on the roller B, the frame F is drawn towards it betwixt the uprights LL, and by means of a projecting wood forming an inclined plane fixed at M, on each side, near the top of the frame F, the rails O are raised off the pegs NN, and carried forward on the part M of the frame F, without impeding its progress to the tin roller B, till the wrapper G, to which the cloth is fastened, passes over the roller, and the wire at G, which attaches it to the cloth, is withdrawn, leaving the whole of the cloth to be dried on the tin roller B, which roller is then taken out and placed in the drying frame.

To ascertain the strength of the oxygenated muriatic acid used by the bleachers in France, Mons. Desferoizilles made use of a solution of indigo in the vitriolic acid, for which purpose he takes one part of finely pulverized Guatimala indigo, and eight parts of concentrated vitriolic acid, which mixture should be put in a glass vessel, and kept of a gentle heat by standing near the fire or in warm water all night, and repeatedly stirred with a glass rod or tube. When the solution is complete, it is diluted with a thousand parts of water. One measure of this solution is put into a graduated tube of glass, and oxygenated liquor is added, until the colour of the indigo is completely destroyed, and the strength of the oxygenated liquor is ascertained by its power in discharging the colour.

Mr. Rose has recommended a method which is better adapted for general use; which is, "to have small measures properly proportioned to each other, and when the liquid is strong, to prevent waste of the indigo liquor prepared as above, and a tedious repetition of measures, let a small measure of the liquor to be tried be put into a measure containing 24 of the same measures of water (it then becomes diluted to a twenty-fifth part); to a measure of this diluted liquor add as many measures of the blue test as it will discharge, which multiplied by 25, gives its whole strength. It will be proper to have a measure of five for the sake of dispatch, in adding the blue test liquor. It is necessary that the experimenter should sit low enough to view his measures horizontally, in order that they may not be overfilled, otherwise he may be deceived.

Great care should be taken in the choice of the indigo and the vitriolic acid employed, for unless the indigo is of the Guatimala kind, or best East India, and the vitriolic acid highly concentrated and pure, the colour produced will be a greenish brown, instead of a bright blue.

Mr. Chaptal has employed the oxygenated muriatic acid to the purpose of bleaching paper, both by applying it to the rags before worked down, and to the pulp or paste; he also restored the white to prints discoloured by time, by immersing them in the oxygenated muriatic acid liquor, or exposing them to the action of its vapour. And several patents have been granted in this kingdom for bleaching pulp or paper, amongst which Messrs. Clement and George Taylor, of Maidstone, in Kent, have obtained one for bleaching the pulp, by inclosing it with a liquor of oxygenated murate of pot-ash, in a vessel resembling a churn, eight feet diameter at the great end, three feet four inches diameter at the little end, and two feet ten inches in the clear. This vessel revolves upon an axis at each end, and the pulp, by this motion, and projecting parts within the vessel, is constantly exposing fresh surfaces to the liquor, till the whole pulp is sufficiently whitened.

Mr. Bigg, of Iping, in Sussex, has since obtained a patent for bleaching paper, and restoring to whiteness damaged or mildewed paper, by exposing in close wooden vessels paper, in quantities of six or eight sheets together, on wooden frames

placed at small distances from each other, to the action of oxygenated muriatic gas, and after the paper is taken out, pressed, and dried, previous to its being sized, wetting it in a solution of alum water.

Another method he proposes, is by wetting and soaking the paper in oxygenated muriatic acid liquor, till it is properly bleached; after which it should be well pressed and dried, and wet out in the alum water, as in the other process.

A patent has likewise been granted to Mr. Elias Carpenter, of Bermondsey, London, for a method of bleaching paper in the water leaf or sheet, and sizing it without drying; he uses for this purpose a stout deal box or case, which must be carefully closed, and capable of confining water or steam within this. The paper to be bleached is to be hung on strips of glass, about 15 inches long, placed in grooves within the box, about four sheets on each strip; the paper is taken for this purpose when pressed in the packs in its wet state, and when the box is filled and closed, it is exposed to the action of oxygenated muriatic gas for eight or ten hours, and when sufficiently bleached, sized with a preparation made from one hundred weight of pieces of skins boiled in water and strained, then fourteen pounds of alum, seven pounds of white vitriol, and one pound of gum arabic added; these ingredients will make size enough for about 50 reams of foolscap paper; the paper when sized and pressed, is finished in the usual way. To prevent the noxious qualities of the gas to the workmen, he directs a solution of pot-ash in water to be placed at the bottom of the bleaching box, to absorb the elastic vapours which would otherwise affect them on opening the box.

Mr. Tennant of Glasgow, subsequent to the patent granted him for his bleaching liquid, has obtained a patent for preparing the oxygenated muriate of lime in a dry form, by which means bleachers may be cheaply and conveniently supplied with it by him, and save much of the trouble, expence, and hazard which attend the preparation of the former bleaching liquor.

To bleach silk from its natural gummy state, whether in skain or manufactured, it should be put into a thin linen bag, and thrown into a vessel of boiling water in which good white soap has been dissolved; the silk should boil two or three hours in this liquor, and the bag of silk frequently pressed with a stick, and turned, so that the gummy matter may separate from it, and rise to the surface of the liquor, from whence it should be skimmed off, and thrown away; the bag should then be taken out, and if it contains silk goods, they should be well washed in clean cold water, to prepare them for printing or dyeing; but if the bag contains silk in the skain, after it has been well washed in clean water, beaten, and slightly wrung, it may be put the second time into the copper vessel, filled with cold water mixed with soap, and a little indigo blue, if you wish it tinged a little of the blueish hue.

The silk, when taken out of the second water, should be wrung hard with a wooden peg, to press out all the liquor; then shaken, to separate the threads; then suspended on poles, in a close room or stove where sulphur is burnt, which improves the whiteness of the silk.

Woollen cloths or stuffs may be bleached and made white by soap and water; by the vapour of sulphur; or by chalk, indigo, and sulphuric vapour. In the best case, after the stuffs have been cleaned at the fulling mill, they are again worked in warmish soap and water, to render them whiter, and afterwards washed in clear water and dried; in this state they are fit for dyeing any light colours.

To destroy or remove the reddish hue arising from boiling printed cottons in madder decoctions, which prevents the

printed colours appearing to advantage, the goods are usually boiled for some time in bran and water, and then exposed to the air, by laying them on the grass, and throwing upon them clear water from time to time. Mr. Grimshaw, in the year 1796, obtained a patent for clearing printed goods coming from the madder copper, by using the grains after brewing malt liquors, instead of bran; the plan he recommends is, that the grains should be previously sour, and that three or four bushels thereof, more or less, according to the colour of the cloth, should be put into a copper of hot water, containing 200 gallons or upwards, and four or five pieces of the printed cotton goods then immersed therein, and worked over a winch backwards and forwards, for ten or fifteen minutes; the pieces are then taken out of the copper, and well washed in clear water, and laid straight upon the ground for two or three days, till the parts which should be white become clear. The same liquor, with the addition of a few grains, will serve to clear other printed goods, till the whole number wanted to be cleared have been completed; a sufficient quantity of clear water being added to replenish what has been absorbed by the goods, or evaporated in boiling. After either of the operations above-mentioned, the immersion of the printed goods in dilute oxygenated acid, will answer the purpose of the exposure to the air.

BLEACHING of Books, Prints, and Paper. See BOOKS, &c. and BLEACHING; *supra*.

BLEACHING of Hair. See HAIR.

BLEACHING of Wax. See WAX.

BLEAK, in *Ichthyology*, the English name of *CYPRINUS ALBURNUS*, a species distinguished from the other fishes of its genus by having twenty rays in the anal fin.

The bleak is a very abundant fish in many of the English rivers, and in those of the northern countries of Europe in general. The flesh is in some esteem; but it is chiefly taken for the sake of the beautiful silvery scales, which artists make use of in the manufactory of artificial pearl. The credit of this invention is claimed by the French; and it is said that they have arrived at such a degree of perfection in this art, that, independent of the plain silvery hue of the beads in common, they can vary the colour to blue, green, or any other vivid tint they may desire. The process is very short; the scales are scraped off, washed, and then reduced to a fine powder; this is diluted with water, and introduced into a thin bubble of glass, where it forms an internal coating; the cavity is then filled with wax, through which a hole is bored, and the bead is finished.

Gmelin speaks of this species being from four to ten inches in length; but these do not commonly exceed six inches. This fish is infested in the summer-time with a creature of the vermes tribe, that lives in the intestines, and which oftentimes increases to such a vast size as to occasion the death of the bleak. Fishes so infested rise to the surface of the water, where they leap and tumble about in the greatest agonies, and in that state are well known to the fishermen by the name of mad bleaks. The white bait taken in the Thames at Blackwall and Greenwich, in the month of July, is believed to be the fry of this species. Vide *Donov. Brit. Fishes*, pl. 18.

BLEB, a small blister, or bubble.

Naturalists have observed small purple blebs on all the plants of the *hypericum* kind. *Phil. Trans.* N° 224. Thick pieces of glass, fit for large optic glasses, are rarely to be had without blebs. *Ibid.* N° 4.

BLECHINGLEY, or **BLETCHINGLEY**, in *Geography*, an ancient but small borough town of Surrey, in England; has had the privilege of returning members to parliament from time immemorial. The right of voting is vested in burghage tenure;

and the lord of the manor's bailiff was the returning officer till 1723, when, by a resolution of the house of commons, he was deprived of that office; and the borough has now the singularity of sending two members to parliament, without a mayor, constable, or any other legal returning officer. Sir Robert Clayton is the proprietor of the borough, and has consequently the power of appointing the representatives. The town occupies the summit and side of a hill, and commands some fine and extensive prospects into Kent, Hampshire, &c. Here was formerly a castle, which is nearly obliterated, and its site is overgrown with coppice wood. An almshouse and free school are the only charitable foundations of this place. The church is large and handsome; but its spire was destroyed by lightning in 1606, at which time the bells were melted by the electric fire. Fuller's earth and a species of iron-stone are obtained in the vicinity of this town. Blechingley is 21 miles south from London. The town and suburbs within the parish, contain 186 houses, and 1344 inhabitants.

BLECHNUM, in *Botany*. *Lin. gen. n.* 1175. *Reich.* 1292. *Schreb.* 1627. Class *Cryptogamia Filices*, or ferns. *Gen. Char.* Fructifications disposed in two lines, approaching to the rib of the frond, and parallel.

Species, 1. *B. occidentale*, South American B. "Fronds pinnate; pinnae lanceolate, opposite, emarginate at the base." This species rises by a simple undivided stalk to the height of 13 or 18 inches; leaves long and narrow; many pinnae, with two small auricles at the base. A native of the West India islands, and the continent of South America. Introduced here about 1777. 2. *B. orientale*, Chinese B. "Fronds pinnate; pinnae linear, alternate." Frond three feet long; stipe covered at the base before, with large grey bristles; the anterior side scored with three longitudinal grooves; leaflets linear-lanceolate, sessile, entire, streaked at an acute angle, the length of the finger. Found in China by Osbeck, and also in the Society isles. 3. *B. australe*, Cape B. "Fronds pinnate; pinnae sub-fessile, cordate-lanceolate, quite entire, the lowest opposite." Stipes a foot long, green; fronds entire, about the edge rugged; the barren ones with broader pinnae, truncate at the base; the fertile, with lanceolate pinnae, heart-shaped at the base; having two lines of fructification, longitudinal, and distant both from the edge and rib. A native of the cape of Good Hope. Introduced here, in 1774, by Mr. F. Masson. 4. *B. virginicum*, Virginian B. "Fronds pinnate; pinnae multilid." Having the stature of polypodium filix mas or male fern; frond smooth; pinnae lanceolate, sessile, semipinnatifid, acute; divisions obtuse, quite entire. A native of Virginia and Carolina. Cultivated, in 1774, by Dr. John Fothergill. 5. *B. japonicum*, Japanese B. "Frond bipinnatifid; pinnules ovate, obtuse, serrated." Stipe convex at the back and smooth, before flat and streaked; the whole smooth, flexuose, equal; pinnae oblong, acute, pinnatifid; the lower subpetioled, the upper sessile; differing from the *orientale* in having an erect frond and blunt pinnules. A native of Japan. 6. *B. radicans*, rooted-leaved B. "Fronds bipinnate; pinnae lanceolate, crenulated; the lines of fructification interrupted." Frond rooting; pinnae sessile, slightly concurrent at the base, ferrate with a very fine callus, acuminate, more veined beneath; the line of fructification is next the nerve, but interrupted as it were by long points. A native of Virginia and Madeira, where it was observed by Kœnig. Introduced, in 1779, by Mr. F. Masson.

Propagation and Culture. The fourth species alone will abide the open air in England; the first must be kept in the bark stove; the rest require only the protection of the dry stove, or conservatory; they are increased by parting the roots. Martyn.

BLED SOE LICK, in *Geography*, lies in the state of Tennessee, in America, 32 miles from Big Salt Lick garrison, and 36 from Nashville.

BLEEDA, or **BLIDA**, in *Geography*, a town of Africa, in the kingdom of Algiers, and province of Titeri, is situate in the interior of the country, over-against the mouth of the Ma-Saffran, at five leagues distance, under the shade of a ridge of mountains, forming a part of mount Atlas. It is about a mile in circuit, encompassed by a wall chiefly of mud perforated by horns, and tolerably populous, but without much trade; some of the houses are flat-roofed, and others tiled; it is well-watered, as a branch of an adjacent rivulet may be conducted through every house and garden, and it is surrounded by very fruitful gardens and plantations. As Bleeda and Medea (see **MEDEA**) lie nearly in the same meridian, and are situated at a proper distance from the Hamam Mereega, the Aquæ Calidæ Colonia of the ancients, and as their modern and ancient names resemble one another, Dr. Shaw supposes that we may take one for the Bida Colonia, and the other for the Lamida of Ptolemy. That part of mount Atlas which lies between these towns, and reaches as far as mount Jurjura, is inhabited by numerous clans of Kabyles; few of which, from their rugged situation, have been made tributary to the Algerines. The Beni Sala and Haleel overlook Bleeda, and the rich plains of Mettijah; whilst the Beni Selim and Halefa sometimes descend into the pasture ground, near the banks of the Bishbeh, or river of fenmel, of which a great quantity grows on its banks. Shaw's Travels, p. 36.

BLEEDING, or **BLOOD-LETTING**, in *Medicine*, a species of evacuation frequently resorted to, as a principal remedy in inflammatory affections, such as pleurisy, peripneumony, phrenitis, quinsy, enteritis, acute rheumatism, &c.; and in disorders accompanied with plethora, such as mania, apoplexy, &c. See these diseases separately. In all these cases, the earlier this remedy is employed the better, and especially in those inflammatory disorders, such as phrenitis and peripneumony, where, from the great vascularity of the part, the progress of the inflammatory action is extremely rapid, and the injury done to organs so essential to life, often becomes irreparable.

Nor is the *timing* of this remedy the only circumstance that requires attention. Other circumstances of equal moment are to be attended to; viz. *the quantity of evacuation, and the suddenness with which it is effected*. The quantity must be regulated by the degree and seat of inflammatory action, and the age and constitution of the patient. The appearances of the blood, when drawn (see **BLOOD**), are commonly regarded as a good criterion for regulating the repetition of the lancet, and the quantity to be taken away each time; but the state of the pulse affords a much better guide; and venesection will often be found necessary in cases where the buffy coat or fizy appearance of the blood is not present in any considerable degree.

The impression produced upon the system is very different, according as the blood is drawn from a large or a small orifice; i. e. according as it is evacuated suddenly or slowly. The former method is to be practised in all violent inflammations of parts essential to life; such as the brain, the lungs, the stomach, &c; for thus the increased action of the vascular system is subdued almost on the onset; a momentary deliquium is induced (a state the opposite to that in which the morbid condition consisted) from which the most beneficial consequences result.

Provided equal quantities of blood be drawn in equal times, it matters not whether it be taken from the *right* or the *left* arm; in other words, supposing, in the case of pleu-

rify, the seat of the pain and inflammation to be in the *right* side, those symptoms will be as speedily removed by taking away in the whole thirty ounces of blood at three different times from the left arm, as they would be, if the same quantity were taken away from the *right* arm, in the same number of times, and from orifices equally large; because in both cases there is the same quantity abstracted from the whole mass of blood, and consequently from the quantity circulating through the lungs, and their investing membranes; whence the *general* and *local* effects in both cases are ultimately the same. Hence the futility of the doctrine of *Revulsion*, about which such warm disputes were at one time carried on.

Hitherto we have merely hinted at the *general effects* produced upon the system by blood-letting. It will now be expected that we should specify what they are. The first and most obvious effect is upon the heart and arteries. The blood is to them a stimulus; consequently, by withdrawing a quantity of that fluid from them, we withdraw a proportionate quantity of stimulus, and bring down their action so much nearer to their natural standard. The absorbents participate in this change; whence a less impeded exhalation takes place. At the same time a diminution of the animal heat succeeds. But the cerebral system and the vascular system are so intimately connected, that the one cannot be materially affected without producing a corresponding effect upon the other. This is proved by the deliquium and convulsions which succeed to sudden and profuse hæmorrhages. Thus it appears that the beneficial effects of blood-letting, in the disorders to which it is applicable, are not owing merely to the abstraction of a quantity of the circulating mass, and consequent abatement of activity in the sanguiferous vessels; but also to the abstraction of a quantity of the superfluous *Animal Heat*, and to the impressions at the same time made upon the lymphatic vessels, and finally upon the system of brain and nerves.

From this view of a remedy so powerful and so extensive in its operation, it is easy to perceive what mischievous and even dangerous consequences must result from its abuse. Being the most speedily debilitating of all remedies, it is obvious that what is termed *general bleeding* ought never to be resorted to, but in cases where the pulse denotes an increased degree of strength, as well as excessive activity. It has been from attending merely to its increased activity, and the accompanying accumulation of heat, without a due estimation of the strength of the pulse in fevers and other disorders supposed to be inflammatory, that so much abuse has been committed in the employment of the lancet. See **FEVER**; under which article, the propriety and impropriety of blood-letting will be fully considered, with remarks on the practice of Fernelius, Botallus, Sydenham, Pringle, and other celebrated physicians, who pushed this remedy to an extravagant length.

Although *general bleeding* be only admissible under the conditions above mentioned, yet *topical bleeding* may be sometimes employed with good effect in cases of partial inflammation, existing in states of the body where vigour in the system at large is wanting; especially when the vessels belonging to some organ essential to life, are obstructed, overloaded, or inflamed.

Bleeding was formerly employed for the purpose of *preventing* plethoric and inflammatory conditions of the body. Hence many of the old writers recommend it to persons in health, both in spring and autumn, to pregnant women, &c.; but this practice is very properly discontinued, and other modes of counteracting a tendency to over-repletion are adopted in its place; such as a vegetable diet, regular exercise, occasional purging, and the like.

BLEEDING.

BLEEDING, or BLOOD-LETTING, in Surgery, is the artificial extraction of blood from an **ARTERY** or **VEIN**, for medicinal purposes. The operation of cutting an artery is named **ARTERIOTOMY**; that of opening a vein is called **VENESECTIO**, or **PHLEBOTOMY**.

The instrument used in this country for bleeding the human subject, is denominated a **LANCEET**; though a *phlebotome*, or *fleam*, was formerly employed, and is still very commonly used by farriers in England, and even by the best surgeons in Germany, &c. See the *Plate of Surgical Instruments*. The lancet, on these occasions, is used single; but where the intention is to puncture numerous small blood vessels at the same instant, rather than any one considerable vein or branch of an artery, surgeons have recourse to an instrument containing many lancets, which is known by the name of **SCARIFICATOR**.

Leeches are often applied to a part of the body requiring the local evacuation of blood; and in this case, as well as in scarifying, the operation is termed *local* bleeding, in contradistinction to *general* blood-letting by the lancet.

Some nations, especially those which have scarcely emerged from a state of barbarism, are accustomed to draw blood by making one or more incisions or punctures at random, with a knife, a stone, a tooth, or a needle. See **ACUPUNCTURE**, **PHLEBOTOMY**, **ARTERIOTOMY**, **LLECHES**, and **CUPPING**.

The art of bleeding may be traced back to the remotest antiquity, and seems to have been common among the Egyptians, Assyrians, Scythians, &c. at a time when anatomy had never been cultivated. The Greeks boast that Podalirius, the son of Esculapius, was the first who practised bleeding, soon after the siege of Troy; but the fact itself is related by only one author (Steph. Byzan. in voce *Syrna*), who lived too long afterwards to be credited implicitly. It is therefore much more likely, that bleeding had been performed previously to the time alluded to. Pliny, indeed, supposes that physicians first learnt this operation from having observed the hippopotamus draw blood by pushing sharp reeds into its body (Hist. Nat. lib. viii. cap. 26.); but this is a very improbable thing, as there is very little analogy between the artificial opening of a vein with a lancet, and the random wounding of an animal by friction against a broken reed.

We shall, however, not enlarge on the history of this practice, but proceed to describe the common modes of opening a *vein* in several parts of the body, after which we shall treat of **ARTERIOTOMY**.

When we resolve to perform venesection, we must, besides the instruments required for that operation, have in readiness one or two well-rolled blood-letting bandages, or tapes, from four to eight feet in length, and of two fingers breadth, with pins, or else needles and thread. Those bandages are, by foreigners, reckoned the best, which have narrow straps at their ends.

In general, venesection is practised at the bend of the elbow, or upon the foot. When the patient is to be bled at the arm, we place him, with his face towards the light, upon a chair of a moderate height; draw his shirt as high as is necessary above the elbow; let him extend his arm to a certain degree, but not too much; after which, the surgeon, in order that the veins may become turgid by checking the circulation, applies a bandage (which is often made of fine red cloth), of the breadth of three or four fingers, twice round the arm above the elbow, with the ends of which, after having previously drawn them moderately tight, he ties a bow with a single knot, at the posterior part of the arm. Whether this bandage has been properly applied, we

know by the circumstance, that the veins become elevated and tumid, whilst the pulsation of the artery at the wrist is distinctly perceptible.

We then choose a vein in the bend of the elbow, which must be done with caution. The upper is the cephalic vein, and this a beginner ought, if possible, always to choose, as little or no danger is to be apprehended from opening it; but it is very seldom to be seen or felt, and commonly is too small. The median vein is most easily seen and felt; but generally the tendon of the biceps muscle is situated under or at the side of it, which we must take great care not to puncture. The inner vein of the arm, or the basilic (which in the right arm is by some termed the hepatic vein, and in the left the splenic), is indeed commonly very easy to be seen, and still more easy to be felt; sometimes, however, it is also very small, or lies so close upon the artery as to render it hazardous to open it.

Some recommend blood-letting upon the back of the hand, although this is an inconvenient place, and, in certain cases, not very safe for the operation. But if it is to be performed, we tie the red bandage two fingers breadth above the wrist, round the fore-arm; and, in order to raise the vein, let the patient then hold his hand in warm water. The most common vein upon the hand is the cephalic of the thumb, which lies between the bones of the carpus; with which the thumb and the fore-finger are joined. But the vena salvatella of the middle finger, which lies between the two metacarpal bones with which the middle and the ring fingers are joined, is at present but very rarely opened, and only when no other is to be seen; especially as it does not discharge much blood, is difficult to be tied, and, if cut quite through, forms a thrombus.

In bleeding these veins, the patient must be placed in a somewhat oblique position against the light; so that when the hand is half closed, and laid upon the edge of the vessel, the fingers are directed towards the light, in order that the instrument may throw no shade upon the place of the vein where we intend to open it.

Bleeding at the foot is generally performed upon the vena saphæna, which lies upon the first metatarsal bone, connected with the great toe, running along it and the tarsus, over the inner ankle. Where it lies close upon the ankle, it is inconvenient to open, and we must be very careful lest we cut through it and injure the periosteum, or even thrust the fleam or lancet into the bone itself. If possible, it will be better to open it one, two, or three fingers' breadths farther from the ankle towards the great toe. We may also open a branch far forwards, almost close upon the great toe; and here we are required often to open it with pregnant women who have swelled legs.

The other pretty safe vein upon the foot is the cephalica pedis, that lies between the two tendons which extend the great and the second toes; only we must be cautious not to injure the tendon lying beside it. The other veins situated upon the back of the foot should never be opened, but in cases of extreme necessity; for the operation is attended with danger, on account of the contiguous tendons; besides, they do not discharge a sufficient quantity of blood, and they almost always form a thrombus, which a beginner should be careful to avoid.

When we bleed at the foot, the patient should first place the limb in a pail of warm water, in order that the vessels may be seen and felt; and it is also necessary with small veins to apply the red bandage, which, however, in order that the purpose of checking the flow of the blood may be attained, and no inconvenience occasioned, must be applied in the middle of the calf, especially with lean persons, in

BLEEDING.

the same manner as on the arm; but the bow and its knot must not lie upon the tibia.

On the arm, therefore, we choose either the cephalic or the median vein, and, if the tendon lying below it should occasion hesitation, the basilic, especially if this lies more convenient and superficial. When the surgeon, then, has brought his eye to the proper distance from the vein, he wets the point of his middle finger, presses gently with this finger upon the vein at the places where he thinks he can best open it, and accurately marks the place with which he was satisfied in trying by the feel; after which he suffers the arm to fall down again into the patient's lap. In the same manner he chooses a vein upon the hand.

For blood-letting at the right foot, the patient is placed upon a chair of a moderate height, in the most enlightened part of the room, with his face directed towards the window, and his feet immersed in a vessel filled with warm water, so that the water covers all the veins of the whole foot. When therefore the foot is warm, and the veins sufficiently tumid, the surgeon lays hold of the foot with his left hand, and places it with the middle of the sole upon the edge of the vessel which is the most remote from the body, in such a manner, however, that the foot is not extended, but forms a right angle with the leg. With the middle finger of the right hand he examines those veins which lie the most elevated, and makes, according to the rules before laid down, a scientific selection; but he must always first direct his attention to the vena saphæna.

The most convenient attitude for the surgeon is when he kneels down with one knee; as in this position the eye is near to the vein, the position is firm, and can be better supported for the requisite length of time. If any other vein besides the saphæna be chosen, the patient is directed to move his toes, whilst we are examining the vein, in order that we may feel how near a tendon may be situated below it; and here the caution should be observed, not to make all the fingers wet, for the warm water diminishes the sense of touch, and consequently renders it indistinct. We therefore use at first only one hand, because, in case of a failure, or from some other cause, we may be under the necessity of taking also the other foot.

The vein may be opened either longitudinally, that is to say, in the direction of its course, or we open it rather obliquely or transversely. The first is the safest, easiest, and most convenient method; but it is admissible only with large veins, and when we foresee that during the operation they will not slip or twist, as it were, out of the way of the instrument. Commonly the veins are opened somewhat obliquely, and in this manner we may generally open the veins on the arm, and in most cases upon the foot. But when the veins are too small, there is reason to apprehend that we may not hit them, or that they will not discharge a sufficient quantity of blood; and when their situation requires it, as is the case with the cephalic of the foot (where it lies over the tendon that elevates the great toe), the orifice must be made quite transversely.

When therefore we have properly examined the vein with the moist finger, we hold the phlebotomy in readiness (if we use this instrument); that is to say, we draw up the spring, take it in the right hand, so that the thumb lies upon the slider, the fore-finger upon the bridge, and the middle finger upon the presser, exactly over its spring, and the ring finger upon the round part of the bottom plate. With the fore-finger and thumb of the left hand, which are moistened with a little saliva, we move the iron as high up in the groove as we think it necessary to make the orifice deep; and place the box (after having again elevated the arm, or

taken the foot or hand out of the water, and supported them, in the manner above described, upon the margin of the vessel) in such a manner upon the skin, that the iron has exactly the proper direction toward the place where the orifice is to be made, and then, by a gentle pressure with the middle finger, let the spring fly loose.

If a person should be so fat as to render bleeding impracticable, and with such it is at least very difficult to do it on the foot, we may in some measure attain our purpose, if we direct the patient, as he gets out of bed, to hold his foot or hand in warm water; after which the veins will generally become sufficiently perceptible to the eye or touch of an experienced surgeon.

But though the phlebotomy is used for blood-letting, especially in Germany, it is however an universally acknowledged truth, that the lancet is the safest and best instrument for the purpose. We run less hazard with it of doing damage, and the surgeon is always able, according as the circumstances require, to make the orifice either small or large. When therefore we let blood with the lancet, we place it so that the handle forms a somewhat acute angle with the blade. The surgeon next lays hold of the limb upon which he is to perform the operation, supports the right arm, with his left hand; and at the same time presses with the left thumb upon the vein, about two fingers' breadth below the place which is chosen for the orifice: he then takes the lancet between the thumb and fore-finger of the right hand, so that something more of the blade is uncovered than he thinks necessary to introduce. At the same time he lets his hand rest upon the middle, ring, and little finger, which must be placed as conveniently as possible below the vein that is to be opened. He then pushes the point of his lancet carefully through the skin and integuments into the vein, and carries the instrument in an oblique direction a little forwards, till the orifice is sufficiently large. But, during the introduction of the lancet, the operator must hold the point as steady and even as possible, in order that it may not penetrate into the subjacent parts. Should he, however, not be able to depend sufficiently upon the steadiness of his hand, he will do well to leave no more of the point of the lancet uncovered than is to penetrate into the vein. The Surgeon having withdrawn his right hand, at the same time removes the thumb of his left hand from the vein, in order that the blood may flow out freely.

If the blood will not flow properly, notwithstanding the vein has been properly hit, either the orifice is too small, or fat perhaps gets into the orifice of the integuments and stops it. The fat is to be pressed back, by stroking with a wet and warm sponge, or by means of an instrument. The impediment, indeed, may lie in the motion of the part; when, for example, the arm is bent obliquely, or the foot is placed in the water, the orifice of the vein may easily be displaced, and some of it be closed by the sound part of the skin. But, finally, the circumstance may also be occasioned by the viscid consistence of the blood. To this latter cause it is often to be attributed, after the first few minutes; on which account it will be proper to wipe the arm, over the orifice of the vein, with a sponge filled with warm water, and let the hand rest in a somewhat higher situation than the orifice, upon a stick, which the patient may also turn round, or press firmly with his fingers.

When a sufficient quantity of blood has flowed from the vein (for example, in the arm), and we are to tie it up, we take the sponge, moistened with warm water, in the right hand, the bandage in the left, and the linen compress between the thumb and middle finger of the same hand; we hold against the vein with the sponge, and with the left hand

remove

B L E E D I N G.

remove the red bandage and hang it over the chair, or the shoulder of the patient. The assistant takes away the vessel into which the blood has been received, and the operator now with a moderate pressure draws the sponge from the vein towards the hand in a right line with the orifice that has been made; and it will be proper, whilst he brings the lips of the wound together with the thumb of his left hand from the side, to repeat the wiping with the sponge once more, in order completely to remove the blood that may have been left in the orifice.

When the surgeon now sees the vein well closed, he lays upon it the compress, with the fingers of his right hand, whilst he draws it towards the thumb of the left hand upon the skin; and when the middle of it is upon the orifice, he presses it down with the fore and middle fingers of the right hand, and immediately changes these for the thumb of the left hand. With the right hand he washes the blood from the limb, by means of the sponge; after which, he lays the sponge aside. He then takes the bandage out of his left hand, lays hold of it with the fore and middle fingers of the right hand at the inner part of its head, and the thumb upon the outer, and places it upon the compress in such a manner that the fingers of the left hand make way for it, whilst the two fingers of the right hand continue the pressure in their place. But, immediately after, these are again changed for the left, fore, and middle fingers, which now press at the same time upon the one turn of the bandage and the compress. The right hand carries the bandage cross-ways round the arm, whilst the fore fingers of the two hands always alternate, till the last, when both ends of the bandage are either sewed, tied, or pinned together.

Notwithstanding we have given these very precise directions, a young surgeon will learn better by seeing the operation performed by a skilful hand, than by any verbal instructions.

Tying the vein upon the thumb is performed in the following manner:—Pressing with the compress, which here must be pretty narrow and thick, is like that performed on other veins; and therefore, whilst we hold it fast upon the wound of the vein with the two fore fingers of the left hand, we let the bandage, (which is rolled upon one head, an inch in breadth, four feet in length from the end to the place where it touches the compress), hang about half a foot down over the back of the hand, obliquely from the wrist outwards; carry the head of the bandage, after pressing it over the compress with two fingers of the left hand, through between the thumb and the fore-finger, over the palm of the hand; and, proceeding over the back of the hand, cover the end of the bandage; then go round the wrist, again over the back of the hand, under the thumb, and now round the ball of the thumb; again over the turn that has just been made across the back of the hand; and after having once more carried it half round the wrist, pin both ends together on the back of the hand. We may also apply this bandage with varied turns. In a similar manner, with turns round the little finger, and circular turns round the wrist, the bandage is applied, when the vena salvatella is opened.

With the veins of the foot, the common bandaging is made by the STAPES, which, however, sometimes requires a peculiar method, that every one will easily be able to adapt according to circumstances. The bandage may be applied somewhat tighter than upon the arm: however, on account of the injurious consequences, which may even be attended with danger, the bandage must not be drawn too tight; but it will be better some hours after to examine it again, and if necessary, draw it somewhat tighter. Upon

the whole, it is to be recommended, if possible, in all blood-letting operations, especially in arteriotomy, that the surgeon should see the patient again some hours after; as he may obviate several small inconveniences, which afterwards frequently occasion unpleasant complaints.

Venesection is more rarely performed upon the frontal vein, the veins under the tongue, and upon the neck. For the frontal vein, when it requires to be opened, we apply a bandage, or a garter or cloth, round the neck, lay the middle of the bandage upon the back of the neck, carry both extremities over the throat, and round again to the back of the neck, where an assistant takes one end in each hand. This the patient may also perform himself; only then the middle of the bandage must be applied to the throat, the two ends carried round the neck till they meet at the throat again; there the patient holds them with both his hands, and according to circumstances, draws the bandage tighter, or relaxes it, so as still to retain sufficient space for respiration. A still more convenient mode of distending the veins of the neck, &c. is to pass the bandage over the sides of the neck, and under the opposite arm-pits, so as not to press upon the trachea, which may impede respiration; then hold the swelled vein down with the thumb or finger of your left hand, a little below the part allotted for the operation. The incision is to be made, when the vein is sufficiently tumid, with a lancet.

In order that the blood may not run down upon the face, we press a card bent crooked under the orifice upon the skin, and thereby conduct the blood into a vessel. After a sufficient quantity of blood has been discharged, we remove the bandage from the neck, when the bleeding generally ceases immediately, and the orifice is secured with sticking plaster, or, if it should be necessary, with a compress and DISCRIMEN bandage.

When we have to open a sublingual vein, we must promote the efflux of the blood, as in bleeding at the forehead by the application of a cloth under the arms and across the sides of the neck. The orifice is made with the lancet, and the incision is continued till it seems large enough. In order more conveniently to get at it, we hold back the tongue with a wooden fork, or spatula. We may draw a silk thread through the wound, in order to clear it from the blood which here easily coagulates, and at the same time to prevent the lips of the wound from adhering together, and consequently to obviate whatever might impede the flow of the blood. When its flow must be stopped, we take off the bandage, and let the patient hold some spirit of wine, or common brandy, in his mouth. If the blood flows more copiously, we may dispense with the thread, and immediately remove the bandage from the neck; also, when it is to be stopped, apply a little alum or agaric to the wound, and press it down for a time; or apply Lampe's compressory, described in L. Val. Heur. Koehler Anleitung zum Verbande, &c. Leipzig, 1796, 8vo. Tab. VI. fig. 5.

To bleed at the external jugular vein, the bandage is likewise applied round the neck; against the clavicle, and upon the vein that is to be opened, a thick compress is placed, and the bandage drawn somewhat together. The thumb is placed upon the compress which lies upon the vein and the fore-finger over it, in order to secure it and to stretch the skin; we then take a pretty large lancet, and with it open the vein in the ordinary manner; only with this difference, that we must introduce it deeper, and make the external orifice larger. To catch the blood, we make use of a card, as in bleeding at the forehead. When a sufficient quantity of blood has been drawn, we remove the bandage; after which, the lips of the wound generally close sponta-

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neously. But should a bandage be necessary, we may secure a compress upon it by means of two circular turns round the neck. As this bandage, on account of the pressure upon the trachea and vessels, &c. of the neck, is always very troublesome; and also the pressure, as it never must be strong, is frequently insufficient; we may most conveniently use the instrument invented by Mr. Chabert for compressing the veins of the neck. In want of it, we must let an assistant close the orifice by pressure with his finger, till the danger of hæmorrhage is over.

Some moisten the compresses with brandy, vinegar, &c. and thereby, on account of the irritation, occasion some inconvenience at the orifice of the vein, in which sometimes inflammation, and even a suppuration, is excited. It is better to apply the compress dry, or to stick upon it a piece of gold-beater's skin, whereby the lips of the wound, if they have been well brought together, are retained in that state, so that the bursting open of the vein is more effectually prevented.

Easy and insignificant as some young surgeons think the operation of phlebotomy, it nevertheless often requires the greatest accuracy, and is on that account one of the most delicate operations. To a true surgeon, therefore, it is always of importance, and the more so as his honour and reputation are endangered by committing an error in it. Frequently the faults which the patient commits during and after the operation, such as incautious motion of the limb whilst the operation is performing, violent exertion of it, drawing on boots, &c. after blood-letting at the feet, are ascribed to the negligence or ignorance of the surgeon. Inasmuch also as no operation occurs so frequently as this, and as it so very often endangers the life of a man, or at least an error committed may give rise to such danger; the surgeon must well consider the symptoms which occur in it, and may superinduce more important consequences dangerous to health, in order that he may timely obviate or remove them.

Sometimes there arises, as the most common bad consequence of blood-letting, an inflammation of the external integuments, and of the subjacent cellular substance. Sometimes it is chronic, but little painful, suppurates slowly, and produces a circumscribed abscess. Sometimes it is more diffused, and has the appearance of an erysipelatous inflammation: sometimes it is violent and acute, and resembles a phlegmon. This generally occurs when the instrument is a bad one, and rather tears than cuts; when the patient is of a very irritable habit, and much disposed to inflammation; when the requisite precautions for healing the wound by the first intention are neglected, and the arm is suffered to be moved: when the wound is externally rubbed, pressed, &c. The nature of this inflammation cannot be mistaken, and it must be treated like a common wound.

It may sometimes happen, that when the wound of the vein does not soon close, an inflammation of the vein takes place, which however varies with respect to its violence, its extension, and progress. In a milder degree, this inflammation is followed merely by a slight swelling of the vein, and an adhesion of its sides. A violent inflammation induces suppuration. The common method of treatment is the antiphlogistic. As the internal membrane of the veins is continued to the heart, and as inflammations in such membranes spread easily and rapidly, where they are not prevented by an adhesion of the sides of the vein, it is in most cases advisable to produce such an adhesion by the application of external pressure at some distance above the orifice. If, as may very easily happen, such an inflamed vein should pass into suppuration, it would (if known) then be necessary

to cut open the vein, in order to prevent the pus from mixing with the circulating fluids.

When a vein has been cut entirely through, the pain is not greater than common, nor does the patient experience any inconvenience whilst the blood is flowing; but a greater or less quantity of it descends under the vein into the adipose membrane, remains there inclosed, and during the first twenty-four hours occasions a tension. The external orifice of the skin may be displaced from the orifice of the vein, likewise, when the orifice of the integuments is smaller than that of the vein; when the patient moves the arm too much, in consequence of which some blood is indeed discharged from the wound, but more penetrates between the vein and the skin into the cellular texture; and when the operation has been absurdly performed where two veins anastomose; from all these causes an effusion of blood may take place, in consequence of which the part acquires a bluish black colour, and sometimes an ecchymoma, sometimes a sugillation, and at other times a thrombus is produced. Although the appearance frequently seems to indicate greater danger than really exists, the speedy application of remedies is nevertheless necessary.

In the first case, cataplasms, with warm vinegar, wine, and other spirituous or discutient remedies, are serviceable. When such extravasated blood is not again taken up, or when the vessels are inadequate to its re-absorption, on account of its great quantity, an abscess is generally formed, which must be treated according to the rules of art, and the spirituous remedies laid aside. See ABSCESS. In the sugillation, we must endeavour to remove the obstacles that may impede the circulation of the blood: these are either external ones, such as a too tight bandage; by loosening which the complaint is removed; or they are internal ones, and occasioned by a contraction of the vessels. In a recent sugillation, we may combine the resolvent means above-mentioned with mild astringents; and when the stagnating blood has been again dissolved and removed, we at last apply cold, discutient, and spirituous remedies.

When an aponeurotic part (for example, the fascia of the fore-arm) is wounded, the patient sometimes experiences a more violent pain than usual, especially when he moves the limb; and this he feels presently after the blood-letting has been performed. A compress, moistened with cold Goulard's water, &c. is of service, whilst at the same time the bandage is left applied for three or four days, and the limb kept completely at rest, and wetted many times a day with such remedies. When this is neglected, there very often takes place a serious inflammation, which must be treated according to the antiphlogistic plan. Repose of the limb, which is to be kept in a bent position, and relaxation of the inflamed parts by means of warm emollient applications, are absolutely necessary. As soon as the inflammation abates, it is proper every day to attempt moving the joints, in order to prevent a stiffness. But if the tension and inflammatory symptoms run very high, it may even be requisite to divide the fascia completely.

When a nerve is injured, the patient experiences a still more violent pain, which extends itself throughout the whole limb, and the patient is also apt to faint; the muscles of the affected part contract, and the blood sometimes does not flow so freely as usual, although the vein has been well opened. The orifice of the vein does not become violently inflamed, and the pain continues. In order to prevent inflammation and other symptoms, a larger quantity of blood must be let run out, the limb must at least for some days be left completely at rest, and we must take care that the muscles of the part remain as much relaxed as possible. Moreover,

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over, we must treat the patient antiphlogistically, prescribe a spare diet, and also, if the case should require it, administer opiates and laxatives. For lesions of the nerves, the application of warm spirit of turpentine is commended; but it would probably be useful only in case the nerve should lie above, but hardly when under, the vein. Over the orifice we apply some lint and a mild plaster, and over this and the whole limb, emollient and discutient cataplasms, with which anodyne remedies are mixed.

If, notwithstanding this treatment, the symptoms should become more violent, the lips of the wound acquire a hardness, and become more inflamed, affected with pain and tumour, with a full and quick pulse, blood must be drawn by leeches, or at another place by venesection. Instead of the warm emollient fomentations and cataplasms, which are recommended in such cases, Mr. B. Bell extols, from his own experience, cooling astringent remedies. Preparations of lead he has found most serviceable. The parts which suffer the most may be covered alternately with cloths wetted with a solution of saccharum Saturni, and with pledgits spread with ceratum Saturni. The fever must also be particularly attended to, and the above mentioned cooling treatment continued. When the pains are so violent, that they entirely deprive the patient of sleep and rest, we must use antimony and opium; but in order that the opium may prove serviceable, it is administered always in considerable doses. The limb must be also kept continually at rest, and in a horizontal posture.

But frequently the first affection is neglected, or improper remedies are employed, so that opium, and all the remedies that have been mentioned, have not the smallest effect. This is particularly to be supposed, when the nerve is cut in such a manner, that only a part of its fibres still remains entire, and these are preternaturally stretched; in which case the whole body suffers, and the most violent convulsive affections take place, which indicate the most imminent danger. The only remedy under these circumstances is the division of the nerve by a transverse incision above the inflamed part, that is to say, higher than the orifice of the vein. As the nerve certainly lies within the breadth of the orifice of the vein, the incision needs not be long, and it must penetrate only down to the fascia of the fore-arm, for all its cutaneous branches always lie on the outside of this fascia.

Mr. Benjamin Bell has given very extraordinary directions on this subject, which have (most unaccountably) been transcribed by many surgeons in France and Germany: he directs, among other things, an extensive transverse incision to be made through the original wound, and even down to the bone! which Mr. Abernethy has very properly reprobated as "dangerous and unnecessary."

When the branch of an artery has been wounded, the patient does not feel more pain than usual; but the surgeon immediately concludes from the colour and spouting of the blood what fault he has committed. See ANEURISM.

In venesection, a bone may also be injured, chiefly with lean persons, who generally have very thin veins, especially on the feet; which though they are very visible, lie, however, so close upon the bones and tendons, that the instrument passes through and injures the subjacent bone. In most cases, this only occasions a pain which the patient feels during the operation, and no bad consequences ensue. Frequently the surgeon himself would not know it, did he not find, on examining the instrument, that the point is entirely wanting, or at least bent round, and its edge spoiled. This, however, applies only to the case where none of the iron is left in it; but when this happens the case is worse. We may know, that it has taken place from the cutting blade being wanting, or in

part broken off; from the pain which the patient feels, and which is generally of a pulsating kind; from the divided stream of the blood; from the feel with the fingers, when they are stroked over the orifice of the vein, and from the rebounding which the surgeon feels in the fingers at the stroke. If it is not seated very firmly, the stream of blood generally drives it out, if we draw the orifice gently asunder with two fingers. But when it is more firmly seated, we must endeavour to draw it out with a fine pair of forceps as cautiously as possible, that it may not break in extracting, and the point remain sticking in the bone. When it has been successfully extracted, we must endeavour to prevent the symptoms, such as inflammation, tumour, &c. by moistening the compress and the bandages with a discutient lotion, and afterwards also keep the bandages moistened with such remedies throughout the day. This accident is only liable to occur in using the phlebotomy.

But the breaking off the blade may also happen with muscular subjects, and this the surgeon can certainly in general prevent, by always inspecting his instruments carefully, and providing them with good blades. The best blades are those which are very sharp and finely polished, and these are generally very thin, and consequently most liable to fly off. Before we use any blade, especially a thin one, we ought always to put it to the following test. We screw the new blade into the phlebotomy, and let it fly two or three times without any object opposed to it. If the blade remains as it should, we are then so much the more secure against its flying off in blood-letting, because it has a resistance opposed to it. This precaution should never be neglected, and the loss of a few blades should not be regarded, in order to secure ourselves against the danger to which we are exposed if we neglect it. These observations and precautions will scarcely be wanted for *English* surgeons, who have laid aside that instrument.

Sometimes a lymphatic vessel is wounded; in which case the patient experiences no extraordinary pain, nor does the surgeon foresee the injury that is still to arise, and consequently cannot be immediately discovered. After the bandaging, the vein heals up, no inflammation is left behind, but there daily flows out of the orifice of the skin a quantity of clear pellucid lymph, which continually keeps the dressings wet. This circumstance often gives the surgeon much trouble. Here we may apply with advantage, Goulard's saturnine water, or a solution of alum, or mere cold water. The cure is best completed by means of dry lint, applied daily once or twice in the form of a tent. We may also sprinkle pulverized alum, or apply a strong pressure upon the vessel; and sometimes we may use the lapis infernalis with advantage. Mr. Jaeger, however, thinks (*Fünfzig. chirurg. prakt. Cantelen. &c. Frankf. a. M. 1788, p. 3.*) that the cure may most speedily be effected by immediately promoting suppuration.

It may happen, that in letting blood at the arm a lymphatic vessel becomes inflamed; in which case we feel upon examination, a hard absorbent vessel both above and below the wound of the vein, which last, however, is not yet healed, but generally uninflamed: if the affected limb is used, the pains become more violent, and sometimes extend themselves into the axilla, where also the glands swell; generally the fore arm likewise swells and becomes painful, and at last abscesses take place in different parts. Besides keeping the affected arm at rest, we must cover the wound with an emollient ointment, and apply to the hard vessels and tumours, cataplasms of emollient, discutient, and anodyne remedies, upon which they are generally discussed. When abscesses have already been formed, they must be opened and healed, according to the rules of the art. See ABSCESS.

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The most common symptom consequent upon blood-letting is fainting, which, however, is in most cases unattended with danger, especially when it does not arise from a too copious evacuation of blood. It may often be prevented, by keeping the patient engaged in conversation, by letting him take a spoonful of vinegar, or a glass of cold water into his mouth, or sprinkling him and washing his hands and face with it. But if it nevertheless supervenes, we must immediately place the patient in a horizontal position, throw open the chamber window, and apply strong stimulating substances, such as volatile alkali, to his nostrils; and when he has come to himself, we may give him a glass of wine, provided it be not contra-indicated by his ill state of health.

With persons who always faint whenever they are bled, and who on this account, however necessary the operation may be for them, always dread it, the best method of preventing their fainting, is to lay them immediately in a horizontal position, with the head low, and at the same time frequently to stop the discharge of blood by holding the vein. This caution is particularly to be recommended with pregnant women, as faintings and convulsions in them, if they continue too long, may prove very injurious to the fœtus, or produce abortion.

We have hitherto confined our remarks to the opening of a VEIN: it therefore now remains for us to describe the operation of ARTERIOTOMY, which is the artificial opening of an ARTERY.

This operation was very frequently practised by the ancients; who, perhaps, from having incorrect ideas of the nature of these blood-vessels, were not always aware of the dangerous consequences which follow from this practice, if injudiciously managed. Those who are desirous of reading a full account of the ancient practice in this branch of surgery, may peruse what Oribasius has collected from Galen and Antyllus; to which they may add the observations of Paulus Ægineta, and Prosper Alpinus, the latter of whom describes the operation as it was performed in Egypt.

The supposed advantages of opening an artery, rather than a vein, are 1st, that the blood flows with greater velocity than from a vein; and therefore affords a larger quantity in a given time: 2dly, that it prevents the accumulation of blood in any local inflammation more effectually, because it intercepts the fluid in its passage towards the affected part: 3dly, that its salutary effects more speedily follow, on this account, than from the operation of phlebotomy; and, therefore, it is preferable in cases of a very urgent nature, such as apoplexy and phrenitis, arising from the pressure of blood upon the brain.

But these advantages are speculative, rather than practical, for the following reasons: 1st, No surgeon who is acquainted with the serious consequences of opening a large branch of an artery, and the difficulty of restraining the effusion of blood in many instances, will perform this operation in the same parts of the body, and in the same dauntless manner, as the ancients did. And in opening only very small branches, (suppose of the temporal artery,) it rarely happens that the blood flows rapidly, and never with the same freedom as it does from a large vein: 2dly, That we may sometimes, by this means, intercept the blood as it passes towards an inflamed part is certain, by cutting through the principal artery which conveys the blood; but this advantage is not often obtained, because we dare not divide any considerable ramification, and there are always more arterial branches than one to supply an important organ: 3dly, We admit, that in certain cases, (in ophthalmia, or inflammation of the eyes, for example,) the good effects of blood-letting by arteriotomy near the affected part, is far

more useful than by phlebotomy, in a remote part; but, unfortunately, the surgeon cannot always evacuate a sufficient quantity of blood by this means, on account of the difficulty of finding a suitable branch of an artery, which may be easily as well as safely incised.

Therefore, considering all the disadvantages of this operation, it is now very rarely practised, except in the temples, where the pulsation of a small branch of the artery may be often felt with ease; and there is little or no danger in attempting to divide it. If we do not succeed in our attempts, or do not procure so much blood as is requisite, the operation of phlebotomy may then be had recourse to. It should, however, be mentioned as an undoubted fact, that acute inflammations of the eyes, are more effectually relieved by arteriotomy, (when it properly succeeds,) than by opening a vein in the arm; and that the excretion of four ounces of blood in this way, is as useful as twenty or even thirty ounces taken from the venous system!

As arteriotomy is now scarcely ever performed in any other part of the body besides the temple, we shall content ourselves with describing this operation alone. In that situation, the artery lies near enough upon the cranium to be compressed readily, when we wish to stop the current of blood; though, in general, the blood does not flow so freely, as to cause any difficulty in restraining it by moderate pressure.

The patient being placed in a good light, the operator feels for a pulsating vessel in the temple, nearly opposite the outer angle of the eye. When he has discovered it, he endeavours to trace the direction in which it runs; and then he places the two foremost fingers of his left hand upon the artery, leaving a space of about half an inch between them for the place of the incision. The vessel is so small, in general, that it cannot be opened by an oblique, or a longitudinal puncture, as in bleeding the veins of the arm; but must usually be cut across, by a single stroke of the lancet, or scalpel. A lancet is not so convenient as a small knife for this purpose, because its fine point is apt to be broken; and it will be found best to draw the instrument over the artery, instead of endeavouring to strike it with the point, (which Dr. Butler, Mr. B. Bell, and others, direct to be done,) as in phlebotomy. It may be convenient to make a little impression with the finger-nail, or with ink, on the exact spot we determine upon for the incision, lest we lose our object in operating; for a surgeon cannot always ensure the division or wounding of the artery on his first attempt, especially if the incision be made with timidity, or hesitation.

When a sufficient quantity of blood has flowed, (which it does by a florid and salient stream,) we close the wound; and apply a long bandage over a very firm, thick compress of linen, in which may be included a piece of coin, or some other hard substance. It is a matter of small importance whether or no we first use an adhesive plaister, except when the bleeding is likely to prove troublesome: but the different modes of arresting arterial hæmorrhages, are described under the articles HÆMORRHAGE, LIGATURE, STYPTIC, and ANEURISM.

Frequently it is necessary that the surgeon should make himself acquainted with the state of the blood, and often also it is required of him to pass his opinion upon it. As long as the blood is warm and flows out of the vein, it exhibits a pretty uniform red colour, and has a viscid gluey feel; but when it grows cool, it coagulates into a mass varying in colour and density. After some hours, there gradually exudes from this coagulated mass a fluid, which separates the more solid parts from the sides of the vessel, so that it swims in it. This water is called *serum*, but the coagulated red cake is named *cruor* or *crassamentum*.

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Good venous blood, exposed to the air, is of a dark red colour: when it cools, it separates a thin and almost colourless serum, and a thick cake, which has no crust of a different colour from the blood below it; and of which the serum forms a proportion, amounting to between the third part and the half. Such blood has no preternatural acrimony, or saline quality; and in it are found all its constituent parts in the proper proportions. From this condition of the healthy blood, we may form a judgment of its preternatural state, if it be materially changed.

When the blood remains so fluid that it will not coagulate, it indicates a deficiency of the gelatinous part, and a great redundancy of serum. Such blood is to be found in many fevers, especially in malignant ones, or when the patient is in a very debilitated condition.

If there be too much serum in the blood, dropsy and other similar diseases are to be apprehended; for such dissolved blood always indicates a weakness of the vessels, and of the muscular fibre.

When the serum is yellow, it indicates an obstructed flow of the bile, and its regurgitation into the mass of the circulating fluids.

When the blood has much serum and little of the red part, the blood is overloaded with mucus, and it indicates that a cachectic disease is impending; especially when the serum has various different colours, and the texture of the crur is very slender.

If the blood has its proper and sufficient redness and fluidity, but at the same time exhibits a greasy pellicle, it indicates a superfluity of oleaginous particles.

When it separates and yields a very compact, tenacious, yellow, or buffy surface, it is too thick; and if the serum be at the same time small in quality, it shews a great degree of vascular action and inflammation. This is a fact very generally admitted.

Finally, it is to be observed, that we need not be alarmed when the thicker part of the blood seems to swim in a milky fluid; for it commonly happens, in drawing blood only a few hours after a meal, when it proceeds from the chylo, which, about this time, is imperfectly mixed with the blood.

We have thrown out these few hints for the attention of practical surgeons; but they are by no means to be regarded as complete, or absolutely incontrovertible. There is a great deal of fallacy in judging from the colour, and other sensible qualities of the blood; and the moderns have, therefore, learnt to give their opinion with diffidence. This subject is considered more at large in a subsequent article. See BLOOD, and its properties.

BLEEDING a Horse, a frequent operation in the *Veterinary Art*, principally intended to diminish the mass of blood, and thereby destroy the too great fulness or over-action of the heart and arteries.

When this operation is intended to affect the general system, the evacuation is usually made from the jugular vein. For the relief of particular parts, the vessels which belong to it, or which are adjacent to it, may be opened; as the vein running down the inside of the fore-arm is commonly opened when it is conceived the shoulder is affected; the necessity of this operation, on account of injuries of this part, is less frequent than is generally imagined; the vein itself in general gives out but little blood, and is very apt to swell after the operation.

Affections of the feet are more frequent, and we have often opened the coronary veins with obvious good effects; by puncturing with a lancet various parts of the coronary ring,

the blood flows copiously, and at length stops of itself without the least ill consequences.

The vein which encircles the coffin bone is also, without much difficulty, opened in inflammations of this part: the blood flows freely, the artery which accompanies it being in general opened along with it. It is necessary in performing this operation, to remove the horn covering the vessels with a drawing knife till the blood flows in sufficient abundance. The horn round the point of section should be thinned considerably, to prevent irritation, and mild resinous dressings should afterwards be laid over the part, to exclude the air, &c.

This operation we have heard condemned by some, as producing ill consequences, and a sore difficult to heal. We have only to remark, after having frequently performed it, we have not met with an instance of these ill effects following it.

The angular veins of the eye are often opened with good effects in inflammations of this part, as also the vessels which are seen passing over the sclerotic coats of the eye, and over the duplicature of the *membrana conjunctiva* on the inside of the eye-lids, both of which admit of easy section with the lancet.

The *temporal* artery also presents itself very conveniently for opening in the horse; and in inflammations of the brain, or its coverings, or where a sudden depletion of the system is desired, it is productive of manifest good effect. If this vessel should bleed too freely, and apprehensions are entertained of the loss of too much blood, it is most easily stopped by pressure, or by a deep incision, which completely severs the vessel; in this case its ends soon retracting, stop the farther effusion of blood.

The veins of the palate are conveniently situated for opening by making a transverse incision in this part with a lancet, and this is often had recourse to in the relaxation of the palate, termed lambers, and with apparently good effect. Some are deterred from the operation, by having experienced a difficulty in stopping the flow of blood; a circumstance that in a few times when we have performed this operation, has not occurred to us.

We shall now briefly state the mode of operating, and the consequences which sometimes follow the opening of the jugular vein in horses.

It is most usual to bleed with the fleam, or the lancet; the former on account of the thickness of the skin of the horse, and the resistance afforded by the hair, is generally had recourse to. It is also next to impossible to drive the blade into the neck so deep as to be injurious, on account of the shoulder to which it is affixed; it is perhaps, on this account, the safest and most certain instrument, especially in the hand of grooms and helpers in stables, as it cannot be much abused. In the structure of it, the back should be particularly attended to, for in general this is too narrow, inasmuch, that the instrument being struck, it sinks into the channel of the vein, the prominent muscles of the neck receive the stroke, and the vein is not opened. To remedy this, which is a very common inconvenience, the back of the fleam should be at least three quarters of an inch broad, in which case the operation very rarely fails.

The lancet is also very convenient in thin skinned horses, and performs the operation very well. It requires, however, on account of the resistance of the skin and hair, to be used rather boldly, as to the length it is presented with, and the force employed, at least when a copious flow of blood is desired.

It is usual to wet the hairs over the part intended to be punctured,

punctured, and then if they are drawn parallel to the direction of the vein, the lancet passing between them, there is less resistance than if they presented themselves transversely to the blade, in which case they must necessarily be divided before the incision can take place.

The jugular vein, after bleeding, often ulcerates, and is attended with the most serious ill consequences, the mischief extending in both directions along the internal surface of the vein, from the point of the incision; the cavity of the vein, or its canal, becomes obliterated, and the irritation occasions a thickening of the cellular membrane surrounding the vein, often to some inches in depth. This, in general, if no external irritation happens, subsides gradually, and disappears without any farther ill consequences, and the vein is totally lost on that side: at other times, an oozing and discharge of thin lymph takes place from the injured part, and a sinus forms, running mostly against the course of the vein up the neck, which, being freely opened, soon heals without farther inconvenience. At other times, considerable abscesses form, which are opened without danger, and the thickening of the cellular membrane gradually subsides, and the part heals. Again, in others, the inflammation and ulceration extend along the course of the vein to the head, forming abscesses, which burst and discharge blood, and the ulceration extending to the head becomes fatal.

As prevention is often much easier than cure, to avoid this accident great care should be taken to use a clean instrument, with a smooth, keen edge, not to strike where the vein has been already opened, where very often is an enlargement, and the vein becomes thinner in that part, and more extended, not to include any thing but the skin in pinning it up, and not to leave the pin remaining in the neck too long, to become cankered and rusty, and thus produce irritation. The pin should be clipped as short as possible, to prevent the horse rubbing it out against the manger, &c.

The wound will in general close of itself after a few minutes, if all pressure upon the vein be removed, and sufficiently firm to stop the escape of the blood, if the lips of the orifice are pressed together, without any pinning, and the horse's head, to render it more certain, should be tied rather high to the rack for a short time; where, however, the orifice is very large, or the veins very tumid, and disposed to bleed, pinning is the surest practice.

Lancets are often made with a spring, suddenly to plunge them into the vein, and are usefully and commodiously employed for this operation, as they do it with great suddenness and effect, more so than the hand or the blow of a blood-tick. The only objection is, that the instrument, from the pressure against the neck required in using it, cannot be so suddenly withdrawn as might be desirable, so that if the horse plunges at the moment he might severely cut himself, which we have seen happen. To prevent the possibility of such an occurrence, the instrument might be provided with a second spring to bring back the lancet to its sheath, or case, immediately after the stroke, which would render this instrument very useful and perfect.

BLEEDING from the nose. See *EPISTAXIS*.

BLEEDING from the lungs. See *HÆMOPTYSIS*.

BLEEDING by measure, is where an account is taken of the quantity as it flows from the vein, in order to put a stop to the flux when the requisite portion is had.

BLEEDING at large, where the flux is continued without regard to the quantity, till such time as some expected effect is perceived. This method is sometimes used in cases of apoplexies, comata, &c.

BLEEDING of a corpse, cruentatio cadaveris, is a phenome-

non said to have frequently happened in the bodies of persons murdered, which, on the touch, or even approach of the murderer, began to bleed at the nose, ears, and other parts; so as formerly to be admitted in England, and still allowed in some other parts, as a sort of detection of the criminal, and proof of the fact. Phil. Trans. N^o 77. p. 3012. But this kind of evidence derives its weight merely from superstition and credulity. Numerous instances of these posthumous hæmorrhages are given by Webster, Lemnius, Libavius, and especially Horstius, who has a discourse express on this point, under the title, "De Cruentatione Cadaverum."

BLEEDING is also applied, in a less proper sense, to a flux of sap out of the wounded vessels of plants, either spontaneously at certain seasons, or by art, and the help of incision.

BLEGNY, NICOLAS, in *Biography*, a bold, and, for a time, successful adventurer in medicine, to which he was not regularly educated. Dionis says, he married a midwife, which probably first suggested the idea of becoming a rupture doctor, and of contriving an elastic bandage for that complaint. In 1676, he published at Paris, "L'art de guerir des hernies," 12mo. which has passed through several editions. He used to cauterize the skin of the groin with aqua fortis, or the muriatic acid; when the wound healed, a firm cicatrix was left, which contributed in preventing the further descent of the gut. This remedy was invented by the prior De Cabeveres. He relates several remarkable cures performed by him: in one case, part of the urinary bladder had slipped into the ring. In 1679 he published, "Histoire anatomique d'un enfant, qui a demeuré vingt cinq ans dans le ventre de sa mere," Paris, 12mo. The fetus was said to be petrified. It had acquired, from its long residence in the abdomen, and from the pressure of the neighbouring viscera, an almost cartilaginous hardness, and retained very little of the human form. About the same time, he commenced the publication of a medical journal, under the title of "Les nouvelles decouvertes, sur toutes les parties de la medicine," of which one number came out every month, and he solicited and obtained assistance from a variety of practitioners; he also contributed considerably to it from his own stock. His name appeared as the editor for the first three years, but was afterwards omitted. Bouet thought the journal deserving of being translated into Latin, and published it at Geneva, in 4to. under the title of "Zodiaci medico-Gallici." He had before this made himself known by a treatise on the venereal disease; "L'Art de guerir les maladies veneriennes expliqué par les principes de la nature, et de la mecanique," 12mo. 2 vols. Paris. This was soon republished, translated into German, English, and other languages. He says, the disease was known to the ancients, and even to Moses. It may be brought on, he thinks, by immoderate venery. He objects to the use of astringent injections in the gonorrhœa, and professes to cure the lues, equally certainly, and more safely, with decoctions of guaiacum and sarsaparilla, than with mercury. He had also published, by order of his sovereign, "Remede Anglois, pour la guerison des sievres," 1682, 12mo. The principal part of this remedy was the Peruvian bark. He had now attained to very high rank in his profession, having been made, in succession, surgeon to the queen, to Philip duke of Orleans, and, in 1687, one of the physicians in ordinary to the king. Soon after he undertook the management of a hospital, for the reception of the sick poor at Pincourt, but for some immoral practices, encouraged in this place, a report of which was made to the king, he was removed from all his appointments,

and confined in prison for eight years. Released at length from his confinement, he went and settled at Avignon, where he continued to the time of his death, about the year 1722, being 70 years of age. Haller. Bib. Chirurg. Anat. et Med. Eloy Dict. Hist.

BLEICHERODE, in *Geography*, a town of Germany, in the circle of Upper Saxony, county of Hohenstein, and lordship of Lora; though small, it is populous and thriving, has some manufactures, and carries on a good trade; 20 miles north of Mulhausen.

BLEIDENSTATT, a town, or large village of Germany, in the circle of the Upper Rhine, and principality of Nassau-Saarbrück-Ufingen, seated on the Aar, 9 miles N.N.W. of Mentz.

BLEISTEIN, or **PLESTAIN**, a town of Germany, in the circle of Bavaria, and principality of Newburg, with an annexed lordship, a fief of the kingdom of Bohemia; 22 miles E. N. E. of Amberg.

BLEKEDE, a small town of Germany, in the circle of Lower Saxony, and principality of Lüneburg-Zell, seated on the Elbe, to which belongs a toll on the river of considerable produce; 20 miles E. N. E. of Lüneburg.

BLEKINGEN, called by the Swedes *Blekingh*, by the Danes *Blegind*, and by the inhabitants *Blegen*, a province of Sweden, bounded on the north by Smoland, on the south and east by the Baltic, and on the west by Scania, Schonen, or Skone, is about 100 English miles in length, and about 26 in breadth. It is a mountainous country, but various parts of it are more pleasant than any other provinces of the kingdom. It abounds with forests of oak, beech, pine, and birch trees, and carries on a considerable trade in pot-ash, tar, tallow, hides, leather, beams, deal-boards, and mats. The inhabitants also employ themselves in fishing and hunting. The shallow soil does not admit of much tillage, but the pastures afford the best cheese in Sweden; the cattle, however, are of a smaller size than those of Schonen. This country has several lakes and six principal rivers, which furnish good salmon. Its islands belonging to this jurisdiction are numerous, and the whole province contains 29 parishes. The clergy are subject to the see of Lund. As to its political division it consists of four barads, or districts, and its principal town is Carlserona, which see.

BLEMISH, in *Horse-dealing*. By this term, among the venders of horses, is understood any appearance by which the horse is disfigured, as broken knees, a blind eye, scars of various kinds, &c. The term blemish, by some, may be extended even to any unsightly natural markings of the horse. These blemishes, however, for the most part, are considered as in no wise of themselves constituting an unsoundness.

BLEMISH, a term in *Hunting*, used when the hounds, or beagles, finding where the chace has been, make a proffer to enter, but return.

BLEMMYES, or **BLEMYES**, among the *Ancient Geographers*, a fabulous sort of people, supposed without heads; having eyes and mouths on their breasts; said to have inhabited part of Ethiopia, on the borders of Egypt.

Some authors imagine that this fable had its origin in a custom which prevailed among this people of depressing their heads between their shoulders, which they forced upwards, so that their necks were very short, and their heads were concealed partly by their shoulders, and partly by their long and thick hair. To this purpose it is alleged, that the Egyptian, or bearded Bacchus, has the head sunk in his breast. We learn from Vopiscus, that some Blemmyan captives, taken prisoners by Probus, in an expedition against

them, about the year of Christ 278, made a very odd appearance at Rome. But at this time they could not be quite unknown at Rome, as some of them had appeared there before, on occasion of Aurelian's triumph. In the time of Dioclesian, the number of the Blemmyes, scattered between the island of Meroe and the Red sea, was very inconsiderable, their disposition was unwarlike, and their weapons rude and offensive; yet, in the public disorders, these barbarians, whom antiquity, shocked with the deformity of their figure, had almost excluded from the human species, presumed to rank themselves among the enemies of Rome. With a view of opposing to the Blemmyes a suitable adversary, Dioclesian, in his attack on the rebellious Egyptians, A. D. 296, persuaded the Nobatæ, or people of Nubia, to remove from their ancient habitations in the deserts of Libya, and resigned to them an extensive but unprofitable territory above Syene, and the cataracts of the Nile, with the stipulation, that they should ever respect and guard the frontier of the empire. We find, however, that at a subsequent period they sent ambassadors to the court of Constantine. The Blemmyes were subdued by Florus, the lieutenant of Marcian, A. D. 450.

Bochart derives the word *Blemmyes* from בְּלִי, which implies a *negation*, and בְּרוּת, *brain*; in which sense, the Blemmyes should have been people without brains. See Strabo, l. xvii. p. 1. 172. Pomponius Mela, l. 1. c. 4. His words, in describing these savages of Ethiopia, are curious; "Intra, si credere libet, vix homines magisque semiferi; Ægipanes, et Blemmyes, et Satyri."

BLENAU, in *Geography*, a town of France, in the department of the Yonne, and chief place of a canton in the district of Joigny, containing 1065 persons; the number of people in the canton amounts to 5976; the territory comprehends 290 kilometres and 9 communes; 2 leagues N.W. of St. Fargeau.

BLENCH, in *Law*, a sort of tenure of land; as to hold land in blench is by payment of a sugar-loaf, a couple of capons, a beaver-hat, &c. if the same be demanded in the name of *blench*, i. e. *nomine albæ firmæ*. See **ALBA FIRMA**.

BLENDE, in *Mineralogy*, called also black-jack, or pseudo-galenæ, the native sulphuret of zinc. See **ZINC**, *ores of*.

BLEND-metal-iron, a coarse sort of iron from the Staffordshire mines, used for making nails and heavy ware; in some places also for horse-shoes.

BLEND-water, a distemper incident to black-cattle, which comes several ways. 1. From blood. 2. From the yellows, which is a ringleader of all diseases. And 3. From the change of ground: for being hard, it is apt to breed this evil, which if not remedied in six days, will be past help.

BLENHEIM, in *Geography*, a village of Germany, in the circle of Bavaria, and principality of Newburg, 2 miles N. E. of Hockstedt, famous for a victory obtained there by the English and their allies over the French and Bavarians, August 13th 1704. For an account of the battle, see **HOCKSTEDT**.

BLENHEIM, a new town of America, in the state of New York, in Schoharie county, incorporated in 1797.

BLENNA, or **BLENA** (βληνα) in *Medicine*, a term used by Hippocrates, and subsequent medical writers, to denote a phlegm or mucus excreted from the nostrils. This sort of excretion occurs not unfrequently in acute diseases, and is generally a favourable symptom.

BLENNIUS, in *Ichthyology*, a Linnæan genus of jugular fishes.

Steph. Byz. to have derived its name from one of the companions of Cadmus.

BLIEGG, in *Ichthyology*, a name given by the Germans to the fish we call the *bleak*. See BLEAK, and ALBURNUS.

BLIESCASTEL, in *Geography*, a town of France, in the department of Sarre, and chief place of a canton, in the district of Sarrebruck; containing 1278 inhabitants; the population of the canton includes 10,084 persons; and the territory has 30 communes.

BLIESNA SALENSI, a harbour on the coast of Lapland, between the river Kola and Kilduyn island.

BLIGH's *Cap*, a name given by captain Cook, on account of its shape, to an island in the southern Pacific ocean, near Kerguelen's land, before called by Kerguelen "the island of Rendezvous." It is a high round rock accessible only to birds. S. lat. $48^{\circ} 29'$. E. long. $68^{\circ} 40'$.

BLIGHT, in *Agriculture*, a general name for various distempers incident to corn and fruit-trees.

It affects them variously, the whole plant sometimes perishing by it, and sometimes only the leaves and blossoms, which will be scorched and shrivelled up, the rest remaining green and flourishing. Some have supposed, that blights are produced by easterly winds, which bring vast quantities of insects' eggs along with them from distant places. These being lodged upon the surface of the leaves and flowers of fruit-trees, cause them to shrivel up and perish.

Mr. Knight, however, observes, that blights are produced by a variety of causes; by insects, by an excess of heat or cold, of drought or moisture; for these necessarily derange and destroy the delicate organization of the blossoms; but he believes the common opinion, that they arise from some latent noxious quality in the air, or from lightning, to be totally unfounded. The term blight is very frequently used by the gardener and farmer, he remarks, without any definite idea being annexed to it. If the leaves of their trees be eaten by the caterpillar, or contracted by the aphid; if the blossoms fall from the ravages of insects, or without any apparent cause, the trees are equally blighted, and if an east wind happen to have blown, the insects, or at least their eggs, whatever be their size, are supposed to have been brought by it. See APHIS.

The true cause of blights seems to be, continued dry easterly winds for several days together, without the intervention of showers, or any morning dew, by which the perspiration in the tender blossom is stopped; and if it so happen that there is a long continuance of the same weather, it equally affects the tender leaves, whereby their colour is changed, and they wither and decay.

The best remedy, perhaps, is gently to wash and sprinkle over the tree, &c. from time to time, with common water; and if the young shoots seem to be much infected, let them be washed with a woollen cloth, so as to clear them, if possible, from this glutinous matter, that their respiration and perspiration may not be obstructed. This operation ought to be performed early in the day, that the moisture may be exhaled before the cold of the night comes on; nor should it be done when the sun shines very hot. Mr. Forsyth recommends their being washed well with urine and soap-suds, as soon as possible after the disease appears.

Another cause of blights in the spring, is said to be sharp, hoary frosts, which are often succeeded by hot sun-shine in the day-time. This is the most sudden and certain destroyer of fruit that is known. The chief remedy to be depended upon in this case is, that of protecting the fruit-trees during the night-time with nets. This mode, where regularly and correctly performed, has been found highly beneficial.

But, in order to cure this disease, some have advised the burning of wet litter on the windward side of the plants, in order that the smoke of it may be carried to them by the wind, which they suppose will stifle and destroy the insects, and thereby cure the mischief. Others direct the use of tobacco-dust, or the washing of the trees with water in which tobacco-stalks have been infused for twelve hours, which they say will destroy those insects, and recover the plants. Pepper-dust, scattered over the blossoms of fruit-trees, &c. has been recommended as very useful in this case; and there are some who advise the pulling off the leaves that are affected.

What is termed the blight is frequently, however, no more than a debility, or distemper in trees. Mr. Forsyth observes, that "this is the case when trees, against the same wall, and enjoying the same advantages in every respect, differ greatly in their health and vigour, the weak ones appearing to be continually blighted, while the others remain in a flourishing condition. This very great difference, in such circumstances, can be attributed only to the different constitutions of the trees, proceeding from want of proper nourishment, or from some bad qualities in the soil; some distemper in the stock, buds, or scions; or from some mismanagement in the pruning, &c. all of which are productive of distempers in trees, of which they are, with difficulty, cured. If the fault be in the soil, it must, he says, be dug out, and fresh mould put in its place; or, the trees must be taken up, and others, better adapted to the soil, planted in their room. It will be found absolutely necessary always to endeavour to suit the particular sorts of fruit to the nature of the soil; for it is in vain to expect all sorts of fruit to be good in the same soil. If the weakness of the tree proceed from an in-bred distemper, it will be advisable to remove it at once, and after renewing the earth, to plant another in its place." But if the weakness is brought on by ill management in the pruning, which is frequently the case, he would advise more attention to the method of pruning and training.

Besides this, "there is another sort of blight that sometimes happens pretty late in the spring, as in April or May, which is very destructive to fruit-trees in orchards, and open plantations, and against which we know of no effectual remedy. This is what is called a *fire-blast*, which, in a few hours, hath not only destroyed the fruit and leaves, but often parts of trees; and sometimes entire trees have been killed by it." This, Mr. Forsyth observes, "is generally thought to be occasioned by certain transparent flying vapours, which may sometimes take such form, as to converge the sun's rays in the manner of a burning-glass, so as to scorch the plants they fall upon; and this, in a greater or less degree, in proportion to their convergency. As this generally happens in close plantations, where the vapours from the earth, and the perspiration from the trees, are pent in for want of a free circulation of air to disperse them, it points out to us the only way, yet known, of guarding against this enemy to fruits; namely, to make choice of a clear healthy situation for kitchen-gardens, orchards, &c. and to plant the trees at such a distance, as to give free admission to the air, that it may dispel those vapours before they are formed into such volumes as to occasion these blasts." But blasts may also be occasioned by the reflection of the sun's rays from hollow clouds, which sometimes act as burning mirrors, and occasion excessive heat. Against this there is no remedy yet discovered.

Mr. Marshall, in the Rural Economy of midland counties, observes, that it is well known that this disease is most injurious

jurious to grain crops in wet seasons; hence, principally, the scarcity and advanced price of wheat after such seasons. It is also remarked to affect the north side of fields, much more than the south, and that the effect is governed by the state of ripeness; consequently, a few days of forwardness may be sufficient to prevent the effect. It is evident, that the forward wheats are least liable to be blighted; for, having passed some certain stage of maturation, they become invulnerable to the attack of this mischievous enemy; at least, no obvious injury is incurred. It is also observable, that no perceptible blight takes place while a dry season continues. The only guard a farmer has against the attack of this secret enemy appears to be that of sowing early.

BLIGHT of corn is called SMUT.

BLIGNY-SUR OUCHES, in *Geography*, a town of France, in the department of the Côte d'Or, and chief place of a canton, in the district of Beaune, 3 leagues N.W. of Beaune, containing 1169 inhabitants; the canton contains 6598; and comprehends 26½ kilometres, and 23 communes.

BLIKOOSKOL, a small island in the Frozen sea. N. lat. 71° 30'. E. long. 125° 14'.

BLIND. See BLINDNESS.

BLIND, *Pore*, or *Pur*, denotes only a great degree of short-sightedness. Phil. Trans. N° 37. p. 731.

BLIND, is also used for occult, or imperceptible. Hence blind rampart, *cæcum vallum*, among the ancients, was that beset with sharp stakes, concealed by grafs or leaves growing over them.

BLIND testimonies, *cæca testimonia*, those given by absent persons in writing.

BLIND is also used in speaking of bodies without apertures.

Hence.

BLIND wall, *cæcus paries*, that without windows. In a like sense we meet with *blind chamber*, *cæcum cubiculum*.

BLIND is also used in speaking of vessels which are not perforated. In this sense the chemists say a blind alembic. A tube is said to be blind, when it is closed a-top. Some anatomists also call the third cavity of the ear *cæcum*, as having no issue; but it is more usually denominated labyrinth, which see.

BLIND harbour, or *Murderer's bay* of Tasman, in *Geography*, a deep bay at the N.W. part of the southern island of New Zealand, having two small islands near the bottom of it on the west side; 6 leagues to the east of cape Farewell.

BLIND, in the *Military Art*, signifies generally every material which serves to cover and protect the besiegers from the fire of the enemy; as wool-packs, sand bags, earth-baskets, &c. Blinds sometimes consist only of canvas stretched, so as to intercept the view of the garrison from the walls. Sometimes they are planks erected, and in this case are more properly called mantlets. They are also occasionally constructed with a number of baskets or barrels.

More particularly taken, blinds denote wooden frames of four pieces, either round or flat. Two of them are six feet long, and pointed at the extremities; the others, about three or four feet in length, serve as spars, to fasten the two former together. These blinds are fixed upright in the ground against the sides of the saps, to hinder the earth from falling in, and to fasten fascines upon the upper part. They are likewise of use in covering the saps, and supporting a roof of fascines to secure the troops from stones and grenades.

Blinds, of another sort are commonly made of osiers, or branches interwoven and laid across between two rows of

stakes, about the height of a man, and four or five feet asunder.

Blinds are of essential service at the heads of trenches, or saps, when they are extended in front towards the glacis; and when, from the superior elevation of the enemy's works, he may overlook, and pour his fire in upon the besiegers. They are also indispensable, in case the nature of the ground should oblige the approaches to be carried on in a straight direction, and the workmen and the guard to be necessarily exposed to the batteries of the garrison. But in this case, the saps can only be carried on in the night, as the loss of men would otherwise prove extremely serious.

BLIND is also sometimes used for ORILLON.

BLIND granado, that which does not light or take fire.

BLIND faith. See FAITH.

BLIND gut. See CÆCUM.

BLIND worm. See SLOW-worm.

BLINDING, a species of corporal punishment anciently inflicted on thieves, adulterers, perjurers, and others; and from which the ancient Christians were not exempt. Sometimes lime in vinegar, or barely scalding vinegar, was poured into the eyes, till their balls were consumed; sometimes a rope was twisted round the head till the eyes started out. Solin. Polyhiit. c. 4. Lamprid. in Alex. Sev. c. 17. Val. Max. lib. vi. c. 5. Lactant. de Mort. Perfec. c. 36.

In the middle age, they changed total blindness for a great darkness, or diminution of sight, which they produced by holding a red hot iron dish or basin before the eyes, till their humours were dried, and their coats shrivelled up.

The inhabitants of the city Apollonia executed it on their watch whom they found asleep. Democritus, according to Plutarch, Cicero, and A. Gellius, put out his own eyes, that he might be less disturbed in his mental contemplations, when thus freed from the distraction of the objects of sight. Herodot. lib. vi. c. 92. Aul. Gell. Noct. Att. lib. x. c. 71. Cicero Tusc. Qu. 5.

BLINDING, *obscatio*, in the *Black Art*, denotes a species of necromancy, whereby a visible body may be concealed, or hidden by an invisible power. See NECROMANCY.

BLINDING of a *casemate*, signifies erecting a battery against it, in order to dismount its cannon and render them useless.

BLINDNESS, in *Surgery*, the privation or want of sight. This defect may arise from a variety of causes, existing either in the organ of sight, or in the circumstances necessary to produce vision. See OPTICS and EYE. Blindness will be complete, when the light is wholly excluded; or partial, when it is admitted into the eye so imperfectly as to convey only a confused perception of visible objects. Blindness may again be distinguished into periodical or permanent, transient or perpetual, natural or accidental, &c.; but these distinctions do not serve to communicate any idea of the causes of blindness, which are to be slightly mentioned in the present article. For a more particular account of the causes and remedies of blindness, the reader will consult the articles which give an account of the doctrine of vision, and the diseases of the eye.

The ordinary causes of blindness are as follow:

1. In the eyelids and muscles. By a cohesion of the eyelids; by an elongation of the upper eye-lid; by a paralytic state, which disables the patient from raising it sufficiently; by an irregular or defective action in the muscles which are attached to the eye-ball.

2. In the membranes of the eye. By their opacity, so as to exclude the rays of light; by their exquisite sensibility, so as to render vision intolerable; by their blood-vessels assuming a morbid action, and effusing a fluid (suppose pus, for example) into any of the cavities of the eye.

BLINDNESS.

3. *In the humours of the eye.* By their defective quantity; by the turbid state, or imperfectly transparent condition, of the humours; by the loss of any one of them, through accident or violence; by an altered figure of the crystalline lens.

4. *In the brain or optic nerve.* By compression, producing pally or *GUTTA SERENA* (which see); by a state of debility or inertness in the visual organ, so as to require an uncommonly strong light; by too great sensibility in the optic nerve, enduring but a very feeble impression from the light, and transmitting only a confused perception of visible objects to the mind; by some unknown change in the nervous power, causing depraved vision, and exciting imaginary scenes, which no person can observe besides the patient himself.

It has been generally supposed, that blind persons have not any idea of visible objects, though they can distinguish them by the touch: thus the gentleman couched by Mr. Chefelden, though he knew the colours asunder in a good light during his blind state; yet when he saw them after couching, the faint ideas he had of them before, were not sufficient for him to know them by afterwards. *Phil. Transf.* N^o 403. p. 447.

It was even a considerable time before he could remember which was the cat and which the dog, though often informed, without feeling them. Add, that he had no idea of distance; but thought all the objects he saw touched his eyes, as what he felt did his skin.

But a case is recorded by Mr. Ware in the *Philosophical Transactions* (read to the society June 11th, 1801), which does not accord with Mr. Chefelden's observation on this subject. It was the case of a young gentleman, who (by a surgical operation) recovered his sight when seven years of age; after having been deprived of it by cataracts, before he was a year old. Mr. Ware gives the following account of the facts in question: "I performed the operation on the left eye, on the 29th of December last, in the presence of Mr. Chamberlayne, F.A.S. Dr. Bradley, of Baliol college, Oxford, and Mr. Platt, surgeon, in London. It is not necessary, in this place, to enter into a description of the operation. It will be sufficient to say, that the child, during its performance, neither uttered an exclamation, nor made the smallest motion, either with his head or hands. The eye was immediately bound up, and no inquiries made on that day with regard to his sight. On the 30th, I found that he had experienced a slight sickness on the preceding evening, but had made no complaint of pain, either in his head or eye. On the 31st, as soon as I entered his chamber, the mother, with much joy, informed me that her child could see.— About an hour before my visit, he was standing near the fire, with a handkerchief tied loosely over his eyes, when he told her that under the handkerchief, which had slipped upward, he could distinguish the table by the side of which she was sitting: it was about a yard and a half from him; and he observed that it was covered with a green cloth (which was really the case), and that it was a little farther off than he was able to reach. No further questions were asked him at that time; as his mother was much alarmed, lest the use thus made of his eye might have been premature and injurious. Upon examination, I found that it was not more inflamed than the other eye; and the opacity in the pupil did not appear to be much diminished. Desirous, however, to ascertain whether he was able to distinguish objects, I held a letter before him, at the distance of about twelve inches, when he told me, after a short hesitation, that it was a piece of paper; that it was square, which he knew by its corners; and that it was longer in one direction than it was in the

other. On being desired to point to the corners, he did it with great precision, and readily carried his finger in the line of its longest diameter. I then shewed him a small oblong band-box covered with red leather, which he said was red and square, and pointed at once to its four corners. After this, I placed before him an oval silver box, which he said had a shining appearance; and, presently afterwards, that it was round, because it had not corners. The observation, however, which appeared to me most remarkable, was that which related to a white stone mug; which he first called a white basin, but, soon after, recollecting himself, said it was a mug, because it had a handle. These experiments did not give him any pain; and they were made in the presence of his mother, and of Mr. Woodford, a clerk in his majesty's treasury. I held the objects at different distances from his eye, and inquired very particularly if he was sensible of any difference in their situation; which he always said he was, informing me, on every change, whether they were brought nearer to, or carried further from him. I again inquired, both of his mother and himself, whether he had ever, before this time, distinguished by sight any sort of object; and I was assured by both that he never had on any occasion; and that when he wished to discover colours, which he could only do when they were very strong, he had always been obliged to hold the coloured object close to his eye, and a little on one side, to avoid the projection of the nose. No further experiments were made on that day. On the 1st of January, I found that his eye continued quite free both from pain and inflammation, and that he felt no uneasiness on the approach of light. I shewed him a table knife; which at first he called a spoon, but soon rectified the mistake, giving it the right name, and distinguishing the blade from the handle, by pointing to each as he was desired. He afterwards called a yellow pocket-book by its name, taking notice of the silver lock in the cover. I held my hand before him; which he knew, but could not at first tell the number of my fingers, nor distinguish one of them from another. I then held up his own hand, and desired him to remark the difference between his thumb and fingers; after which he readily pointed out the distinctions in mine also. Dark-coloured and smooth objects, were more agreeable to him than those which were bright and rough. On the 3d of January, he saw, from the drawing room window, a dancing-bear in the street; and distinguished a number of boys that were standing round him, noticing particularly a bundle of cloths which one of them had on his head. On the same evening, I placed him before a looking-glass, and held up his hand: after a little time he smiled and said he saw the shadow of his hand, as well as that of his head. He could not then distinguish his features; but, on the following day, his mother having again placed him before the glass, he pointed to his eyes, nose, and mouth, and seemed much gratified with the sight.

Having thus stated the principal observations that were made by Master W. I shall now make a brief comparison between this statement, and that which is given in the XXXVth volume of the *Philosophical Transactions*, of M. Chefelden's patient, who was supposed to be born blind, and obtained his sight when he was between thirteen and fourteen years old.

It should be observed, that though Master W. was six years younger than Mr. Chefelden's patient, he was remarkably intelligent, and gave the most direct and satisfactory answers to every question that was put to him. Both of them, also, if not born blind, lost their sight so very early, that, as Mr. Chefelden expresses it, "they had not any recollection of having ever seen."

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My first remark is, that, contrary to the experience of Mr. Cheselden's patient, who is slated "to have been so far from making any judgment of distance, that he thought all objects touched his eyes, as what he felt did his skin," Master W. distinguished, as soon as he was able to see, a table, a yard and a half from him; and proved that he had some accuracy in his idea of distance, by saying, that it was a little further off than his hand could reach. This observation, so contrary to the account we have received of Mr. Cheselden's patient, would have surpris'd me much more than it did, if I had not previously, in some similar instances, had reason to suspect that children, from whom cataracts had been extract'd, had a notion of distance the first moment they were enabled to see. In the instance particularly of a young gentleman from Ireland, fourteen years old, from each of whose eyes I extract'd a cataract, in the year 1794, in the presence of Dr. Hamilton, physician to the London hospital, and who, before the operation, assur'd me, as did his friends, that he never had seen the figure of any object, Dr. Hamilton and myself were much astonish'd by the facility with which, on the first experiment, he took hold of my hand at different distances, mentioning whether it was brought nearer to, or carried further from him, and conveying his hand to mine in a circular direction, that we might be the better satisfied of the accuracy with which he did it. In this case, however, and in others of a like nature, although the patients had certainly been blind from early infancy, I could not satisfy myself that they had not, before this period, enjoyed a sufficient degree of sight to impress the image of visible objects on their minds, and to give them ideas which could not afterwards be entirely obliterated. In the instance of Master W. however, no suspicion of this kind could occur; since, in addition to the declaration of himself and his mother, it was proved by the testimony of the surgeon who examined his eyes in the country, that the cataracts were fully formed before he was a year old. And I beg leave to add further, that on making inquiries of two children, between seven and eight years of age, now under my care, both of whom have been blind from birth, and on whom no operation has yet been performed, I find that the knowledge they have of colours, limited as it is, is sufficient to enable them to tell whether coloured objects be brought nearer to, or carried further from them; for instance, whether they are at the distance of two inches or four inches from their eyes; nor have either of them the slightest suspicion, as is related of Mr. Cheselden's patient, that coloured objects, when held before them, touch their eyes.

But the judgment which Master W. formed of the different distances of objects, was not the only instance in which he differed from Mr. Cheselden's patient; who, we are inform'd, "did not know the figure of any thing, nor any one thing from another, however different in shape and magnitude;" for Master W. knew and describ'd a letter, not only as white, but also as square, because it had corners; and an oval silver box, not only as shining, but also as round, because it had not corners: he likewise knew, and call'd by its name, a white stone mug, on the first day he obtain'd his sight, distinguishing it from a basin, because it had a handle. These experiments were made in the presence of two respectable persons, as well as myself; and they were several times repeated, to convince us that we could not be mistaken in them. I mention the circumstance, however, with much diffidence, being aware that the observations not only differ from those that are related of Mr. Cheselden's patient, but appear, on the first statement, to oppose a principle in optics, which I believe is commonly and justly admitted, that the senses of sight and feeling have no other connection than that

which is formed by experience; and, therefore, that the ideas derived from feeling can have no power to direct the judgment, with respect either to the distance or form of visible objects. It should be recollected, however, that persons who have cataracts in their eyes, are not, in strictness of speech, blind, though they are deprived of all useful sight. The instances I have adduc'd prove, that the knowledge they have of colours is sufficient to give them some idea of distance, even in their darkest state. When, therefore, their sight is cleared by the removal of the opaque crystalline, which intercepts the light, and the colour of objects is thereby made to appear stronger, will it be difficult, or unphilosophical, to conceive that their ideas of distance will be strengthened, and so far extended as to give them a knowledge, even of the outline and figure of those objects with the colour of which they were previously acquainted?"

The miseries of blindness are feelingly describ'd both by Homer and Milton, in the following impressive passages. The venerable father of epic poetry, who is said, in the person of Demodocus the Phœacian bard, to have describ'd his own situation, proceeds thus:

"Τὸν πρῶτον Μῆσος ἔφιλῆσσε, δῖος δ' ἀγαθὸν τε, κακὸν τε,
Ὅτ' ἄσπετον μὲν ἄμερσσε, δῖος δ' ἦναι ἄσπιδον."

Odyss. l. 9. v. 63, 64.

"Dear to the muse, who gave his days to flow
With mighty blessings mix'd with mighty woe,
In clouds and darkness quench'd his visual ray,
Yet gave him pow'r to raise the lofty lay." POPE.

In similar strains does Milton bewail his calamity, in his address to light:—

"Taught by the heav'nly muse to venture down
The dark descent, and up to re-ascend,
Though hard and rare; thee I revisit safe,
And feel thy sov'reign vital lamp; but thou
Revisit'lt not these eyes, that roll in vain
To find thy piercing ray, and find no dawn;
So thick a drop serene hath quench'd their orbs,
Or dim suffusion veil'd. Yet not the more
Cease I to wander, where the muses haunt
Clear spring, or shady grove, or sunny hill,
Smit with the love of sacred song: but chief
Thee, Sion, and the flow'ry brooks beneath,
That wash thy hallow'd feet, and warbling flow,
Nightly I visit; nor sometimes forget
Those other two, equal'd with me in fate,
So were I equal'd with them in renown,
Blind Thamyras and blind Mæonides,
And Tiresias and Phœneus prophets old:
Then feed on thoughts, that voluntary move
Harmonious numbers: as the wakeful bird
Sings darkling, and in shadiest covert hid
Tunes her nocturnal note. Thus with the year
Seasons return; but not to me returns
Day, or the sweet approach of ev'n or morn,
Or sight of vernal bloom, or summer's rose,
Or flocks, or herds, or human face divine:
But cloud instead, and ever during dark,
Surrounds me, from the cheerful ways of men
Cut off, and for the book of knowledge fair
Presented with an universal blank
Of nature's works to me expung'd and ras'd,
And wisdom at once entrance quite shut out."

Paradise Lost, b. iii.

Thus also does he deplore, in the most affecting accents, the misfortune of blindness in his "Sampson Agonistes:—

—————"But chief of all,

O loss of sight, of thee I must complain!

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Blind among enemies, O worse than chains,
 Dungeon, or beggary, decrepid age.
 Light, the prime work of God, to me is extinct,
 And all her various objects of delight
 Annul'd, which might in part my grief have eas'd,
 Inferior to the vilest now become
 Of man or worm. The vilest here excel me :
 They creep, yet see ; I dark in light expos'd
 To daily fraud, contempt, abuse, and wrong,
 Within doors, or without, still as a fool,
 In power of others, never in my own ;
 Scarce half I seem to live, dead more than half.
 O dark, dark, dark, amid the blaze of noon,
 Irrecoverably dark, total eclipse
 Without all hope of day !
 O first created beam, and thou great word,
 Let there be light, and light was over all ;
 Why am I thus bereav'd thy prime decree ?
 The sun to me is dark,
 And silent, as the moon
 When she deserts the night,
 Hid in her vacant interlunar cave.
 Since light so necessary is to life,
 And almost life itself, if it be true
 That light is in the soul,
 She all in every part ; why was the sight
 To such a tender ball as th' eye confin'd ?
 So obvious, and so easy to be quench'd ?
 And not, as feeling, throughout all parts diffus'd,
 That she might look at will through ev'ry pore ?
 Then had I not been thus exil'd from light,
 As in the land of darknes, yet in light
 To live a life half dead, a living death :
 And buried ; but yet more miserable !
 Myself the sepulchre, a moving grave ;
 Bury'd, yet not exempt
 By privilege of death and burial
 From worst of other evils, pains, and wrongs,
 But made hereby obnoxious more
 To all the miseries of life."

The degree in which the calamity of blindness is felt and lamented by those to whom it occurs, may be also partly guessed at by the extasies into which persons have fallen on their recovery from it.

Mr. Boyle mentions a gentleman, who, having been blind, and brought to sight at eighteen, was very near going distracted with the joy. See a remarkable case of this kind, Tatler, N^o 55. vol. i. Boyle's Works abr. tom. i. p. 4.

We find various recompences for blindness, or substitutes for the use of the eyes, in the wonderful sagacity of many blind persons recited by Zaharius in his "Oculus Artificialis," and others. In some, the defect has been supplied by a most excellent gift of remembering what they had seen; in others, by a delicate nose, or the sense of smelling; in others, by an exquisite touch, or a sense of feeling, which they have had in such perfection, that, as it has been said of some, they learned to hear with their eyes; as it may be said of these, that they taught themselves to see with their hands.

Some have been enabled to perform all sorts of curious and subtle works in the nicest and most dextrous manner. Aldrovandus speaks of a sculptor who became blind at twenty years of age, and yet ten years after made a perfect marble statue of Cosmo II. de Medicis: and another of clay like Urban VIII. Bartholin tells us of a blind sculptor in Denmark, who distinguished perfectly well, by mere

touch, not only all kinds of wood, but all the colours; and F. Grimaldi gives an instance of the like kind; besides the blind organist living in Paris, who is said to have done the same.

The most extraordinary of all is a blind guide, who, according to the report of good writers, used to conduct the merchants through the sands and deserts of Arabia. James Bernouilli contrived a method of teaching blind persons to write. Leo Afr. Desc. Afr. lib. vi. p. 246. Casaub. Treat. of Enthuf. chap. ii. p. 45. Fonten. Elog. des Acad. p. 114.

An instance no less extraordinary is mentioned by Dr. Bew in the "Transactions of the Manchester Society." It is that of a person, whose name is John Metcalf, a native of the neighbourhood of Manchester, who became blind at so early an age as to be altogether unconscious of light and its various effects. His employment in the younger period of his life was that of a waggoner, and occasionally as a guide in intricate roads during the night, or when the common tracks were covered with snow. Afterwards he became a projector and surveyor of high-ways in difficult and mountainous parts; and in this capacity, with the assistance merely of a long staff, he traverses the roads, ascends precipices, explores valleys, and investigates their several extents, forms, and situations, so as to answer his purpose in the best manner. His plans are designed, and his estimates formed, with such ability and accuracy, that he has been employed in altering most of the roads over the Peak in Derbyshire, particularly those in the vicinity of Buxton, and in constructing a new one between Wilmslow and Congleton, so as to form a communication between the great London road, without being obliged to pass over the mountain.

Although blind persons have occasion, in a variety of respects, to deplore their infelicity, their misery is in a considerable degree alleviated by advantages peculiar to themselves. They are capable of a more fixed and steady attention to the objects of their mental contemplation, than those who are distracted by the view of a variety of external scenes. Their want of sight naturally leads them to avail themselves of their other organs of corporeal sensation, and with this view to cultivate and improve them as much as possible. Accordingly they derive relief and assistance from the quickness of their hearing, the acuteness of their smell, and the sensibility of their touch, which persons who see are apt to disregard; and many instances have occurred, that seem to verify the opinion of Rocheller;

"That if one sense should be suppress'd,

It but retires into the rest."

To this purpose we may observe, that Democritus is said to have put out his eyes, that he might think more intently.

Many contrivances have also been devised by the ingenious for supplying the want of sight, and for facilitating those analytical or mechanical operations, which would otherwise perplex the most vigorous mind and the most retentive memory. By means of these they have become eminent proficient in various departments of science. Indeed, there are few sciences in which, with or without mechanical helps, the blind have not distinguished themselves. The case of professor Saunderson at Cambridge is well known. His attainments and performances in the languages, and also as a learner and teacher in the abstract mathematics, in philosophy, and in music, have been truly astonishing; and the account of them appears to be almost incredible, if it were not amply attested and confirmed by many other instances of a similar kind, both in ancient and modern times. Cicero mentions it as a fact scarcely credible, with respect to his master in philosophy, Diodotus, that "he exercised himself

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in it with greater assiduity after he became blind; and, which he thought next to impossible to be performed without sight, that he professed geometry, and described his diagrams so accurately to his scholars, as to enable them to draw every line in its proper direction." Jerom relates a more remarkable instance of Didymus in Alexandria, who, "though blind from his infancy, and therefore ignorant of the letters, appeared so great a miracle to the world, as not only to learn logic, but geometry also to perfection, which seems (he adds) the most of any thing to require the help of sight." Professor Saunderson, who was deprived of his sight by the small pox, when he was only twelve months old, seems to have acquired most of his ideas by the sense of feeling; and though he could not distinguish colours by that sense, which, after repeated trials, he said was pretending to impossibilities, yet he was able with the greatest exactness to discriminate the minutest difference of rough and smooth in a surface, or the least defect of polish. In a set of Roman medals he could distinguish the genuine from the false, though they had been counterfeited in such a manner, as to deceive a connoisseur, who judged of them by the eye. His sense of feeling was so acute, that he could perceive the least variation in the state of the air; and it is said, that in a garden where observations were made on the sun, he took notice of every cloud that interrupted the observation, almost as justly as those who could see it. He could tell when any thing was held near his face, or when he passed by a tree at no great distance, provided the air was calm, and there was little or no wind: this he did by the different pulse of air upon his face. He possessed a sensibility of hearing to such a degree, that he could distinguish even the fifth part of a note; and by the quickness of this sense he not only discriminated persons with whom he had once conversed so long as to fix in his memory the sound of their voice, but he could judge of the size of a room into which he was introduced, and of his distance from the wall; and if he had ever walked over a pavement in courts, piazzas, &c. which reflected a sound, and was afterwards conducted thither again, he could exactly tell in what part of the walk he was placed, merely by the note which it sounded. See SAUNDERSON.

Sculpture and painting are arts which, one would imagine, are of very difficult and almost impracticable attainment to blind persons; and yet instances occur, which shew that they are not excluded from the pleasing creative and extensive regions of fancy. We have known cases in which the form and features of the face have been delineated wholly by the touch, and in which it has been moulded with the utmost exactness. De Piles (*Cours de Peint.* p. 329.) mentions a blind sculptor, who thus took the likeness of the duke de Bracciano in a dark cellar, and made a marble statue of king Charles I. with great justness and elegance. However unaccountable it may appear to the abstract philosophers, yet nothing is more certain in fact, than that a blind man may, by the inspiration of the muses, or rather by the efforts of a cultivated genius, exhibit in poetry the most natural images and animated descriptions even of visible objects, without deservedly incurring the charge of plagiarism. We need not recur to Homer and Milton for attestations to this fact; they had probably been long acquainted with the visible world before they had lost their sight; and their descriptions might be animated with all the rapture and enthusiasm which originally fired their bosoms, when the grand and delightful objects delineated by them were immediately beheld. We are furnished with instances in which a similar energy and transport of description, at least in a very considerable degree, have been exhibited by

those on whose minds visible objects were never impressed, or have been entirely obliterated. Dr. Blacklock affords a surprising instance of this kind; who, though he had lost his sight before he was six months old, not only made himself master of various languages, Greek, Latin, Italian, and French, but acquired the reputation of an excellent poet, whose performances abound with appropriate images and animated descriptions. See BLACKLOCK.

Another instance, which deserves being recorded, is that of Dr. Henry Moyes in our own country, who, though blind from his infancy, by the ardour and assiduity of his application, and by the energy of native genius, not only made incredible advances in mechanical operations, in music, and in the languages, but acquired an extensive acquaintance with geometry, optics, algebra, astronomy, chemistry, and all other branches of natural philosophy. From the account of Dr. Moyes, who occasionally read lectures on philosophical chemistry at Manchester, delivered to the Manchester society by Dr. Bew, it appears, that mechanical exercises were the favorite employment of his infant years; and that at a very early age he was so well acquainted with the use of edge-tools, as to be able to construct little wind-mills, and even a loom. By the sound, and the different voices of the persons that were present, he was directed in his judgment of the dimensions of the room in which they were assembled; and in this respect he determined with such a degree of accuracy, as seldom to be mistaken. His memory was singularly retentive; so that he was capable of recognizing a person on his first speaking, though he had not been in company with him for two years. He determined with surprising exactness the stature of those with whom he conversed, by the direction of their voices; and he made tolerable conjectures concerning their dispositions, by the manner in which they conducted their conversation. His eyes, though he never recollected his having seen, were not totally insensible to intense light; but the rays refracted through a prism, when sufficiently vivid, produced distinguishable effects upon them. The red produced a disagreeable sensation, which he compared to the touch of a saw. As the colours declined in violence, the harshness lessened, until the green afforded a sensation that was highly pleasing to him, and which he described as conveying an idea similar to that which he gained by running his hand over smooth polished surfaces. Such surfaces, meandering streams, and gentle declivities, were the figures by which he expressed his ideas of beauty; rugged rocks, irregular points, and boisterous elements furnished him with expressions for terror and disgust. He excelled in the charms of conversation; was happy in his allusions to visual objects; and discoursed on the nature, composition, and beauty of colours, with pertinence and precision. This instance, and some others which have occurred, seem to furnish a presumption, that the feeling or touch of blind persons may be so improved, as to enable them to perceive that texture and disposition of coloured surfaces by which some rays of light are reflected and others absorbed, and in this manner to distinguish colours. But the fact is still undecided; and farther trials are necessary, in order to set aside high authorities to the contrary, and absolutely to decide it. Dr. Reid, in his "Inquiry into the Human Mind on the Principles of Common Sense" (ch. vi. § 2.), deduces evidence from acknowledged facts, as well as reasoning, in order to shew, that there is very little of the knowledge acquired by sight, that may not be communicated to a man born blind. One who never saw the light may be learned and knowing in every science, even in optics; and may make discoveries in every branch of philosophy. He may understand as much as

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another man, not only of the order, distances, and motions of the heavenly bodies, but of the nature of light, and of the laws of the reflection and refraction of its rays. He may understand distinctly, how those laws produce the phenomena of the rainbow, the prism, the camera obscura, and the magic lanthorn, and all the powers of the microscope and telescope. Nevertheless, as to the appearances of colour, a blind man must be more at a loss, because he has no perception that resembles it; though, by a kind of analogy, he may supply even this defect. To those who see, a scarlet colour signifies an unknown quality in bodies, that exhibits to the eye an appearance which they have often observed, and which they well know; but to a blind man, it denotes an unknown quality that exhibits an appearance, with which he is unacquainted. But he can conceive the eye to be variously affected by different colours, as the nose is by different smells, or the ear by different sounds; thus, he can conceive scarlet to differ from blue, as the sound of a trumpet does from that of a drum; or, as the smell of an orange differs from that of an apple. It is impossible to know whether scarlet colour has the same appearance to me which it has to another man; and if its appearances to different persons differed as much as colour does from sound, they might never be able to discover this difference. Hence it is plain, that a blind man might talk for a long time about colours distinctly and pertinently; and if you were to examine him in the dark about the nature, composition, and beauty of them, he might be able to answer, so as not to betray his defect. After all, as a blind man has never had any sensation of light and colour, his knowledge concerning them, however extensive and accurate, must be the result of previous instruction; it must depend on the force of genius, or on the strength of memory; and his language concerning coloured objects must be like that of a parrot, without any precision of meaning, and without any corresponding ideas. On this disputed subject the reader may derive information from Diderot's "Lettre sur les Aveugles a l'usage de ceux qui voyent," or "A letter concerning the Blind for the use of those who see," in his "Works," vol. ii.; and they also may consult Chefelden's "Anatomy," and Locke's "Essay on the human understanding."

With regard to the scientific and practical departments of music, every age has supplied numerous instances of blind persons who have attained to great excellence. They will occur among the articles of musical biography in the course of this work.

Of the contrivances that have been devised for the assistance of the blind, we have already mentioned those of professor Saunderson, and of Mr. Grenville, under the article *Palpable ARITHMETIC*. We shall here subjoin, from a letter addressed by Dr. Moyes to the editor of the "Encyclopædia Britannica," an account of the palpable notation generally used by him for twenty years, for the purpose of assisting his memory in numerical computations. With this view he made use of a square piece of mahogany, a foot broad and an inch thick, represented by ABCD (*Plate I. Algebra, fig. 3.*); he divided each of the sides AB, BC, CD, DA, into 24 equal parts; joined each pair of opposite divisions by a groove cut in the board of sufficient depth to be felt with the finger; and perforated the board at each intersection with an instrument $\frac{1}{16}$ th of an inch in diameter. Having thus divided the surface of the board into 576 small squares, perforated at each of their angles, he fitted to the holes in the board three sets of pegs or pins, resembling those in the plate, *figs. 4, 5, 6*, in such a manner, that when fixed in them they kept their position, and required some force to turn them round. The head of each peg belonging to the first

set is a right-angled triangle, about $\frac{1}{16}$ th of an inch thick; the head of each peg belonging to the second set differs from the former merely in having a small notch in its sloping side or hypotenuse; and the head of each peg of the third set is a square, the breadth of which should be equal to the base of the triangle of the other two. These pegs should be kept in a case consisting of three boxes or cells, each cell being allotted to a set; and the case must be placed close by the board before the commencement of every operation. Each set should consist of 60 or 70 pegs, at least when employed in long calculations; and when the work is finished, they should be collected from the board, and carefully restored to their respective boxes. When a peg of the first set is fixed into the board, it will acquire four different values, according to its position with respect to the calculator. When its sloping side is turned towards the left, it denotes *unit*, or the first digit; when turned upwards, or from the calculator, it denotes 2, or the second digit; when turned to the right, it represents 3; and when turned downwards, or towards the calculator, it denotes 4. The number 5 is denoted by a peg of the second set, having its sloping side turned to the left; 6, by the same turned upwards; 7, by the same turned to the right; and 8, by the same turned directly down, or towards the body of the calculator. The figure 9 is expressed by a peg of the third set, when its edges are directed to right and left; and the same peg expresses the cypher 0, when its edges are directed up and down. By these different pegs the relative values of the ten digits may therefore be distinctly expressed with facility; and by a sufficient number of each set the steps and result of the longest calculation may be clearly represented to the sense of feeling. For an example, let it be required to express the year of the Christian æra 1788. Take a peg of the first set, and fix it in the board, with its sloping side turned towards the left, which represents 1; take a peg of the second set, and fix it in the next hole in the same groove, proceeding as usual from left to right, with its sloping side turned to the right, and this expresses 7; take again a peg of the same set, and fix it in the next hole with its sloping side turned downwards, and this will represent 8; and lastly, take another peg of the same set, and place it in the next hole in the same position which will denote 8; and thus the whole will express the number required. In order to express a vulgar fraction, the numerator is placed in the groove immediately above, and the denominator in that immediately below the groove in which the integers stand; and in decimal arithmetic an empty hole in the integer groove represents the comma, or decimal point. By similar breaks are also denoted pounds, shillings, pence, &c.; and by the same expedient, the divisor and quotient in division are separated from the dividend. "This notation," says the ingenious inventor, "which supplies me completely with coefficients and indices in algebra and fluxions, seems much superior to any of the kind hitherto made public in the west of Europe. That invented and described by Mr. Grenville, having no less than ten sets of pegs, is by much too complicated for general practice; and that which we owe to the celebrated Saunderson is apt to puzzle and embarrass the calculator, as the pegs representing the numerical digits can seldom or never be in the same straight line."

It redounds very much to the honour of modern times, that the public attention has been directed to the improvement of the condition of blind persons; and that institutions have been formed in different countries for providing them with suitable employment, tending not only to alleviate their calamity, but to render them useful. The first regular and

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systematic plan for this purpose was proposed by M. Haüy in an "Essay on the education of the Blind," printed at Paris in the year 1766, under the patronage of the Academy of Sciences. An English translation of this essay is annexed to "Dr. Blacklock's Poems," printed at Edinburgh in 1793, 4to. The object of this plan is to teach the blind reading, by the assistance of books, in which the letters are rendered palpable by their elevation above the surface of the paper; and by these means to instruct them, not only in the liberal arts and sciences, but likewise in the principles of mechanical operations, such as spinning, knitting, book-binding, &c. so that those who are in easy circumstances may be capable of amuling employment, and those of the lower ranks of life, and such as have no genius for literary improvement, may nevertheless, become respectable, useful, and independent members of society, in the situation of common artificers. By these palpable characters, they are taught to read, to write, and to print; and they are likewise instructed, according to their several talents and stations, in geometry, algebra, geography, and every branch of natural philosophy. The institution encourages and cherishes a taste for the fine arts; it teaches the blind to read music with their fingers, as others do with their eyes; and it does this with so much success, that though they cannot at once feel the notes and perform them upon an instrument, yet they are capable of acquiring any lesson with as much exactness and rapidity, as those who enjoy all the advantages of sight. Of this curious and interesting essay, now before us, we shall give such an account as may serve to gratify those of our readers, who are concerned in the support of plans, somewhat resembling that which it describes, in our own country. The author, after stating the object of his plan, and obviating the scruples of those who demur against allowing its general utility, in the two first chapters, proceeds, in the third chapter, to illustrate the method of reading, as adapted to the practice of the blind. This method consists, as we have already observed, in the use of typographical characters, whose elevation above the surface of the paper renders them obvious to the touch, without the intervention of sight. From the perception of typographical characters, the transition is not difficult to that of written characters; i. e. of characters not written with ink, but formed by impressions made upon strong paper with an iron pen, whose point is not slit. The characters, thus produced, are distinctly separated and inverted; and they are marked on the side of the paper contrary to that which is read, and in such a manner that the position and order of the letters may appear right and in relief when the page is turned. The blind may thus be able to form and decypher musical characters, mathematical diagrams, and all the necessary processes of arithmetic and geography, as well as those that are printed and written. In the fourth chapter the author replies to several objections that are urged against the method of reading he has proposed. The fifth and sixth chapters contain an account of the art of printing, as it is practised by the blind, for their peculiar use, and also as it is performed for the use of those who see. In the process of printing, the blind compositor has a box for every alphabetical character in use; on the outside of these boxes are palpably marked the peculiar character belonging to each; these are filled with types, which he selects and sets as they are wanted, but in a contrary position to that in which they are read. When the types have been arranged and fixed, a page of very strong paper is moistened, so as to be capable of receiving and retaining impressions, and laid upon the types; and then by the operation of the press, or by the easy strokes of a small hammer frequently repeated over the surface, the impression of the type is made to rise on the opposite side of the paper; and it continues, when

dry, not only obvious to the sight but to the touch, and is not easily effaced. On the upper side of the paper the letters appear in their proper position; and by their sensible elevation above the common surface, the blind may easily read them with their fingers. The seventh chapter explains the method of teaching the blind to write; which we have already noticed. The eighth chapter shews how they are taught arithmetic; for this purpose they are provided with a board pierced with different lines of square holes, proper for receiving moveable figures, and bars for separating the different parts of an operation. To render this board more useful, a case is added, composed of four rows of little boxes, which contain all the figures proper for calculation, and which are placed at the right hand of the blind person while he operates. In order to obtain characters for expressing all the possible fractions, 10 simple denominators are cast, in the order of the figures 0, 1, 2, &c. to 9 inclusively, and likewise 10 simple numerators in the same order, moveable, so as to be adapted at the head of the denominators. By means of this combination, the blind are able to express any fraction. The ninth chapter treats of geography, and in teaching it, M. Weissenbourg and Mad. Paradis marked the circumference of countries by a tenacious and viscid matter, and covered the different parts of their maps with a kind of sand mixed with galls, in various modes; and distinguished the order of towns by grains of glass, of a greater or less size. M. Haüy satisfies himself with marking the limits of the maps, for the use of the blind, by small iron wire rounded; and it is always a difference, either in the form or size of every part of a map, which assists his pupils in distinguishing the one from the other. For the purpose of teaching music, the subject of the tenth chapter, musical characters are cast; and these are so numerous, as to represent upon paper, by elevations on its surface, all the possible varieties that occur. The eleventh chapter contains an account of the mechanic arts, in which the blind are employed, and of the method in which they are formed for such occupations. Accordingly they have been successfully employed in spinning, in making pack-thread of the thread they have spun, in weaving girths with this pack-thread, in making nets, in sewing, in binding books, &c. In the twelfth chapter we have a view of the proper mode of instructing the blind, together with a parallel between their education and that of the deaf and dumb. This operation, it is said, is easy in itself, and requires in a matter more courage than knowledge. "By the aid," says M. Haüy, "of our books in relief, every one can teach them to read. Upon the musical works found in our press, every professor of that art may give them lessons. With an iron pen, with plates and moveable characters, executed according to our models, the first master in writing may teach them that art, and arithmetic." The thirteenth chapter contains a brief account of the elementary books of languages, mathematics, and history, which should compose the library of the blind person. The essay terminates with an historical summary of the rise, progress, and actual state of the institution for blind children. The success of this institution has fully answered the expectation of its founder, and amply compensated the expense bestowed upon it by the liberal and well disposed. We are happy to add, that institutions of a similar kind have been established in our own country; and to render our particular tribute of respect to the founders and supporters of the "School for the Indigent Blind," instituted in London in 1799. It is now situated in St. George's-fields, but will speedily be removed to Gray's Inn-lane, as soon as the necessary buildings for its accommodation are erected. The object, with a view to which this school was founded, is unquestionably one of the most important and interesting kind

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that can excite compassion, or demand encouragement. It provides instruction for the indigent blind, in a trade, by which they may be able to provide, either wholly or in part, for their own subsistence; and thus, instead of being altogether a burden to the community, they will be of some service to it; and instead of being depressed and cheerless themselves, under a sense of their total dependence, and for want of regular employment, habits of industry will relieve their spirits, and produce the most beneficial effects on their state and character. The children of this institution, amounting in the present year (1804) to 32, are completely clothed, boarded, lodged, and instructed, gratis. The articles at present manufactured in the school are shoemakers' thread, fine and coarse thread, window sash-line, and cloaths' line (of a peculiar construction, and made on a machine adapted to the use of blind persons), by the females; and window and sash-line, cloaths' line, hampers, and wicker baskets, by the males. The success that has crowned the efforts of the friends of this institution, since its first establishment, affords sufficient evidence of the degree in which the situation and faculties of the blind are capable of improvement; and a view of it in its present prosperous state, must be gratifying to persons of humane and compassionate feelings. Here they will not find the scholars sitting in listless indolence, which is commonly the case with the blind, or brooding in silence over their own defects, and their inferiority to the rest of mankind; but they will behold a number of individuals, of a class hitherto considered as doomed to a life of sorrow and discontent, and to be provided for merely in alms-houses, or by donations of charity, not less animated in their amusements, during the hours of recreation, and far more cheerfully attentive to their work in those of employment, than persons possessed of sight. This important and useful institution is under the direction of a president, eight vice-presidents, a treasurer, and a committee of 24 members. A subscription of one guinea annually, or of not less than 20 guineas at once, or within one year, constitutes a member.

To this article we shall subjoin the following directions given by Mr. Thicknesse, for teaching the blind to write:

“Let any common joiner make a flat board, about 14 inches long, and 12 wide; in the middle of which let a place be sunk, deep enough, when lined with cloth, to hold only two or three sheets of fool's-cap paper, which must quite fill up the space: over this must be fixed a very thin false frame, which is to cover all but the paper, and fastened on by four little pins, fixed in the lower board: and across the lower frame, just over the paper, must be a little slider, an inch and a half broad, to slip down into several recesses made in the upper frame, at a proper distance for the lines, which should be near an inch asunder; and this ruler, on which the writer is to rest his fourth and little finger, must be made full of little notches, at a quarter of an inch distant from each other; and these notches will inform the writer, by his little finger dropping from notch to notch, how to avoid running one letter into another. When he comes to the end of the line, he must move his slider down to the next groove, which may easily be so contrived with a spring to give warning that it is properly removed to the second line, and so on.”

BLINDNESS, in the *Veterinary Art*, a disease very frequently happening to horses. The eye of the horse is subject to various diseases which may occasion blindness, as the *catarrh*, the *gutta serena*, opacity of the cornea or its coverings, &c.

The disorder, however, generally inducing blindness among horses is the *catarrh*, and the inflammation of the external parts of the globe of the eye, which precedes the obscuration of

the crystalline, is termed blindness, as though the disease was really confirmed; and horses so affected are considered as such, and denominated blind, though at this period of the disease the sight is only rendered imperfect.

This destructive disorder, in general commences with an inflammation of the outer coats of the eye, as the *membrana conjunctiva*, or *cornea*, or both together, and extending gradually to the interior, inflames and destroys the transparency of the crystalline, and obstructs the admission of light.

These attacks of inflammation not unfrequently disappear for a time, or, at least, become much less distinguishable, and then return again, observing something like regular periods of accession and remission; and from hence the disease has been termed by some the *moon blindness*; and these changes were considered as under the influence of this planet, and corresponding with the periods of its change: there are, however, other causes more powerful in their influence, to which these changes in this disorder may, with more appearance of truth, be attributed, as improper exposure to excessive cold, or drafts of air; to a close, low, over-heated stable, or sudden alternations from the one to the other; violent exercise and sweating; then washing with cold water, leaving the hair drenched with it; acrid volatile salts rising from the dung; over-feeding with too hot, dry, and stimulating food, and all causes inducing an increased action of the heart and arteries, naturally tend to induce a recurrence of this complaint.

As this disease is one of the most interesting in the veterinary art, and the most necessary to be well understood, as well by professional men, as by dealers and possessors of horses, we shall describe at some length the appearances by which it is known to exist, and the means that have hitherto been employed, as far as they have come to our knowledge, for the removal of it. Those who may desire to be acquainted respecting the information possessed by the ancients of this complaint, and their practices for its cure, may be referred to the writings of Aëtyus and Vegetius: the latter, in his elegant work *de arte Veterinaria*, lib. 2: cap. xvi. *de suffusione oculorum*, has divided this disorder into three kinds, under the titles *stenochoriafis*, *protophoriasis*, *hypochoriafis*; by his definitions, however, of these three kinds, it appears that he only meant the different stages of the formation of the cataract, from the first inflammation of the eye, to the crystalline becoming perfectly opaque and bursting its capsule; rushing to the anterior chamber of the eye, and resting, like a white opaque ball, against the cornea; occasioning a total loss of sight, and which he compares to the yolk of an egg bursting from its situation in the centre of the egg, and to which it can never be again reduced. He considers the cause of this complaint to be the rupture of the membrane containing the sight; by excessive heat, or more certainly from the fatigue of a long journey, or the neglected injury of the eye, from the inattention of the master. His *hypochoriafis*, which appears to be the first stage of this disorder, he says, descends from the head; and often shews itself in one eye, and then migrates to the other, and is attended with a flow of water or tears. His treatment, in this case, is to bleed often from the eye-brow, or rather the eye-lids, and from the temples; to foment frequently with warm water in which rue and fennel seeds have been boiled; to anoint the eye “*cum collyrio opopanato et opobalsamato*.” He also recommends applying the actual cautery to the temples above the veins. This author, in another chapter, recommends, in this complaint, that you should inspect the nostril on the same side with the morbid eye, and you will find

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find a small opening, through which, by inserting a pipe, you may fill the eye with wine, and relieve the disorder; a remarkable proof of the minute and accurate observation of the ancients. The existence of such an opening (for it is, in reality the opening of the lacrymal duct that is alluded to), is not known to many who profess to practise on the diseases of horses at this day.

Ablyrtus, a Greek writer, who lived about the reign of Constantine the Great, and prior to Vegetius, recommends, in this disorder, and which he calls *αλωμα*, that the ear should be pierced with an awl, and a piece of white hellebore should be inserted in the perforation for its relief.

The following we venture to give as a more natural and true description of the appearances of the eye, during the presence of this complaint, than what has before been exhibited; though, no doubt, subject to many omissions and imperfections, which future observations may lead us to rectify.

The earliest indication of this disease is exhibited by the external transparent parts of the ball of the eye becoming obscured, assuming a blackish glassy hue; sometimes blue or brown, or a dull white, and streaked with blood, according to the degree of inflammation or distension of the blood-vessels; admitting, according to their capacity, the different parts of the blood which are not transparent; and this inflammation, it may be remarked, takes place more frequently in young horses of five or six years old, than in those of a more advanced age, and the upper half of the *cornea* generally appears more obscured than the lower; this, however, may be a deception, arising merely from the point of vision, the observer being placed below the eye, and seeing directly through the lower part, and more obliquely through the upper. The blood-vessels also may be observed increased in number and size, passing over the opaque white surface of the sclerotica, to the *cornea* and *conjunctiva*; for it has not, as far as we know, been ever ascertained from actual dissection or experiment, whether it is the *cornea* that is inflamed, or the *conjunctiva*, or both; nor is it absolutely necessary for the treatment, that this should be known.

The eye and eye-lids feel hotter to the hand than usual; and often times there is a deposit of a white matter resembling pus, in the bottom of the anterior chamber of the eye, which, perhaps, proceeds from the vessels of the ciliary fringe, or uvea, which are large in the horse.

After this opacity of the *cornea* has existed some time, the eye of itself, or still more certainly, if antiphlogistic means are used, returns to its natural brilliancy, and the disorder seems removed; a few weeks or months may elapse before its return; and if these remedies are had recourse to very early, the disorder may even be permanently removed; it very frequently, however, returns, and again disappears, and this several times before the inflammation of the crystalline, and the destruction of sight take place. In other subjects, one uninterrupted course of inflammation, without any interval takes place, till the cataract is fully formed.

When this morbid process begins in the crystalline, the inflammation of the exterior parts of the eye often disappears, and they assume their usual brightness, and afford us an opportunity of distinctly observing the changes which take place in the lens.

And with respect to the cataract itself, or this opacity of the lens, we may remark that the whole crystalline shall assume this milky appearance at once, or a small speck only near the centre shall be seen, which often remains for years, without the least perceivable increase, and without producing blindness, or any sensible detriment to the ani-

mal; again, in other cases, no speck is observable but whitish lines which reflect the light, stretching like rays from the centre of the lens to its circumference; and sometimes the capsule containing it is said to be only affected.

The cataract, as it is called, being fully formed, the complete opacity of the lens being established, and light no longer admitted, the iris begins to lose its properties, nearly closing up the opening of the pupil; from its relaxation, the whole eye becomes diminished, and apparently sunk in the head; and the capsule, especially in draft horses, bursts, and the lens is forced from its situation, and falls to the anterior chamber of the eye, resembling, as we have before observed, an opaque white ball.

As perfect clearness and distinctness in all parts of the eye, with a due contraction of the pupils, are the most certain indications of its goodness, so the slightest dulness or opacity in the external coats, or diminution of the pupil, should lead the purchaser to be cautious; for it cannot be too often observed, that this opacity, after it has been of some standing, is almost certain destruction to the eye; and there are no remedies at this time known that can prevent its fatal termination, though numerous attempts and experiments have been instituted with this view; and the operation for the cataract is useless in the horse; for if it succeeds, the vision is still so imperfect, that blindness itself is preferable.

Though various useful offices can be found for horses that have lost their sight; yet it is of importance, for most of the purposes to which they are applied, that it should be preserved. We cannot recommend with too much force, the necessity of an early recurrence to the prescribed remedies for destroying the inflammation; for, at its very commencement, it has probably only the characters of common inflammation, and might be entirely and effectually subdued as in other parts; but neglected, this disorder soon assumes its peculiar properties, arising, perhaps, from the particular structure and functions of the parts affected, and in a short time becomes perfectly beyond the reach of any remedy; for though, no doubt, there are a few insulated instances where this disorder has been removed, yet, as the termination of the generality of cases is of an opposite nature, it would be unwarrantable to make a conclusion from such cases of the general possibility of cure in this complaint.

Where the inflammation has not yet received the specific properties above described, the following remedies will frequently remove it; and in more confirmed cases, we shall mention the means that have been unsuccessfully employed to remove it, that we may shew the insufficiency of such attempts, and promote farther experiment and research respecting it.

In the commencement of this complaint, the use of abstinence from heating food, or hard exercise; exposure to stables of cooler temperature, and well aired, not from partial drafts, but their loftiness only; exclusion of too much light, or the light altogether; diluent drinks, and purgatives; such may be employed to the general system. To the part itself, washes of cold water, or ice and water, or litharge water, or with a small portion of opium dissolved in it; others think more favourably of stimulating, or caustic washes, as weak solutions of vitriolated zinc, very dilute acids, and even spirits and water.

Blisters applied to the cheek, or over the masseter muscle, produce an irritation which is very successful in removing this inflammation, and, in particular, the insertion of a seton or two in the muscular parts surrounding the eye, care being taken that the fascia over the muscle is divided, otherwise

otherwise there is no suppuration; these will tend, as we have experienced, powerfully to carry off an attack of this disorder. Firing with a hot iron has also been employed with the same view, on the surrounding skin; and likewise blood-letting from the jugular vein, or from the temporal artery, or locally from the vessels proceeding from the inner canthus, or anterior angle of the orbit; as also the vessels passing over the sclerotic coat, which become very much enlarged and visible in this disease, as well as those in the lining of the lids.

Mr. Coleman, the very ingenious professor of the veterinary college, secured up the vessels of the scleroticæ with a hot iron, forming an entire circle round the ball of the eye, at some distance from the cornea, to prevent all access of blood to this part, and so endeavoured, mechanically, to put a stop to the inflammation; it was found, however, insufficient to destroy the disorder, and we believe that any hope of relief from this mode of treatment has since been abandoned; and for this reason, perhaps, this experiment has proved insufficient, that when communication is stopped from the exterior vessels, there are others whose trunks are short of these, which supply the substance of the cornea; and others again, out of our reach, on the inside of the cornea; but above all, the habit in the parts to diseasè, and the disposition in the system to generate it, are not overcome, and the morbid tendency is not thereby destroyed.

The farriers, who practise medicine, in treating this complaint, often remove the lacrymal gland, which they call the haw, from its supposed resemblance to this fruit; and as this part partakes of the inflammation, and is much swelled, they mistake it for the source of the disorder. The removal of it, which is easily done, by drawing it out with a hook, and cutting it off, occasions a copious discharge of blood, which, in slight attacks, relieves the eye, and encourages them in this practice; but from our own personal experience we have learned, that in cases of any duration, it is totally inadequate to the removal of the complaint, and the eye must obviously suffer from the loss of a part that is necessary to its well-being: and means less injurious to the eye may be equally well employed with as much success, such as we have before pointed out.

An infusion of the *polygonum hydropiper* injected into the nostril, so as slightly to inflame the membranes, produces very good effects in this complaint.

It has been observed, that in the human eye, long continued inflammations of the exterior coats rarely produce cataracts, as they do in the horse; and the reason that has been assigned for this is, that the same blood-vessels which supply the *tunica conjunctiva* and *cornea*, also supply the lens and the humours of the eye, which they say is not the case with the human, as these parts are supplied from the eyelids and integuments; there is, however, in the horse, a singular propensity to inflammatory complaints, and to this disposition, perhaps, it is rather to be attributed.

In the inflammation of the cornea, which is attended with a black, glossy appearance of this part, there is seldom any increased discharge of tears from the eye and nose; but in the other kinds which we have before enumerated, there is, in general, a considerable increase of this secretion. When blood-streaks, or blotches appear, it is probable that the vessels are ruptured, and that this blood is really in a state of extravasation.

BLINK of the ice, in *Sea Language*, denotes that bright, white appearance produced by the ice near the horizon, and perceptible, in approaching the ice, long before it is itself seen. This phenomenon has been often remarked by ma-

riners, and is particularly mentioned in Phipps's (lord Mulgrave's) voyage to the North Pole, p. 70.

BLINKS, in *Botany*. See MONTIA.

BLINKS, among *Ancient Sportsmen*, denoted boughs broken down from trees, and thrown in the way where deer are likely to pass, to hinder their running, or rather to mark which way a deer runs, in order to guide the hunter.

BLINKING of beer, in Lincolnshire, signifies letting the wort stand for some time in the vat, till it hath acquired some degree of acidity, in order to dispose it to fine, and be the sooner ready for drinking.

BLISSOM, among *Husbandmen*, corruptly called *blissom*, is the act of a ram, when coupling with an ewe.

BLISTER, in *Pharma y*. Blisters are raised on the surface of the body for medicinal purposes, by applying, for a number of hours, some of the most active of the animal or vegetable stimulants. Of these, by far the most convenient, and that which is almost universally employed, is the *cantharis*, or *Spanish fly*, (*MELÖE Vesicatorius*.) These insects are found in Spain, Italy, and the south of Europe; they have a longish body, beautifully brilliant with green and gold. They are gathered, by shaking the trees which they frequent, and are killed by the vapour of spirit of wine burnt beneath them, or by the fumes of vinegar, after which they are dried in a stove. In this state they are brought over without further preparation.

Cantharides possess so much acrimony, that in reducing them to powder, the face should be covered with a mask, to prevent the troublesome sneezing and excoriation of the fauces, from the finer dust flying about. Taken internally, in an overdose, they inflame the whole intestinal canal, in a greater or less degree; and they have a peculiar tendency to irritate the urinary organs. Applied to the skin, they first inflame the part, but often, with scarcely any attending pain; after which they produce a very copious blister of clear, yellowish serum beneath the cuticle, which rises in a large bag. This insect appears to possess this vesicating property in a much larger degree, in proportion to the pain excited, than any other stimulant; and hence its peculiar utility in producing this serous discharge with the least possible inconvenience to the patient. It is not exactly known in what part of the insect the vesicating property resides, or whether it does not equally belong to every part. It is not easily destroyed, or impaired by long keeping, if the insect be unbruised, and preserved in a dry place.

For blistering the skin, the cantharides are first finely powdered, and then incorporated, with some labour, with a simple mixture of wax and resin melted together, to which some add a little vinegar, and allowed to grow nearly cold before the flies are added. This is a necessary precaution, since it is certainly known that a considerable heat impairs the blistering property. The plaster, thus made, should be of such a consistence, as readily to soften with a moderate heat. When used, it is generally spread uniformly upon leather, of the requisite size and shape, by the assistance of an iron spatula, warmed scarcely more than the hand can bear.

To increase the effect, some apothecaries sprinkle the plaster with powdered cantharides, after it is spread on the leather, but this is not necessary, where the plaster itself is good; and the powder is apt, after vesication, to lodge on the tender cutis, and produce much needless irritation. As the blistering plaster adheres very loosely to the skin, it is useful in applying it to children, to maniacal persons, and wherever it is in danger of being too soon pulled off, to surround the blister with a margin of strong adhesive plaster.

The plaster of cantharides seldom fails to produce a large blister, in ten or twelve hours; but its operation continues sometimes longer, so that it may be conveniently suffered to remain for twenty-four hours, the large cuticular bags being punctured to let out the fluid. When the plaster is taken off, and the serum mostly discharged, the blistered part should be dressed with spermaceti, or some other mild ointment, unless it be intended to keep up the serous discharge by stimulating applications.

The pain produced by the action of cantharides varies greatly, according to the part affected, the thickness of the skin, and the general irritability of the constitution, and in particular of the surface of the body. Most frequently the pain is very slight, often amounting to no more than a sense of heat on the part. When very acute, it is of great service to remove the plaster, when it has been on about two hours, to anoint the part with oil or cream; and about an hour or two after, to replace the blistering plaster, which will then often proceed to vesicate without much further irritation.

The operation of cantharides is much affected by the thickness of the skin beneath; and hence the scalp resists vesication more than the softer skin of the abdomen; and particularly by the heat of the body, so that the plaster should be stronger, and its consistence softer, when applied to an unusually cold surface.

Sometimes, though rarely, the symptoms of strangury produced by this active medicine, follow even its external application.

A more active vesicatory is supposed to be made by adding other stimulating substances to the cantharides plaster. In the Paris Pharmacopœia, euphorbium (the most acrid of all the medicinal gums) is added in equal quantity with the cantharides: in the Edinburgh, verdegriis, mustard, and black pepper are used.

It is often of advantage to keep up a discharge from a blistered part for a considerable time. It then becomes gradually purulent. For this purpose, a milder form of cantharides is highly useful, and a softer consistence is given to it. This may be done by mixing a small portion of the flies in powder, with any simple ointment; but this is liable to act unequally, and the entire particles of the fly sometimes create trouble, by lodging upon the tender cutis. To remedy this, the London college use a watery infusion of cantharides, mixed with a stimulating resin ointment, melted, and continued over a slow fire, till all the water is evaporated, leaving a small portion of extractive matter of the flies, equally diffused through the ointment, and strongly increasing its stimulating power.

A few other substances have been occasionally used to produce vesication. One of these is the inner bark of the *Mezereon*, (*ДАРЪНЕ Mezereum*) and of another plant of the same genus, the *Thimelœa Laureola*, or *Spurge Laurel*, (*ДАРЪНЕ Laureola*) both shrubby plants, well known in gardens. The use of the latter (which will equally apply to the mezereon) is thus directed in the Paris Pharmacopœia. Small twigs of the plant, about the size of a pen, and smooth, are selected, and cut transversely into portions of the requisite length. These are steeped in milk-warm water, or in vinegar, for about half an hour, to loosen the bark, which is then peeled off with a pen-knife, and the wood is thrown away. This bark is applied to the skin to be blistered, previously rubbed with vinegar.

In twenty-four hours a perfect vesication is produced, with little pain, and without the possibility of those symptoms of strangury, which now and then attend the use of cantharides.

BLISTERED, *bullatus*, in *Botany*, is applied to the

surface of a leaf, which rises high above the veins, so as to appear like blisters.

BLISTERING of *horses*, in the *Veterinary Art*, a remedy much in use for promoting the removal of a great variety of disorders; more especially, however, in reducing morbid enlargements of bone, or morbid thickenings of any of the softer parts, where its utility is principally obvious.

The vesication of the skin of the horses is attended with some remarkable circumstances, in which it differs from the human, especially in the greater irritability of the skin; for the cuticle of the horse is raised by a blister of less strength, than is required in raising the human cuticle; whence, perhaps, it may be inferred, that its sensation also is more acute. It is probable that the skins of animals covered with hair are, in general, more irritable than naked skinned animals; the spirits of turpentine producing a most painful irritation, both in the horse and the dog, when applied to the skin, but not so in the human.

Irritants, however, of the skin, without any blistering, or vesication, may be had recourse to with very great advantage, in the veterinary art, as they can, without injury to the parts, be very frequently renewed, and with the happiest effects.

The mildest applications of this description, are the animal and vegetable oils; as hog's-lard, and the oil expressed from linseed, or olives: where more irritation is thought requisite, the addition of the essential oil of origanum, or the spirits of turpentine, will readily afford it.

Lard alone, rubbed on the skin of the horse, we have often observed to produce a sensible irritation and increased warmth in the part, so susceptible is this part in these animals; and may serve as a basis from which we may proceed to the higher degrees of stimulus, firing the skin with the actual cautery, in lines more or less close, being the highest degree of irritation to which we can or ought to proceed.

That irritation which is produced by the cantharides, is, of all others, we believe, the most useful in its effects. It should be applied, mixed with lard, or olive-oil; to which it is usual to add the dried juice of the euphorbium; as, however, it is ever desirable to avoid unnecessary complication in the remedies we prescribe, by which our effects are rendered more certain, and the inductions more easy and clear, so we proposed to try this medicine by itself, to ascertain its precise effects; and being mixed with olive-oil, it was applied to the skin of the leg of the horse: no distinct vesication of the part followed, but it produced a considerable heat, and formed a brown scab, with very little discharge of serum; but, on the contrary, was particularly dry and irritating to the horse. We have since omitted it in the blister, and, we believe, without the smallest detriment to its operation; for the cantharides, when they act properly, and are not applied too strong, produce a plentiful vesication, and a copious discharge of thick serum, almost of the consistence of honey.

We have found also the pyro-ligneous acid, or the acid obtained by the distillation of wood, in close vessels, and properly concentrated, a cutaneous irritant, of very useful qualities. After the skin has been simply wetted with it, it slightly inflames it; and the cuticle, after two or three days, comes away dry, bringing with it any foulness of the skin, for the removal of which it is most particularly serviceable.

We have known some, from motives of economy, omit the cantharides in their blister, and use, instead of it, vitriolic acid. It, in general, as far as we have seen, forms a dry, black scab, and is by no means so agreeable in its effects as the former.

It is a common habit with farriers practising medicine, to mix corrosive sublimate with their blister; and, where it may be desirable to destroy the skin, this should be used, but not otherwise; for it is no vesicatory, but a most violent caustic, soon destroying any living matter with which it comes in contact; and we have seen, from the ignorant use of it, the most deplorable effects, by its bringing off extensive sloughings of the skin, and even penetrating to the parts beneath, and so injuring them, as ever after to render the horse unserviceable.

There is an effect produced by the cantharides on the skin of the horse, which, as far as we know, has not met with much attention; though it is very remarkable, and not analogous to its effects on the human skin: it is that prodigious thickening of the integuments, after the operation of the blister, which sometimes does not subside for many weeks, being a great disfigurement: a blister, therefore, if one could be devised not producing these effects, would be a desirable thing in the veterinary Pharmacopœia. This effect, we should, however, remark, is not constant.

BLITAS, LAs, in *Geography*, a cluster of small islands in Nicaragua lake, in Spanish North America.

BLITH. See BLUTH.

BLITHE, a river of England, which runs into the Trent, 4 miles N. E. of Litchfield.

BLITUM, from βλεπον, *abjiciendum, fit only to be thrown away*, in *Botany*. Lin. Gen. n. 14. Schreb. 18. Juss. 86. Chenopodio-Morus, Boerh. Morocarpus, Rupp. Eng. *Blite*. Fr. *Blète*. Class and Order, *Monandria Digenia*. Nat. Ord. *Holoracea. Atriplices*, Juss. Gen. Char. *Cal.* perianth three-parted, spreading, permanent; divisions ovate, equal, two more gaping than the other. *Cor.* none. *Stam.* filaments setaceous, longer than the calyx, within the middle division, erect; anther twin. *Pist.* germ ovate, acuminate; styles two, erect, gaping, the length of the stamen; stigmas simple. *Per.* capsule very thin, rather the crust of the seed, ovate, a little compressed, contained within the calyx now become a berry. *Seed* single, globular, compressed, the size of a capsule.

Ess. Char. *Cal.* trifold. *Pet.* none. *Seed* one, with a berried calyx.

Species 1. *B. capitatum*, berry-headed straw-berry blite, Lin. Spec. 6. Reich. 11. Hal. helv. n. 1571. Morocarpus capitatus. Scop. Carn. n. 3. Atriplex. Bauh. pin. 119. n. 7. Prodr. 58. n. 2. Ger. emac. 326. n. 8. Park. 748. f. 1. Mor. hist. 2. 606. f. 5. t. 32. f. 11. Raii hist. 197. n. 5, 7. "Heads spiked terminal." An annual plant, with leaves resembling those of Spinach, and stalk rising, in gardens, about 2½ feet high; but in a wild state, upright and only about a foot high; flowers on the upper part issuing in small heads at every joint, and terminated by a cluster of the same; when the flowers are past, these heads swell to the size of wood-strawberries, and when ripe have the same appearance, full of a purple juice, which stains the hands, and formerly much used in cookery, for colouring puddings, &c. seed black when ripe: commonly called straw-berry blite, straw-berry spinach, or bloody spinach, and by some, berry-bearing orach. A native of Switzerland, the Grisons, Austria, the Tyrol, Spain, and Portugal; cultivated by Parkinson, in 1633. 2. *B. virgatum*, slender-branched straw-berry blite. Lin. spec. 7. Reich. 12. Gmel. sib. 3. 16. Atriplex. Bauh. pin. 119. n. 6. Mor. t. 32. f. 10. Raii hist. 197. n. 6. "Heads scattered, lateral." Scidom growing more than one foot high, with smaller leaves than the former; flowers produced from the axils, almost the whole length of the stalk; small, and collected into little heads, smaller than the first, and not so deeply coloured, but of the same shape. A native of the south of France, Spain, Italy,

and Tartary. 3. *B. tataricum*. Mill. Dict. n. 3. *B. fragiferum maximum polyspermum*. Amm. ruth. "Leaves triangular, sharply toothed; heads simple, lateral." Rising near three feet high; flowers axillary, in small heads; fruits of the same shape and colour with those of the first, but smaller; differing from it in the shape and indentures of the leaves; and in having leaves placed between the fruits the whole length of the stalk, not terminated by heads, as the first, but having leaves above the heads. Probably a variety of the second sort. The seeds were sent to Mr. Miller by Dr. Amman, professor of botany at Petersburg. 4. *B. chenopodioides*. Linn. Syst. Reich. 12. Mant. 170. "Heads in whorls, juiceless." A low plant, resembling chenopodium. A native of Tartary; now in Sweden. Probably only a variety; and in reality the four sorts seem to be but one.

Propagation and Culture. All are annual plants, which drop their seeds, that will produce plentifully the following spring; or if the seeds of any one of them be sown in March or April, upon a bed of common earth, in an open situation, the plants will come up in a month or six weeks, and remaining in the same place, will require no other care besides being kept from weeds, and thinned out to the distance of six or eight inches apart; and in July the plants will begin to shew their berries, which will make a pretty appearance. By many they are transplanted into the borders of the flower garden, and by others planted in pots, so as to be ready for removal into the court-yard, or for being placed upon low walls for ornament. When these plants are designed to be removed, they should be transplanted before they shoot up their flower-stems, for they will not bear transplanting afterwards; and when planted in pots, they must be watered in dry weather; and, as the flower-stems advance, they should be supported by sticks. Martyn.

BLITUM. See ACHYRANTHES, AMARANTHUS, CHENOPodium, and GUNNERA.

BLOATED *fish* or *herring*, in our *Statutes*, are those which are half dried. Vide Stat. ann. 18 Car. II. c. 2.

Bloated herrings are made by steeping them in a peculiar brine, and then hanging them in a chimney to dry.

BLOATING, in *Medicine*. See LEUCOPHLEGMATIA, and OEDEMA.

BLOCH, MARK ELEAZAR, in *Biography*, a Jewish physician at Berlin, and a celebrated ichthyologist, was born at Anspach in Franconia. His parents were in a condition so obscure and destitute that they were scarcely able to maintain him during his infancy, and much less to procure for him any suitable means of education. At the age of 19 he understood neither German nor Latin; and as he had read only a few Rabbinical books, he spoke a kind of Franconian gibberish, intermixed with the Jewish jargon. About this time, however, he was taken into the house of a surgeon at Hamburg, who was a Jew, and employed by him in the instruction of his children; and in this situation he acquired a competent knowledge of the German language. The savings of his scanty salary enabled him to procure assistance in the study of Latin. Having also gained some knowledge of surgery, he repaired to Berlin, where his relations lived, with a view of prosecuting the study of anatomy. After struggling with various difficulties, he was admitted as doctor in the university of Franckfort, and returned to Berlin for the exercise of his profession. Here he became acquainted with M. Martini, who recommended him to be elected a member of the Society of the Friends of Nature. In order to promote the objects of this institution, he undertook a natural history of the murena, a fish caught, as it was supposed, only in the lakes of Pomerania. He also began to form a cabinet of natural history; and having made a considerable collection

of aquatic animals from all parts of the globe, he determined to write a natural history of fishes; and in this design he was encouraged and aided by obtaining possession of the original MSS. of Father Plamier, who had made three voyages to America, and brought with him many objects highly interesting to the natural historian. M. Bloch first published, in German, four numbers of an "Economical Natural History of Fishes, particularly those in the states of Prussia, with figures from original drawings;" Berlin, 1781 and 1782, large 4to. In the following years appeared an "Economical Natural History of the Fishes of Germany," in 3 volumes, consisting of 108 plates, and including the three numbers already mentioned. He afterwards published, in 9 volumes, "The Natural History of foreign Fishes;" so that his whole work was comprehended in 12 volumes, and contained 432 plates. The last appeared in 1795. He also, at his own expence, procured a French translation of his work, by C. Laveaux, then at Berlin, which he published under the title of "Histoire general et particuliere des Poissons;" Berlin, 1785—1788, in 6 vols. folio, with 216 plates. In order to defray the expence of this work, his only son, a young man distinguished by his talents, undertook a tour through France and England for the purpose of procuring subscriptions; and in the prosecution of his journey died at Paris, in 1787. This loss, and the embarrassment of his circumstances, preyed upon the spirits of this ingenious naturalist, and sunk him into the deepest affliction. However, he still continued to employ himself in his favourite work, the history of fishes, and having completed it, undertook a journey to Paris. He died at Carlsbad in Bohemia, August 6th, 1799. Besides the above voluminous works, M. Bloch published many memoirs on subjects of natural history, in the transactions of different societies. That on the murena, in the Memoirs of the Friends of Nature, has been already mentioned; he also communicated, in the same Memoirs, "Observations on the regular depressions in vitriform stones;" "On the worms in the intestines and lungs of birds;" "An Essay towards the natural history of the worms which live in other animals;" "On worms of the bladder;" "Description of the bullard, and some kinds of birds found in marshes;" "On the oil of herrings;" "On the vulgar opinion that the organ of generation in the ray and shark is double;" "On the myxina glutinosa of Linnæus," &c.

BLOCK, DANIEL, an eminent portrait-painter, was born at Stertin, in Pomerania, in 1580, and educated for his profession under Jacob Scherer. As a painter of portraits, he gained great reputation, and had the honour of painting the portraits of Christian IV. king of Denmark, and of Gustavus Adolphus, king of Sweden. His merit recommended him to the prince of Mecklenburg, in whose service he was retained for 44 years, and for whom he painted the portraits of his whole family, at full length, as large as life, and in the antique habit. By the agreeable manner of his colouring, and the easy attitudes of his figures, he obtained so much employment, as to enable him, before the decline of his life, to amass a large fortune; of which, however, he was unfortunately deprived by a plundering party, preserving, with great difficulty, his own life. He died in 1661. Pilkington.

BLOCK, JACOB ROGER, was born at Gouda, where he acquired the art of painting, particularly in reference to perspective and architecture, which he principally cultivated. Having spent several years in Italy, where he imbibed that taste of grandeur and elegance in his compositions, by which he was advanced in the public esteem above all his contemporaries, he returned to his own country, and was appointed state-painter to the archduke Leopold, whom he attended in all his campaigns; but whilst he was passing a small rivulet,

over a bridge of planks to view the fortifications of St. Vinox in Flanders, his horse slipped, and he was unfortunately drowned. Whilst he lived at Gouda, he was visited by Reubens, who, having examined his works, testified to his honour, that he had not seen any painter in the Netherlands, who could stand in competition with him for the subjects he painted. The time of his birth and death are not ascertained. Pilkington.

BLOCK, BENJAMIN, son of Daniel Block, was born at Lubeck in 1631, and, with a view of improving himself in colouring and design, resided for some time at Rome, Venice, and Florence. Having thus acquired a good taste, and a pleasing tone of colouring, he was introduced to the court of Saxony, where he painted several portraits of the elector and prime nobility; and he also painted several altar-pieces for the churches and convents of Hungary, which are much commended. His capital performance is the portrait of Kircher the Jesuit, which, even at Rome, was exceedingly admired. The time of his death is not ascertained. Pilkington.

BLOCK is used for a piece of marble as it comes out of the quarry, before it has assumed any form from the hand of a workman.

BLOCK, in the *Mechanic Arts*, a large piece of solid wood, whereon to fasten work, or to fashion it; strength and stability being the requisite properties.

In this sense we say a chopping block; a sugar-finer's block; a smith's block, on which his anvil is fastened; an executioner's block, on which the criminal's head is laid to be struck off.

BLOCK, *Mounting*. See ANABATHRA.

BLOCK, among *Cutters of Wood*, is a form made of pear-tree, box, or other hard and close grained wood, free from knots, on which they cut their figures in relieve, with knives, chisels, &c. The like are in use for card-making; and from the same first arose the modern art of printing. Phil. Trans. N^o 310. p. 2398.

BLOCK, among *Bowlers*, the mark which is aimed at, being a small sized bowl laid on the green for this purpose; it is called also the *jack*.

BLOCK, in *Falconry*, denotes the perch whereon a bird of prey is kept. This is to be covered with cloth.

BLOCK *Island*, in *Geography*, called by the Indians "Manisses," lies about 21 miles S. S. W. of Newport, in Newport county, and state of Rhode Island. It was erected into a township, named "New Shoreham," in 1672. This island is 7 miles in length, and its extreme breadth is 4 miles. It has 714 inhabitants. It is famous for cattle and sheep, butter and cheese; and round its coasts are caught considerable quantities of cod-fish. The southern part of it is in N. lat. 41° 8'.

BLOCK, in *Naval Architecture*, denotes an eight square, or round part below the heeling of the main and fore top-masts.

BLOCKS are short pieces laid under a mast to raise it from the ground.

BLOCKS are also pieces of wood belonging to ships, in which the shivers, or sheaves, of pulleys are placed, and whereon the running ropes go. Accordingly they possess the properties and powers of pulleys, and they have from one to eight sheaves. The blocks in general use are the single block, the double block, the treble block, and the four-fold block; but when heavy weights or bodies are to be raised or moved, blocks with a greater number of sheaves are applied, the increasing power being as two to one for every sheave moving with the object. See PULLEY.

Blocks differing from the common shape are the bee-block, the cheek-block, the long-tackle-block, the main-sheet-block, the monkey-block, the nine-pin-block, the rack-block, the

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shoe-block, the shoulder-block, the sifter-block; the snatch-block, the strap-bound-block, the viol-block, and the warping-block. The principal parts of blocks are their shells, sheaves, and pins, which are of various sizes and powers, according to the effect which they are to produce. The dimensions of the shells, and the thickness and number of the sheaves, are proportioned to the size of the ropes working in them, and the powers required. The sheaves turn abreast of each other in the shell, on one axis or pin, or one above another, on separate pins. The shell is made of elm or ash, and hollowed between the cheeks, with one or more sheave-holes to receive the sheave or sheaves. On the outside of the cheeks of blocks that are to be strapped, one score is cut towards the ends, in which part of the strap is buried; if they are double-strapped, they have two scores. A hole is bored through the centre to admit the pin; which, passing through both sides of the shell, forms the axis for the sheaves. The sheave is a solid cylindrical wheel, and round its circumference is a groove, one-third of the thickness of the sheave deep, in which the rope works. It is commonly made of lignum vitæ; but for laborious purposes, it is coated in the middle with metal, or else made of cast metal; if the sheave is iron, it is coated with brass, and if of brass, with the hardest bell metal. The hole in the centre is somewhat larger than the pin. The pin is made of lignum vitæ, cocus, greenheart, which is a wood imported from the West Indies, or iron, and it is the axis on which the sheaves turn.

The proportions for single, double, treble, four-fold blocks are as follow; viz. the length is eight times the breadth of the sheave-hole, which is one-sixteenth of an inch more than the thickness of the sheave; and this is one-tenth more than the diameter of the rope for which it is intended, and the diameter of the sheave is five times the thickness. The breadth of the block is six times the thickness of the sheave, and the thickness about one half the length. Flat thin blocks are three-eighths of the length thick; but all blocks, having more than one sheave, are increased in thickness more than in the above proportion by the additional number of sheave-holes, and middle-parts or partitions; the thickness of each partition being one-sixth less than the breadth of the sheave-hole. These dimensions are variable, according to the uses for which blocks are intended. Very large and four-fold blocks are formed of separate pieces, as the cheeks; partitions, &c.; and when thus made, they are denominated "made-blocks." The shells of blocks are first sawed to their length, breadth, and thickness; and the corners or angles are taken off. The workman then gauges the size of the sheave-hole in the middle, one sixteenth larger than the thickness of the sheave, and one-third the thickness longer than the diameter, for a single-sheaved block. In blocks of two sheaves, the partition is kept in the middle, and is one-sixth less than the sheave-hole; each sheave-hole is gauged equally on each side, and so for all blocks with a greater number of sheaves. The blocks are then jammed up edgewise with wedges in a clave, and the sheave-holes are made in this manner: the length and breadth are first gouged out, and holes are bored half way through the block, along the part gouged out, with an augre of the size of the sheave-hole; then the sheave-hole is gouged and bored on the opposite side in the same manner, so as to meet the opposite holes. Blocks from 10 inches and upwards have one hole bored at each end, and cut through with a chissel; and the wood is sawed out with a rib-saw. All blocks have the sheave-holes cleared through by chissels, and by burrs at the corners. Blocks that are to have iron straps, should have the strap fitted on before the wood is cut out of the middle. The hole for the pin is bored through the middle of the block, one-tenth less than the diameter of the pin. The outsides and edges of the shell are next rounded off by

the stock-shave, and neatly finished by the spoke-shave. In the royal navy, blocks are left thick upon the edges of the cheeks; but in the merchant ships, the edges are sometimes thinned off to a small square, and sometimes rounded off. The scores for the straps are gouged out along the outsides of the cheeks, and taper in depth from nothing at the pin to half the thickness of the strap at the ends of the block, for a single score, and the same on each side of the pin for a double score. The scores are gouged down, across the breast of the block, to half the size of the strap, in order to allow for the serving. After the score is cut, the sheaves are fitted; they are one-tenth thicker than the diameter of the rope intended for running on them, and five times that thickness in diameter. The hole for the pin should be bored through the centre by a bitt fixed in the mandrel of a turning lathe, or with a stock and bitt, and reamed with an augre one sixteenth larger than the diameter of the pin, that it may easily turn; they are then put in a lathe and turned smooth, and the outer circumference hollowed one-third of its thickness, that the rope may embrace it closely. The diameter of the pin is the thickness of the sheave, and is turned in a lathe, except its head, which is left eight square, to prevent its turning in the block, and is driven through the holes in the block and sheaves. After the sheaves are fitted, the inside of the sheave-hole, at the arse of the block, is gouged hollow, to admit the rope, and correspond with the sheave; and a small neat chamfer is taken off the edges.

Blocks, Bee, are made of elm, in length seven-ninths the length of the bee, in depth two inches for every foot of length, and in thickness seven-eighths of the depth. A block of this kind is trimmed square, chamfered on the outside edges, and fitted with a sheave in one end; and in the other end is cut a hole, to be fitted with a sheave, in case the other should fail. The sheave-hole is $\frac{3}{4}$ ths of the length of the block, and $\frac{1}{4}$ th the length of the sheave-hole in breadth, and half the length of the sheave-hole within the end. Bee-blocks are bolted to the outer ends of bowsprits, under the bees, and the bolts serve like the axis or pin for the sheaves to work upon; the fore-top-mast stay reeves through the sheave-hole at the fore-mast end of the starboard bee-block, and the fore-top-mast preventer, or spring-stay, through the sheave-hole at the after-end of the larboard bee-block.

Blocks, Brail, in rigging the mizen-yard, are strapped together in one strap, and lie over the yard, and seize together underneath; the throat-blocks next the cleats to the mast; the middle-blocks in the middle between the throat-block and peek; the peek-blocks about three or four feet within the cleats at the peek.

Blocks, Bunt-line, are lashed in rigging the lower-yards, like the leech-line blocks in the middle between them and the slings of the yard. These, in rigging the top-fail yards, are spliced round the strap of the top-fail-tye-block upon the yard.

Block, Cat, is employed to draw the anchor up at the cat-head. See CAT-HEADS.

Blocks, Cheek, or half-blocks, are made of elm-plank; the length being twice and a half the depth of the top-mast head; the breadth is seven-eighths of the depth of the top-mast head, and the thickness half that depth. The depth of each tenon, and thickness of the cheek, when the sheave-hole is cut, is each three-eighths of the whole thickness, so that the remaining two-eighths are the sheave-hole. The three tenons are each two inches square, one in the middle, and one at each end; and the length of the holes is more than the breadth of the block, by the thickness of the sheave. The back of the block is divided into three parts, and one-third on each side is bearded down to one-third the thickness of the cheek on each edge. Pins of iron are made for fasten-

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fastening them to the top-mast head, and for durability the sheave-holes are coppered. Check-blocks are bolted to the thwart-ship sides of top-mast heads, close up under the cap, the bolts serve as the pin or axis for the sheaves to work on; the jib-stay and haliards, and fore-top-mast stays, sail-stay, and haliards reeve through the check-blocks at the fore-topmast-head, and the main-topmast-stay sail haliards, and middle-stay, sail-stay, and haliards reeve through the check-blocks, at the main-topmast head.

Blocks, Clue-garnet, serve to draw the clues, or lower corners of the courses up to the yards, and are fastened to the clues of those sails. In rigging the lower-yards, these lash through the eyes upon the yard; the blocks hanging underneath, four feet without the middle cleats on each side. See *Clue-garnet*.

Blocks, Clue-line, in rigging the sprit-sail yard, are strapped with two eyes, and are lashed through those eyes round the yard, three feet without the slings; the lashing to be upon the yard. In rigging the sprit-sail top-sail yard, these blocks are strapped with two eyes, and are lashed through those eyes round the yard, about two feet without the slings. The clue-line blocks, in rigging the top-sail yards, are strapped with two lashing eyes, and lash upon the yard three feet without the slings; the blocks hanging underneath the yard through which the clue-line reeves, and is strapped with a knot, and leads down upon the deck. In rigging the top-gallant yards, these blocks are strapped with two lashing eyes, and lash upon the yard three feet without the slings. The blocks hang under the yard, through which is reeved the clue-line, which is stopt with a knot. The leading part leads down the mast, and into the lower shrouds. Some sloops and light-rigged vessels have no clue-line blocks; they lower the yard.

Blocks, D, are lumps of oak in the shape of the letter D, from twelve to sixteen inches long, and eight or ten inches wide. They are thirded and bearded on the back, and the edges beaded. A sheave-hole is cut through the middle fore and aft. It is bolted to the ship's side, in the channels, to reeve the lifts, &c.

Blocks, De-p-sea-line, are the same as a wooden snatch-block (which see,) only smaller; generally from nine to eleven inches long.

Block, Derrick, in rigging the mizen-yard, is strapped with eyes, that go round the yard, and lash underneath, between the slings and the outer yard-arm or peck; the other block is cross-seized into the strap, has an eye spliced in each end, and lies upon the mizen cap, and seizes or hangs through the eyes under the cap, or upon the upper side of it.

Block, Fists, is hung in a notch at the end of the davit, and serves to haul up the flukes of the anchor to the ship's bow.

Blocks, Girt-line, in rigging the fore-mast, and main and mizen masts, are lashed round the mast head, above the stop of the cap, one to hang on each side. The girt-lines that reeve through them lead down upon deck, for hoisting the rigging-tops, and cross-trees, and the persons employed to place the rigging over the mast-head.

Blocks, Leech line, in rigging the lower yards, are lashed round the yard, and through the eye of the strap, ten feet within the cleats on each yard-arm; the blocks hang on the fore-part of the yard.

Blocks, Lift, in rigging the lower yards, are spliced into the strap of the top-sail-sheet blocks; the lifts reeve through the block in the span round the mast head, between that and the top-mast, then lead down abreast the shrouds, and reeve through a block fastened to the side, and are there belayed. In rigging the top-sail-yards, the lift-blocks are strapped with an eye to the side of the yard arm. The lift

reeves through the lower sheave in the fister block in the top-mast shrouds, and through the block on the yard-arm. The standing part hooks to a becket round the top-mast-cup, and the leading part leads down the side of the mast, and belays to the dead-eyes in the lower shrouds.

Block, Long-tackle, resembles two single-blocks joined together endways, one being two-thirds less than the other. The shell is made of ash, or elm, two-thirds longer than the proportion for a single block. These blocks are used for tackles, and are made according to the size of the rope, as other single blocks. They are used in the Royal Navy and East India service as yard-tackles; but in the merchant service as loading tackles.

Blocks, Made, have the shell formed of several pieces of elm-plank, suited to the thickness of the cheeks, sheave-holes, and middle parts, and are strongly bolted together with three bolts at each end, driven through and clenched on a ring at the points. These blocks have flatter cheeks and more square edges than other treble and four-fold blocks. Of this sort are large treble and four-fold blocks, for heaving down ships, or other heavy purchases. Smaller made blocks, of modern invention, are formed of two pieces, joining in the middle; the pin working on patent rollers, let into the inside of the cheeks, which are bolted or rivetted together at the ends. These blocks are thought too complex for the Royal Navy, and are not so easily remedied in case of failure.

Block, Main-sheet, is used for the sheet-tackle of the main-sail-booms of small vessels, and is single or double; the sheet or fall being always belayed round the pin. The shell is made of ash or elm, one half longer than the proportion for single or double blocks; the additional length is tapered, and a hole bored through between the sheaves and the end, to admit the strap; the length of the pin is the length of the block, and is similar to a belaying pin, for which purpose it is sometimes used.

Blocks, Monkey, are sometimes used on the lower yards of small merchant ships, to lead (into the mast or down upon deck) the running rigging belonging to the sails. The shells are made of ash or elm; some are only small single blocks, attached by a strap and iron swivel to iron-traps that embrace and nail to the yard, the block turning to lead the small running-ropes in any direction; others are nearly eight-square, with a roller working in the middle, the same as a sheave, with a wooden saddle beneath, to fit and nail to the yard.

Blocks, Nine-pin, are used to lead the running-ropes in an horizontal direction. The shells, made of ash or elm, resemble the form of a nine-pin, though flattened on the sides; their lengths are generally confined to the place in which they are fixed, and this is for the most part under the cross-pieces of the fore-castle and quarter-deck bitts. The breadth of the block, sheave, &c. is governed by the rope, and tapers at the ends to three-eighths of the breadth of the middle; the pin at each end, serving as a vertical axis, is two-thirds of the bigness of the end. The thickness is five-eighths of the breadth. These blocks may be turned in a lathe, and flattened afterwards with a spoke-shave.

Block, Quarter. See *Thick and thin Block*.

Blocks, Rack, are a range of small single blocks, made from one solid, by the same proportions as single blocks, with ends, in form of a dove's tail, for the lashing, by which they are fastened athwart the bowsprit, to lead in the running ropes. They are seldom used.

Blocks, Shoe, are two single blocks, cut in a solid piece, transversely to each other. They serve for legs and falls of the hunt-lines, but are seldom used.

Block, Shoulder, is a large single block, left nearly square at the lower end, or arse of the block, and cut sloping

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in the direction of the sheave. Shoulder-blocks are used on the lower yard-arms, to lead in the top-fail sheets; and, on the top-fail-yards, to lead in the topgallant-sheets; and by means of the shoulder, are kept upright, and prevent the sheets from jamming between the block and the yard: they are also used at the outer end of the boomkins, to lead in the fore-tacks.

Blocks, Sister, are made of ash, similar to two single blocks, and are turned out of a solid piece, about twenty inches long, one above the other; between the blocks is a score for a middle seizing: a round head is turned at each end, and hollowed underneath, to contain the end-seizings; along the sides, through which the pins are driven, is a groove, large enough to receive part of the topmast-flroud, in which it is seized. In these blocks reeve the lifts, and reef-tackle-pendants, of the top-fail-yards.

Blocks, Slab-line, in rigging the lower-yards, are strapped with a short lashing-eye, that seizes to the span of the quarter-blocks underneath the yard.

Blocks, Snatch, are proportioned by the rope, as a single block, leaving twice the length for the score and lashing; they taper from the sheave to the lashing end, to half the breadth and thickness at the sheave; one side of the shell is cut across above the sheave, large enough to admit the rope or fail. In the Royal Navy, snatch-blocks are iron-bound, terminating at the small end with a swivel hook, or an eye, large enough to receive several turns of lashing; that part of the strap, over the notch in the side, lifts up with a hinge, and is confined down, when the rope is in the block, by a small iron hook, or latch, that hooks in the eye of a toggle-bolt, and that secures the upper end of the strap; the hinged part of the strap goes over the bolt, with a hole in the end; the strap is let into the block its thickness, and is confined by the pin and nails; they are used for heavy purchases, and where a warp, or hawser, is brought to the capstern. Snatch-blocks, not iron-bound, have a large hole bored through the tapering end of the shell, for the lashing. They are used for the main and fore sheet blocks of square-rigged vessels.

Block, Spring, a new kind of block, invented by Francis Hopkinson, esq. of Philadelphia, and designed to assist a vessel in sailing, by increasing the acting spring of her rigging. It is proposed to apply it to all such parts of the rigging as will admit of it with safety and convenience, and where its operation will be most advantageous; but particularly to the sheet ropes, and, if practicable, to the dead-eyes, in lieu of what are called the chains. A, (see *Plate of Ship*) is a block made in the usual manner, having a ring, or eye, B, at one end. C, is a spiral spring, linked at one end to the hook DE, and at the other to the ring F, which is to be annexed by a staple to the timber-head, or by some other means to the place where it is to be applied. The spring C must be of well-tempered steel, and proportioned in strength to the service it is to perform. Within the cavity or pipe, formed by the spiral spring, there must be a chain of suitable strength, called a check-chain (represented separate at G), connected by the links to the hook DE and ring F. When the spring is not in action, this chain is slack; but when the spiral spring is extended, by the force of the wind, as far as it can be without danger of injury, the check-chain must then begin to bear, to prevent its farther extension, and, if strong enough, will be an effectual security against failure.

Fig. 2. represents part of the gun-wale of a sloop, with the spring-blocks in action, one of them hooked to a staple in the timber-head, and the other to the corner of the jib.

The inventor of this machine apprehends, that a vessel thus furnished will be less liable to heel; and that she will

receive the impulses of the wind to better advantage, and sail with a more lively and equable motion than if rigged in the common way. *Transactions of the American Philosophical Society, vol. III. art. 40.*

Blocks, Strap-bound, are single blocks, with a shoulder left on each side, at the upper part, to admit the strap through, a little above the pin. These blocks are used at the clues of the square-sails, for the clue-garnets or clue-lines, and under the yards; the shoulder preserves the strap from chafing.

Block, Thick and thin, or Quarter, is a double block, with one sheave thicker than the other, and is used to lead down the top-fail-sheets and clue-lines. In the merchant service they are used single, thick and thin. In rigging the lower yards, they are strapped with a long and short leg, with a lashing eye spliced in the ends, and lash to the yard within the cleats, in the middle of the yard, the block hanging downwards. The long leg comes up the aft-side, and meets the short leg on the fore-side, and there lashes through the eyes. Although these are used for the top-fail sheets, and intended for the clue-lines, a single block would be cheaper and better; as the thin sheave is seldom used for the clue line, it being found rather to impede than to facilitate. Small ships, in the merchant service, have a double block lashed in the middle of the yard, as the quarter block through which the sheets reeve, and lead down on opposite sides. Large ships, in the merchant service, have a single block lashed on each side of the middle of the yard, and the sheets reeve on their respective sides, and lead down by the mast. A quarter block, in rigging the cross-jack-yard, is strapped with a double strap, with an eye in each of the four ends, and is lashed upon the yard in the middle between the cleats.

Block, Top. See **TOP-ROPE.**

Blocks, Top-Gallant-Sheet, in rigging top-fail yards, are strapped with two lashing-eyes, and lash upon the yard, close within the clue-line-blocks on each side.

Blocks, Top-fail-Sheet, in rigging the lower yards, are put over the yard-arms, strapped with an eye of the size of the yard-arm.

Blocks, Tricing, for the yard-tackles, are strapped with a short lashing-eye, that seizes round the yard about one third of the length within the arm cleats; the blocks hanging under the yard.

Blocks, Tye, in rigging the top-fail-yards, lash at the topmast-head close up to the rigging, under the collar of the stay, as the lower ones; and the blocks on the yards lash under the fore-part of the yard, as the lower ones, and reeve with a double tye, in large ships, and with a single tye, like the lower, in small ones. The standing parts of the double tyes clinch round the mast-head, then reeve through the double block upon the yard, and up again, and reeve through the block on each side of the mast-head. The blocks are then spliced in their lower ends, and connected by their haliards to a single block, that is strapped with a long strap, with a hook and thimble, that hooks to a swivel-eye-bolt in the channel on each side; the leading-part comes in through a block lashed on each side; the foremost ones abaft the forecable, and the after ones on the quarter-deck.

Block, Voyol or Viol, is a large single-sheaved-block; the length is ten times the thickness of the sheave-hole, which is three-eighths more than the thickness of the sheave; the thickness of the sheave is one-tenth more than the diameter of the viol, and the diameter of the sheave is seven times the thickness. The breadth of the block should be eight times the thickness of the sheave, and the thickness two-sevenths of the length. This block is double scored,

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the sheave is coated with brags, and the pin is iron, and nearly as thick as the sheave. It is used in heaving up the anchor. The viol passes round the jeer-capstern, and through the block, which is lashed to the main-mast; and the cable is fastened in a temporary manner to the viol in several places. It is seldom used except in the largest ships of the Royal Navy.

Block, *Warping*, is made of elm or ash board, shaped like the body of a bellows; the sides or cheeks are 8½ inches broad in the middle, and tapered to 2 inches broad at the ends; the back, or longest cheek, is 16 inches long, and ½ths of an inch thick, with a hole bored through the upper end to receive a leathern strap; the upper cheek is 12 inches long, and ½ths of an inch thick, except the lower end, which is 1⅓ inch thick, and forms the sheave-hole. The sheave is, 1½ inch thick, and 7¼ inches in diameter, made of lignum vitæ, coated with brags; it is let into the cheeks one-eighth of an inch, to prevent the yarn from getting between the sheave and the cheeks. The cheeks are fastened together at the lower end with three screws and nuts; and the pin, which is iron, is seven inches long, driven through the middle of the block, with a shoulder on the upper side, and clinched at the point on the lower side of the shell; the upper part of the pin is tapered small, and a wooden handle rivetted upon it. The cheeks have a broad chamfer round the outer edges; the inside edges, and inside of the block above the sheave, are lined with thin iron neatly screwed on, to prevent the block from wearing. This block is finished in a neater manner than blocks in general, and is seldom used but by rope-makers, to warp off the yarn into hauls for tarring.

Blocks, *single, double, or treble, in Rope-making*, are strapped with a hook and thimble, and reeved with a rope, called the tackle-fall, which is used to stretch the yarn to its full extent, before the press is put on, by a capstern, or crab, at the lower end of the rope-walk. The fall is then belayed, until every yarn is hove through the strands and brought down, so that the rope may not exceed the circumference intended. For other blocks, see **BULLS'-eyes, DEAD-eyes, and EUPHROES.** See *Plates of Ships.*

Blocks, *Strapping of.* A seventeen-inch block has a five-inch rope strap, and every inch in length above or under, to a twelve-inch block, has half an inch more or less sized rope allowed for the strap; a 11-inch block has a 3-inch strap; a 10 and a 9-inch block, 2½ inches; an 8 and 7-inch block, 2 inches; a 6-inch block, 1½ inch; a 5 inch block, 1 inch; and a 4-inch block, ¾ of an inch. The score round iron-bound blocks is taken out to the size of the iron-strap, sufficient to bury it, except at the pin. Iron straps are from ¼ of an inch to 1 inch in thickness, and nearly three times the thickness in width; the thickness of these should correspond to the strain which they are to resist. The cat-block must have a strong strap and large iron hook, which hooks the ring of the anchor in catting. The top-block should have a stout iron binding, with a strong short hook. Top tackle blocks have strong iron bindings, the upper block with a tackle-hook, and the lower block with a swivel-hook. The swivel, in iron-bound blocks, serves to turn it occasionally, in order to untwist the parts of the rope that form the tackle, as the mechanical power is greatly reduced thereby.

In rigging, the whole length of all the different sizes of block-strapping is got upon the stretch, and hove out tight for worming and serving; it is then wormed and served, and cut into shorter lengths, to suit the different blocks. The strapping of jeer-blocks is wormed, parcelled, and served; strapping of 4 inches diameter, and above, is wormed and served; and all under 4 inches is only served with spun yarn;

except the sprit-fail brace, bunt-line, and leech-line blocks, that are lashed under the tops, which are only served with spun-yarn over the splice, and the tail left half a fathom in length. Jeer-blocks are double scored, and the double and treble blocks are strapped with a double strap, thus: it is spliced together at the ends, and, when doubled, to be the size of the block and circumference of the yard; it is then doubled, and the block seized in the bight, with a long and short leg; the splice lying in the arse of the block.

The scores of all blocks are to be well-tarred, and the pin and sheave examined, before the strap is put on. The block is set well into the strap with wedges, thus: the four parts are frapped together with rope-yarn under the block, with a chock between, and the wedges are set between the breast of the block and chock. Then the strap is nippeded, with a heaver, round the block; the wedges, chock, and frapping, taken away, and the block hung upon the flake-head, or post, and the strap well seized together, close under the block, with nine under and eight riding turns, every turn strained tight round by a heaver, and crossed each way with two turns.

Jeer-blocks, for the mast-heads, are strapped with long eyes, to receive many turns of the lashing; and the block is seized into the strap as before, as are all seizing blocks, in proportion to their sizes. The straps are cut agreeable to the following table.

A TABLE of the Dimensions of Straps for Lashing and Seizing Blocks.

Size of the Blocks.	Circumf. of the Straps.	Length of the Straps.	
		Feet.	Inches.
17	5	7	4
16	4½	6	8
15	4	6	0
14	3½	5	4
13	3½	4	11
12	3½	4	6
11	3	4	2
10	3	3	9
9	2½	3	4
8	2½	3	0
7	2½	2	9
6	2	2	6
5	1½	1	9
4	0¾	1	6

Blocks, strapped with eyes or thimbles spliced in the ends, are seized tight into the bight, and the legs left long enough to lash through the eyes, round a mast, yard, &c. as the top-fail clue lines, clue-garnets, and sprit-fail clue lines, &c.

Blocks strapped with a thimble, or hook and thimble, have the strap spliced together at the ends. The block is fixed in one bight, for the splice to lay on the arse of the block, and the thimble in the other bight; the seizing is put on, between the block and thimble, with eight under and six riding turns, according to the size of the block, each turn strained tight by a heaver; the turns double crossed, and the end stopt with a wall-knot crowned.

Blocks strapped with double tails, are fixed in the strap, similar to blocks with eye-straps: and those with a single tail are spliced in, and served with spun yarn over the splice.

Girtline blocks are strapped in the house, and the girtlines reeved. See *Elements and Practice of Rigging, &c.* vol. i.

BLOCKADE.

Block-and-Block, in *Sea-Language*, denotes the situation of a tackle, when the effect is destroyed by the blocks meeting together.

Block-wood, is a name sometimes given in our laws to logwood. 23 Eliz. c. 9.

BLOCKADE, in the *Military Art*, signifies the method adopted in cutting off all communication between a town which it is intended to reduce by famine, and the neighbouring country. It is effected by posting troops on all the passages and avenues leading to and from the place; preventing any supplies of provisions or reinforcements from being thrown in by the enemy, and thus, in course of time, starving the garrison into a surrender. A blockade differs from a regular siege, inasmuch as there are no trenches or attacks. Blockades are principally formed by the cavalry. The term probably owes its origin to the German expression *blockus*, or *blockhaufe*, a *bulwark*, or *house of wood*; or to the Gaulish *bloca*, a *barricade*; though others derive it from the Latin *baculare*, signifying to *stop a passage*.

The word is sometimes used in speaking of the commencement of a siege, when detachments are sent forward to seize the principal avenues, and occupy the ground on which the besiegers intend to fix their quarters.

To *raise a blockade* is to force the troops, which keep the place blocked up, from their posts.

The only method of reducing fortresses in the more remote ages of antiquity, was by blockade. The town was completely invested by a wall of masonry constructed around it, and furnished at certain distances with redoubts and places of arms; or the besiegers contented themselves in surrounding it with a deep ditch and intrenchment, well pallisaded, to prevent the garrison from making sorties, or any succour or provisions from being introduced by the adversary without. In this situation the investing army tranquilly waited until famine brought about what at that period art and force were unable to accomplish. From hence proceeds the extreme length of those sieges chiefly spoken of in the more early pages of profane history; that of Troy, which lasted ten years; that of Azotus, by Phamærichus, which continued twenty-nine; and that of Babylon, by Cyrus, who, according to Xenophon (*Cyrop.*), would have been much longer detained before its walls, if a lucky surprize had not rendered him master of the place. See **BABYLON**.

The ancient Greeks, on foreseeing that the siege of a fortress would prove a work of time, often changed it into a blockade. They environed the town with a fosse and rampart against the attempts of the garrison, and drew another ditch round it towards the country, to oppose such troops as might advance to succour the place. The besiegers established their camp between the two lines, and thus, in process of time, starved their adversaries into a capitulation.

In the instance of the blockade of Platæa, carried on during the third year of the Peloponnesian war, the works constructed by the Lacedæmonians were of a more complex nature. They consisted in two walls of solid masonry, built at the distance of sixteen feet from each other, of a reasonable thickness, and covered in at top by a kind of roof or platform. The intervening space formed a suite of apartments, in which the troops, destined to carry on the blockade, were lodged during the winter. Each of these walls was furnished with a parapet and battlements, and, at the distance of every ten of these last, was erected a turret with a flat roof, of the breadth of the whole terrace, and capable of making resistance at the same time against an enemy from within or without. The only method of communication between the different chambers, was by traversing these towers.

The approach to the walls on either side was defended by a deep ditch, the earth of which had been used in constructing the rampart. During the night, guards were kept on the several towers; centinels were established at different posts round the whole extent of the circumvallation; and a corps de reserve of three hundred men remained always under arms, ready to march on the first signal wherever there might be occasion for their services.

This is the most remarkable instance of a blockade we meet with in the Grecian history. Notwithstanding, however, all the precautions above related, and the seeming impracticability of flight, the intrepid garrison of Platæa, found means to elude the vigilance of their besiegers, and by a well concerted sortie, about one half of them effected an escape across the formidable works of the Peloponnesians, and reached Athens in safety. The event is related in a very interesting and circumstantial manner by Thucydides in his second book. The Romans first imitated, and finally surpassed the Greeks in this as well as in every other branch of scientific warfare. As early as the siege of Agrigentum, in the first Punic war, we find them dividing their forces, and forming two encampments to block up the place on both sides; connecting these encampments by lines of circumvallation, and braving within these defences every effort made to relieve the town by the enemy from without. But these lines were equally badly guarded against a sortie with those of Platæa. The Carthaginian garrison, imitating the former example, succeeded in a like manner in forcing a passage by night over the intrenchments of the besiegers. (*Polyb. lib. i. c. 17.*) The famous blockade of Lilybæum, during the same war, which lasted for nearly ten years, is a remarkable instance of Roman perseverance in military undertakings, although, the place being open to receiving supplies from the sea, the assiduity of the besiegers was not attended with such complete success as it deserved. By degrees, however, the Romans improved in the art of reducing fortresses by blockade. Syracuse, which the abilities of Archimedes rendered impregnable by open force, had been thus reduced by Marcellus, but for the treachery of a townsman, which in a great measure abridged his labour; and all the military science and manœuvre of the formidable Hannibal was in vain exerted for the preservation of Capua, during the twelve months the siege lasted. (*Polyb. Livy.*)

The works constructed by Scipio Æmilianus for the reduction of Numantia, exceeded in magnitude all which had been raised on any former occasion, and besides surpassing them in strength, embraced a much greater extent of ground, than the intrenchments of the Lacedæmonians before Platæa. Numantia was eighty-four stadia, or nearly a league in circuit. Scipio, after having invested it, drew a circle inclosing twice the area of the circumference of the town; and this work being completed, he threw up his lines of circumvallation and contravallation at a reasonable distance from each other. Each of these fortifications was composed of a rampart eight feet thick, and ten in height, defended by sharp pallisades, and flanked with turrets at a hundred feet distant from each other. We can hardly comprehend or credit the immense labour of such a circumvallation; but nothing can be better attested than these facts. (*Appian. de Bell. Hisp.*)

Among the numerous exploits of Cornelius Sylla, the blockade of Præneste, during his civil war with the party of Marius in Italy, is not to be reckoned the least. The inflexible assiduity, with which it was kept up during a long period of time, and preferred unbroken against the bloody and almost unintermitted attacks of several hostile armies, superior in number to his own, conveys the highest idea of

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his martial abilities. It was, however, under the auspices of Julius Cæsar, that this branch of military science attained its highest point of perfection among the Romans; and whether we consult the annals of ancient or modern warfare, we find no example to equal the talents displayed by that unrivalled general, in the formation of his immense works before Alesia, and at Dyrrhachium, which have deservedly excited the wonder and admiration of posterity.

In the former instance, he undertook the arduous task of blocking up an army of 80,000 Gauls, doubly superior in number to his own forces; commanded by a general of the greatest military knowledge, Vercingetorix, and entrenched under the walls of a fortified city, situated itself on an almost inaccessible mountain. Cæsar's line of contravallation, extending nearly eleven miles, was composed of a ditch fifteen feet broad, and as many deep, defended by a rampart twelve feet in height, furnished with a parapet, and fortified all round by turrets, at the regular distance of eighty feet. The front of the rampart, looking towards the town, was protected by a pallisade of sharp stakes and boughs of trees, interlaced, cut sharp, and pointing outwards. Before the fosse were planted five different rows of *cippi*, or large branches sharpened at the ends, fixed in trenches five feet in depth, and so strongly interwoven, as not to be removed or plucked up, without infinite labour. In front of these were arranged eight other rows of *lilia*, or pits, three feet deep, disposed in the form of a quincunx, ruck thick with strong sharp stakes, and covered over with bushes to deceive the enemy. Before these again were scattered up and down numerous stakes of a foot in length, fastened in the earth, and headed with barbed iron hooks, called by the Romans *stimuli*. Farther advanced than these last, at 400 paces distance from the rampart, Cæsar drew another ditch, twenty feet broad and deep, to keep the garrison at a distance, and prevent them from annoying his soldiers while employed on the contravallation. Not contented with such immense labours, he constructed the like fortifications towards the country, for the purpose of frustrating any attempts the expected Gaulish succours might make for the relief of their besieged countrymen. Between the lines, a space of nearly half a mile in breadth, was disposed the investing army, and their principal encampment was pitched in the most convenient situation for communicating with every part of the circumvallation. Behind these defences did Cæsar baffle the utmost efforts of a new army of 250,000 Gauls, sent to extricate Vercingetorix; and, after a series of the most brilliant achievements ever recorded, obliged the town of Alesia, and the army inclosed within its walls, to surrender at discretion. Cæs. de Bel. Gal. lib. vii.

No less famous in history, though not productive of equal success, were the celebrated lines at Dyrrhachium, carried over a tract of fifteen miles, and within which, Cæsar flattered himself, to surround, and compel to a capitulation, an army exceeding his own in strength, and commanded by the great Pompey. But in this instance the conqueror of Gaul had to do with Romans, and the enterprise proved too vast for his strength. Pompey, by a sudden and well-directed effort, broke through the blockade, when it was on the very point of being completed; and had he briskly followed up the advantage, might, according to Cæsar's own confession, have converted his adversaries' hopes of success into total defeat. Cæs. de Bel. Civ. lib. iii.

The works thrown up by Augustus at Perusia, and the entrenchments within, which Stilico at Pæsula enclosed, and destroyed an inundation of 400,000 Goths, are proofs that in after ages the Romans retained a remembrance of the means by which Cæsar had triumphed at Alesia, and were

still capable of practising them for the extermination of their numerous enemies. App. de Bel. Civ. Zozim. Prosp. Marc. Chron.

In modern warfare, there are two ways of forming blockades. The first, and most simple, consists in fortifying and occupying different positions at a small distance from the place, principally upon all the highways and avenues, and along the banks of rivers, both above and below the town. These posts are guarded by distinct corps of infantry and cavalry, who take care to keep up an easy communication with one another, and to prevent all supplies of provisions from being conveyed into the fortrefs blockaded. This, by degrees, reduces the garrison to great necessity, causes them to desert, and frequently occasions such murmurings and mutinies among the inhabitants, as to force the governor to a premature capitulation. Such a species of blockade is extremely tedious; for it is almost impossible to prevent provisions from being sometimes introduced in small quantities, and reviving the courage and patience of the besieged. But it is of advantage, after having thus for some time invested a town at a distance, to convert the operations into a regular siege, as the garrison are then generally unprovided with the materials necessary for protracting their defence.

The second kind of blockade is much closer and nearer. It is effected by means of lines of circumvallation and contravallation, between which the army lies encamped, and is adopted only in particular cases. If, for example, after the loss of a battle, the enemy should retire into a town which is well known not to be over-abundantly supplied with provisions, and, it is presumed, must be obliged to surrender in a few days. But as it would be the height of imprudence in a beaten general to expose the remains of his army to certain ruin, by shutting them up in a place so ill-circumstanced, (a fault, nevertheless, committed by marshal Wurmser in 1796, after the loss of the battles of Bassano and Roveredo, and which all the importance attached by the imperialists to the preservation of Mantua can hardly excuse,) this kind of blockade is seldom put in practice.

It is rarely a fortrefs is reduced to surrender, by the mere process of blockading; but sieges are often greatly accelerated by it, on account of that scarcity of necessaries, whether for the subsistence or defence of the garrison, which, in a greater or less degree, is its never failing consequence.

The blocking up of towns by corps principally of cavalry, posted in the neighbouring places of strength, is more convenient than any other method; because the troops forming the investiture, are not so fatigued as they would be in occupying open positions, and unfortified villages. In the latter case, it is necessary to be always on the alert, not only against the garrison, who, by a well directed sortie, may interrupt the communication, and cut off some of the detachments; but, against the enemy from without, who, by secretly marching a strong force, may surprise, beat up one of the besieger's quarters, and introduce a convoy, or reinforcement into the town. On account of these inconveniences, it is essentially necessary to ascertain the quantity of provisions and stores contained in the magazines of a place blockaded, in order to compute how long it may hold out, and to have an army in the field sufficiently strong to protect and cover the blockade. For, should the enemy succeed in surprising and cutting off one detachment, its defeat might occasion the successive destruction, or capture of all the others, before they could assemble in competent force to repulse the collected attacks of an enterprising and vigorous adversary. (Fouquieres, Mem. chap. lxxxii. p. 377.)

It is chiefly, since the contest for the imperial succession

BLOCKADE.

in 1740, that the expedient of blockading fortresses of the most formidable strength, has been preferred to the less tedious, but more destructive plan of carrying them by a regular siege. In the latter case, every outwork belonging to the place must be taken, or battered down inch by inch, with an immense loss to the besieging army, and frequently at the hazard of its being so reduced in numbers, as not to be capable of undertaking any action of moment during the remainder of the campaign. On the other hand a blockade, well kept up, must, sooner or later, reduce the garrison to the last extremity for want of provisions, or ammunition. The number of troops engaged in the enterprise is comparatively small. The loss of men, necessarily considerable in the frequent and bloody attacks on the fortifications of a well defended place, is entirely avoided; and the major part of an army is still at liberty to continue its advances into the heart of the enemy's country, and to follow up a previous success, without the tedious process of stopping to reduce every strong hold in its way. The inconveniences which might otherwise result from leaving a hostile garrison in the rear, are, in a great measure, obviated, if the blockade is kept up with proper alacrity and closeness. The enemy within the town have nothing to do to attend to procuring provisions for themselves, without troubling the convoys destined for the main army of their besiegers; and by this means, the operations of a campaign, so far from being retarded, are frequently accelerated, by having recourse to a blockade. Had the allied powers, instead of mouldering away their armies before the walls of Mayence and Valenciennes, and afterwards completing their ruin, by the impotent and bloody attempts upon Dunkirk and Maubeuge, adopted this method during the summer of the year 1793, they possibly might have made greater impression on the territory of the French republic. Had, on the contrary, the generals Jourdan and Pichegru endeavoured, in 1794, to carry Landrecy, Valenciennes, Condé, and Luxembourg, by regular sieges, instead of contenting themselves with leaving those fortresses in a state of blockade, it is very evident that the successes of the French, during the latter part of that memorable campaign, would have been by no means so rapid and important as they actually turned out.

When the directory formed, in 1796, the resolution of invading Germany, their armies made no attempt to attack in front the towns of Mannheim, or Mayence, but proceeded to effect a passage over the Rhine, at a distance from those places; and, instead of consuming their time, and wasting their strength in long and tedious sieges, they advanced rapidly into Suabia and Franconia. They wished to become masters of Ehrenbreitstein, Mayence, Mannheim, and Philippsburg, by the same method by which, in 1794, they had recovered the towns of Landrecy, Quefnoy, Valenciennes, and Condé, and to achieve, by a single manœuvre, that which would, in former times, have been the result of two or three successive campaigns. Pursuant to this system, they forbore to undertake any siege, and ventured to leave fortified places at a great distance behind them. Their generals foresaw, that by carrying the war away from these towns, they should, by force, detach the enemy from them; and judged that if they could obtain and keep possession of the country situated beyond these fortresses, they would, in the end, fall into their hands perfectly undamaged, and without having cost them either blood or treasure. They proposed to acquire the fortified places, by making themselves masters of the surrounding country; as formerly these countries were secured by getting possession of the

fortified places. These had hitherto been the means of conquest; they now meant to make them its result. This method, by which the French acquired so great a number of fortified towns in 1794, met not with the same success in 1796; but their failure did not arise from the strong places which they left behind them; and as these had not impeded the progress of Jourdan and Moreau, neither were they the causes of their first disasters. If the troops of the republic had been victorious at Amberg, or at Wurtzburg, the fortresses of Ehrenbreitstein, Mannheim, Mayence, and Philippsburg, would, no doubt, have ultimately fallen, as Luxembourg did in 1795. *Hist. of the Camp. of 1796, Lond. 1796, 8vo.*

As a proof of the little danger attending this method of carrying on war, we shall only add, that the garrisons of Philippsburg and Mayence remained so closely blockaded by a small part of the French forces, as not to be capable of affording the archduke any essential assistance in cutting off the retreat of the invaders, notwithstanding the rapid and disorderly manner in which more particularly that of Jourdan was conducted. During the same year, Buonaparte, although the reduction of Mantua was the principal object of the campaign in Italy, did not for a moment discontinue his other operations in the field. On the contrary, this did not hinder him from carrying his arms into the middle states of that beautiful country; from laying Parma and Modena under contribution; obliging the pope and duke of Tuscany to agree to a neutrality; forcing the English from Leghorn, and fighting the imperialists almost incessantly, on every point of a very extended line, to the destruction of no less than four of their armies successively detached against him.

Notwithstanding the tardy proceedings of a blockade are far from being congenial to French vivacity, yet, where the strength, or peculiarly inaccessible situation of a fortress, have precluded all hopes of success from a coup de main, they have often had recourse to this means. That they are possessed of sufficient perseverance on these occasions, the three blockades of Luxembourg, Mantua, and Ehrenbreitstein, in 1795, 1796, and 1798, are convincing proofs.

The most famous blockades which, during the last century, have distinguished the military history of Europe, are the following: That of Prague by the Austrians in 1742, is renowned for the gallant defence made by the French forces under the marshals Bellisle and Broglio, for the space of five months, during which time they were driven to the last necessity for want of provisions; and for the daring retreat by which the former of these generals preserved the remains of his army from falling into the hands of the enemy. The late war has produced several remarkable instances. The two already mentioned of Luxembourg and Ehrenbreitstein reflect equal honour on the besiegers, whom no obstacle could deter from continuing, with invincible patience, their plan of reduction; and the garrisons, whose resistance was in the highest degree meritorious.

In 1796, public attention was every where engrossed by the blockade of Mantua, which gave occasion for the utmost exertion of that military talent by which the first consul of France has so eminently distinguished himself, and for the veteran marshal Wurmser to add fresh laurels to those he had already acquired, and draw even from his conqueror a flattering acknowledgement of the ability he had displayed in its defence. The different exploits of these generals; the entire destruction of four imperial armies, in vain attempts to relieve the place; the bloody battles of Castiglione, Roveredo, Arcole, and Rivoli, the result of those attempts; and the conquest of all Italy by the French,

French, the consequence of its fall, secures to the blockade of Mantua everlasting fame.

The conduct of general Massena, when blocked up in 1800 within the walls of Genoa, may justly be compared with the most glorious actions of the war. Surrounded on all sides by enemies; cut off from every hope of succour by land or sea, and almost destitute of provisions or ammunition, he maintained, for sixty days, a post the Austrians had flattered themselves to reduce by famine in six; destroyed immense numbers of them in his different attacks on their posts; and having defended the place to the last extremity, obtained a negotiation (for Massena would not suffer the word capitulation to be inserted in the treaty), equally honourable to himself, and advantageous to his country. It was advantageous, inasmuch as it obliged the enemy to divide and scatter their forces, entangle themselves among the defiles of the Apennines, and, besides losing a number of men before Genoa, drew them to such a distance from what the French government intended to make the principal seat of action during the campaign, as enabled the first consul to pass the great St. Bernard unopposed, occupy the plains of Piedmont, throw himself in the rear of general Melas, and, by the battle of Marengo, extinguish at once the hopes of the Austrians in Italy.

BLOCK-battery, in the *Military Art*, denotes a wooden battery on four wheels, moveable from place to place, whereby to fire *en barbe*, or over the parapet; sometimes also used in galleries and casemates, where room is wanted.

Block-brush, a term used in *Heraldry*, to express a bundle or bunch of knee-helm, or bastard myrtle, formerly used by butchers to clean the surface of their chopping-blocks, which forms a part of the armorial ensigns assigned to the company of butchers of London.

Block-carriage, in the *Artillery*, denotes a carriage used for conveying mortars and their beds from one place to another.

Block-house, in the *Military Art*, a kind of wooden fort or battery, either mounted on rollers, or on a vessel, and serving either on the water, or in some counter-scarps and counter-approaches. The name is sometimes also given to a brick or stone fort, built on a bridge, or the brink of a river, serving not only for its defence, but for the command of the river, both above and below. Such was that noted *block-house* anciently on the bridge of Dresden, since demolished on enlarging the bridge.

Block-printing. See **PRINTING**.

BLOCKING, in *Middle Age Writers*, denotes a kind of burial used for persons dying excommunicated.

Blockings, circular, in *Architecture*, are bases to the dome, represented in the *Plate of Archit.* (title *Basilic*) QQQ; which, by their apparent solidity, seem to strengthen the dome, and at the same time taking from its height, add a peculiar gracefulness to its appearance.

Blockings, square, are represented at S (title *Basilic*), in *Plate of Archit.* These, when enriched with base and cap, obtain the appellation of **PEDESTALS**.

Blocking-course. See **COURSE**.

BLOCKLAND, ANTHONY DE MONTFORT, in *Biography*, a painter of history and portrait, was born of a noble family at Montfort, in 1532, and acquired his art in the school of Francis Floris, whose manner he always followed. By endeavouring principally to imitate the taste of the Roman school in design and composition, he became a distinguished artist. He well understood the principles of perspective, and he disposed his figures with judgment and accuracy. The style of his colouring was agreeable, and

his pencil mellow. He designed every object after nature, and gave to the contours of his figures considerable elegance. His genius was best adapted to grand compositions, of which he designed many, both at Delft and Utrecht. Several of his works, particularly a Venus, and the history of Joseph and his brethren, are in so good a taste, that they seem to have been painted by a master educated in the school of Florence. Pilkington.

BLOCKLEY, in *Geography*, a township in Philadelphia, in the county of Pennsylvania.

BLOCKY, among *Jewellers*, a name given to a diamond when its sides are too upright, by its table and collet being larger than they ought to be.

BLOEMAERT, ABRAHAM, in *Biography*, the most distinguished of a family of Dutch artists, was the son of Cornelius, an architect, engineer, and excellent statuary of Dordrecht, who, during the troubles of the Low Countries, removed to Utrecht. He was born at Gorcum in 1567; and resided chiefly at Utrecht, where he probably died, A. D. 1647. In his youth, he diligently copied the designs of Francis Floris; but the excellence to which he attained was chiefly owing to his own genius, which enabled him to acquire a style of painting peculiar to himself. He painted history pieces, sacred and profane, landscapes, and animals; but though he possessed a facility of invention, and a free-spirited touch, and well understood the chiaro-scuro, his taste and style are said to have too much of the Flemish, and he is charged with having indulged his own fancy, and deviating from nature in his figures. The historical picture of the death of Niobe and her children, gained him great reputation; the figures in the composition being as large as life. Some slight, masterly etchings are attributed to this artist, which are executed in a manner imitating drawings with a pen, from his own compositions. He also published some spirited chiaro-scuros, the outlines of which, contrary to the usual custom, were not cut on blocks of wood, but etched upon copper. Of this kind are two large prints by him, representing Moses and Aaron, both sitting figures. He left four sons, all artists. His son *Frederic* worked chiefly from his father's designs, and imitated his style in his etchings and chiaro-scuros. He also, conjointly with his father, made a large drawing book, consisting of figures, animals, landscapes, &c. *Henry* and *Adrian*, were both painters; and they are also mentioned as engravers: the most eminent, as a painter, was the latter.

Cornelius, the most distinguished as an engraver, was Abraham's youngest son, and born at Utrecht, in 1603. Devoting himself wholly to the art of engraving, he first studied under Crispin de Pass, and then went to Rome, where he died, at a very advanced age. The manner of engraving adopted by this artist was original, and the source of that style, in which the best French masters excelled, or those of them who worked merely with the graver. He covered the lights upon his distances, and the other parts of his plates which required tinting, with great care; whereas, before his time, the lights on the distant hills, trees, buildings, or figures, had been left quite clear; and by so many white spots, scattered in various parts of the same design, the harmony was destroyed, the subject confused, and the principal figures prevented from relieving with any striking effect. By this judicious improvement, Bloemaert gave to his prints a more clear and finished appearance, than all the laboured neatness even of Jerom Wierix had been able to produce. He drew correctly; but as he executed entirely with the graver, the extremities of his figures are heavy; and his heads are not always beautiful or expressive. In the mechanical part of the work few have excelled him,

either as to clearness, or freedom of execution. His great fault, however, is want of variety. The naked parts of his figures, the draperies, and the back ground, are equally neat, and engraven precisely in the same manner. Hence the effect is flat, and the flesh, for want of distinction, appears cold and silvery.

His works, which are numerous, are justly held in high estimation, and cannot be easily procured. The following are particularly noticed, and the first impressions of some of them are very rare: the "Chastity of Joseph," from Blanchart; the "Adoration of the Shepherds," from Raphael; the same subject from Pietro de Cortona; the "Holy Family" of the "Spectacles," as it is called, from Joseph's holding a pair of spectacles in his hand, from Annibale Caracci; another "Holy Family," from Parmegiano; the "Virgin and Child," the child sleeping, from Guido; "St. Luke painting the Virgin and Child," from Raphael; "St. Peter raising Tabitha from the Dead," from Guercino; "St. Marguerita" leaning on a pedestal, and setting her foot upon the dragon, after Annibale Caracci; the "Four Fathers of the Church," from his father A. Bloemaert; "Christ appearing to St. Ignatius," from the same; "Meleager presenting the boar's head to Atalanta," from Rubens; several "prints for a missal," after Ciro Ferri and others; a set of small prints of "Rustics, &c." from his father; "Heads" from the same; &c. &c. Pilkington and Strutt.

BLOEMEN, JOHN FRANCIS VAN, a painter of landscapes, called by the Italians, from the delicate manner in which he painted his distances, "Horizonti," or "Orizonti," was born at Antwerp in 1656; and as he studied at Rome, and always resided in some part of Italy, he is generally considered as an Italian artist. His works have been very much admired in every part of Italy, and bought at very high prices by the best judges. His first manner resembled that of Vander Cable; but he afterwards made nature his model, and more particularly the views about Tivoli, the subjects of many of his landscapes, in which he represents, with extraordinary truth and beauty, the mists arising from the agitated surface of the river below. His pictures are generally well designed, and well handled; and those of his best time are now considered as an ornament to the most select cabinets in Europe. A very capital picture of this excellent artist, in which the figures were inserted by Sebastian Conca, is in the collection of the earl of Moira. By this artist we have five small etchings, probably done for his amusement. They are "perspective views," apparently near Rome. Pilkington and Strutt.

BLOEMEN, PETER VAN, brother of the preceding, was born at Antwerp, and after living several years with his brother at Rome, and studying the works of the greatest masters, returned to his native city, where, in 1699, he was appointed director of the academy. The subjects of his pictures are the marchings of squadrons of cavalry, encampments, artillery, battles, Italian fairs, markets, and festivals, in which he manifests correctness of design and drawing, and an elegance in the manner of dressing his figures. His horses are designed in an admirable style, and in his battles they exhibit great spirit, graceful attitudes, and an expression full of life and nature. His landscapes are enriched with elegant architecture, with basso-relievos, and mutilated statues, in a noble taste; and they are rendered the more agreeable by a good tone of colour, animals of different kinds, and excellent figures. His best works are admired in all parts of Europe, and afford high prices; but some of them are too laboured, and less valuable. Pilkington.

BLOEMEN, NORBERT VAN, brother of the preceding, was born at Antwerp in 1672, and being allured by the reputation of his brothers to visit Italy, he there devoted all his hours to study. He principally painted conversations and portraits; but the colouring of his pictures is too glaring, and wants more truth and nature. Pilkington.

BLOIS, in *Geography*, lat. *Blesie*, a city of France, was, before the revolution, the capital of "Le Blaisois," the see of a bishop, suffragan to the archbishop of Paris, and formerly the residence of the kings of France; but is now the capital of the department of the Loir and Cher, and divided into east and west Blois, the former containing 5,400 inhabitants, and its canton 12,885, and the latter 7912, and its canton 11,862: the whole territory comprehends 237½ kilometres, and each canton has eight communes. Blois is seated in a pleasant country, on a small eminence near the river Loir, over which is a handsome stone bridge. The castle is the principal ornament of the city, and has, on the first view, the appearance of two distinct buildings, which are joined by a passage cut out of a rock. That part of the castle, which was built by the duke of Orleans, instead of that which he demolished in 1632, is a superb, but unfinished edifice. The court before it, where the church of St. Saviour is situated, is very large, and was formerly used for tournaments. The adjoining gardens are magnificent and beautiful. On every gate of the city is exhibited an image of the Virgin Mary, who is thought to have delivered the inhabitants from the plague in 1631. In this castle, famous as the birth-place of Louis XII., are shewn the chambers where the duke of Guise, and his brother the cardinal, were murdered by order of Henry III., December 23, 1587. The church of St. Solenne is the cathedral, which is a beautiful structure. The front of the Jesuits' college is decorated with the Doric, Ionic, and Corinthian orders of architecture. About three quarters of a mile from the city, water in great abundance descends through the clefts of a rock, in a large aqueduct, by which it is conveyed to a reservoir near the walls, and it is then distributed by leaden pipes to the several parts of the city. The trade of Blois consists chiefly of wine and brandy; though it has manufactures of ferges and ticken. Several kings have kept their courts at Blois, and the French language is spoken in the greatest perfection by its inhabitants. N. lat. 47° 35' 20". E. long. 1° 20' 10".

BLOIS, PETER OF, *Petrus Blesensis*, in *Biography*, an eminent writer of the 12th century, was born about the year 1120 at Blois in France, whence he derived his name; and as his parents were opulent, he enjoyed all the necessary means of a learned education. In his youth he studied in the university of Paris, where he manifested a strong inclination to poetry, and in his more advanced life, he applied with peculiar ardour to the study of rhetoric. At Bononia, in Italy, whither he removed from Paris, he acquired eminence by his knowledge of the civil and canon laws; and he appears also, by his writings, to have cultivated an acquaintance with medicine, and with various branches of the mathematics. But the principal object of his attention, and in which he is said to have particularly excelled, was theology, or the scholastic theology of the times, which consisted in vain attempts to prove and explain the numerous absurd opinions, which prevailed in the church, by the subtleties of Aristotelian logic. To him some have ascribed the first use of the term "transubstantiation," which was soon after adopted in the church of Rome. Being appointed preceptor to William II. king of Sicily, A.D. 1167, he obtained the custody of the privy-seal, and, next to the archbishop of Palermo, the prime minister, he had the greatest influence in all affairs. However, his power

power soon terminated; for, upon the banishment of the archbishop, A. D. 1168, he left the court of Sicily, and returned into France. From France he was invited into England, by Henry II. who employed him as his private secretary, made him archdeacon of Bath, and gave him some other benefices. After having spent a few years at court, he conceived a disgust at that mode of life, and retired into the family of Richard, archbishop of Canterbury, who made him his chancellor, about A. D. 1176. After the death of this prelate, A. D. 1183, he acted as secretary and chancellor to archbishop Baldwin, his successor; and was deputed by him on an embassy to Rome, A. D. 1187, in order to plead his cause before pope Urban III. in the famous controversy between him and the monks of Canterbury, about the church of Hackington. When Baldwin departed into the Holy Land, A. D. 1190, he was involved in various troubles in his old age, the causes of which are not distinctly known, and died about the end of the 12th century. From his works, which may be justly reckoned among the most valuable monuments of the age in which he flourished, and some of which may even now be read with profit, he appears to have been a man of approved integrity and piety, as well as of a lively inventive genius, and uncommon erudition. He is said to have dictated letters in Latin to three different scribes, on different subjects, and to have written a letter in the same language himself, at the same time. His printed works consist of 183 letters, which he collected together at the desire of Henry II.; of 65 sermons, delivered on various occasions; and of 17 tracts on different subjects; "Opera P. Blesens. Paris, edit. A. D. 1667," fol.; and afterwards printed in the *Bibliotheca Patrum*, tom. 24. *Cave Hist. Lit.* vol. ii. p. 333. Henry's *Hist.* vol. vi. p. 147, &c.

BLOKZYL, in *Geography*, a town and fort of Overijssel, situated at the mouth of the Steenwyk, or Old Aa, where it enters the Zuyder sea, with a harbour capable of containing 200 vessels; defended by six bastions, and erected by the Dutch, at the commencement of their republic, to defend them from the invasions of the Spaniards. N. lat. 52° 45'. E. long. 5° 45'.

BLOMARY, or **BLOOMARY**, the first forge in an iron-work, through which the metal passes after it is melted out of the ore. (See *IRON*.) They are also called *blomary-hearths*.

BLOMBERG, in *Geography*, a town of Germany, in the circle of Westphalia, and county of Lippe, which obtained its first privileges, in the beginning of the 14th century, from count Simon I.; 8 miles S. E. of Lemgow.

BLOMESHOLM, a manor of Sweden, in the district of Bohus, about 3 Swedish miles from Stromstadt, in which is a very ancient monument, consisting of large stones, set up perpendicularly, and arranged in the form of a ship.

BLONAI, a barony and castle of Switzerland, near Vevay, and about 1½ mile from the lake of Geneva.

BLOND, **LE**, **CHRISTOPHER**, in *Biography*, a painter, was born in 1670, but little noticed in the more early part of his life. He became known at Rome in 1716, and established his reputation in Italy, as a good painter of portrait in miniature. At Amsterdam he distinguished himself by painting small portraits, for bracelets, rings, and snuff-boxes, first in water colours, with a very lively and natural colouring, and afterwards in oil. From the Low Countries he came over to England, and projected a new manufactory for impressing colours on paper with copper-plates, which promised to be advantageous, but in the end proved detrimental to himself and his associates, to which his own dissolute life and manners very much contributed. His scheme was to copy the most

capital pictures in England, of the greatest masters, so as to give his prints the appearance of paintings in oil. Many of his prints were well executed, are still extant, and are held in estimation. It is said, however, that he was not the original inventor of this method of managing colours; but that he took it from Lastman, and others, who with equal capacities and more discreet conduct, had undertaken it before him, but failed of success. Pilkington.

BLONDEL, **DAVID**, a French protestant minister, eminent for his acquaintance with ecclesiastical and civil history, was a native of Chalons in Champagne, admitted minister in 1614, and settled at Houdan near Paris. His first work in favour of the Protestants was printed at Sedan in 1619, under the title of "Modeste Declaration, &c." or, "A Modest Declaration of the sincerity and truth of the reformed churches in France:" and intended as a reply to the invectives of the party of the bishop of Luçon, afterwards cardinal Richelieu. This work established his reputation among the Protestants, and occasioned his being much employed in their synods. He was not distinguished as a preacher; and his style, as a writer, was perplexed, and incumbered with parentheses; but his judgment was penetrating, his memory tenacious, and his erudition extensive. As an honorary professor, with a pension, to which office he was appointed by the synod of Charenton in 1645, he had opportunity to devote his time to literature; but though he undertook to refute Baronius's annals, it does not appear that he did much besides writing a few notes in his own copy of the work. His works were "Explications on the Eucharist;" a treatise concerning "The Primacy of the church;" "Pseudo-Isidorus et Turrianus vapulantes," against the Decretal epistles; a "Treatise on the Sibyls," disproving the truth of their oracles, and refuting the ancient practice of praying for the dead; and a treatise "De Episcopis et Presbyteris." By his treatise against the story of pope Joan, which he rejected as fabulous, he offended some Protestants, who did not wish to be deprived of this topic of satire against the Romish church. Among Blondel's works on civil history, we may reckon his "Genealogy of the kings of France against Chifflet," written in Latin, and printed at Amsterdam in 1654, 2 vols. fol. which is said to have been undertaken at the desire of chancellor Seguier; and his piece "De formula regnante Christo." On the death of Gerard Vossius, he was chosen to succeed him as professor of history in the schola illustris of Amsterdam, and took possession of his office in 1650; but his assiduity in the prosecution of his studies and change of air, occasioned the loss of his sight, after which, it is said, that he dictated his work intitled "Genealogy, &c." At Amsterdam his situation was rendered uneasy by a charge of Arminianism; and he died in 1655. *Gen. Dict.*

BLONDEL, **FRANCIS**, an eminent mathematician and military engineer, was born in 1617, at Ribemont in Picardy. In 1652, he was travelling governor to the young count of Brienne, and after a tour of three years he published an account of it in Latin. After his return he was advanced to considerable posts both in the army and navy, and he was employed in various negotiations with foreign princes. In 1659, being deputed by Louis XIV. as his envoy-extraordinary to Constantinople, he visited Egypt; and at the termination of his embassy, he was appointed counsellor of state, tutor in mathematics and belles-lettres to the dauphin, and one of the mathematical professors at the royal college. In 1655, he began to display his talents for architecture, when the court employed him to construct a bridge over the Charente at the town of Saintes. In 1669, he became member of the Academy of Sciences; and in 1670 he was honoured

honoured with letters patent from the king for the superintendance of all the public works in Paris. To him were intrusted the repair and decorations of the gates of St. Antony and St. Bernard; and the gate of St. Denis, one of the most finished pieces of French architecture, was designed and erected by himself. In the office of director and professor of the Academy of Architecture, established in 1671, he gave "A Course of Architecture," which was published in large folio, in 1698, and which was long considered as a standard book. In 1675, he presented to the king his treatises "On the art of throwing bombs," printed in 1685, 4to. and "On a new method of fortification," which procured for him the rank of marshal de camp. His other works were "Notes on the architecture of Savoy;" the "Resolution of four principal problems of architecture," Paris, 1676, fol.; "A Course of mathematics," Paris, 1683, 4to.; the "History of the Roman calendar," Paris, 1682, 4to.; and a "Comparison between Pindar and Horace." He also communicated several ingenious pieces to the Royal Academy of Sciences, which are inserted in their Memoires, particularly for the year 1666. He died at Paris, Feb. 1. 1686. Gen Dict.

BLONDEL, FRANCIS, was admitted doctor in medicine at Paris, the place of his birth, in 1632. As he had acquired considerable reputation as a scholar, he was engaged, on the death of Chartier, to assist in completing his magnificent edition of the works of Hippocrates and Galen, three volumes of which were left unfinished. He was an avowed opponent to the admission of antimony, and of all chemical preparations, into the practice of medicine, coinciding in that respect with his cotemporary and coadjutor, Guy Patin. In 1658, he was made dean of the faculty of medicine, which office he held the following year. In 1660, he published "Statuta facultatis medicine," Paris, 12mo.; and in 1665, an epistle to Alliot, "De cura carcinomatis, absque ferro et igne," 4to. Alliot used for the purpose a medicine prepared from the arsenicum rubrum, dissolved in aqua fortis, and precipitated with the acetum saturni. The precipitate was then washed by repeated affusions of warm water, and its causticity further mitigated by burning spirits of wine, in which it was immersed, until the powder became perfectly insipid. Blondel died Sept. 5th, 1682. Haller. Bib. Chirurg. et Med. Eloy Dict. Hist.

BLONDEL, FRANCIS, born at Liege in 1613, studied medicine at Cologne, and was for some time physician to the elector of Treves. On the death of that prince, in 1652, he went to Aix, and was appointed physician and superintendant of the baths in that city. In 1662, he published "Lettre de Francis Blondel a Jaques Didier, touchant les eaux minerales chaudes d'Aix, et de Borset, et les cures qui se font faites par son usage," Brux. 12mo.; and in 1671, "Thermarum aquigranensium, et porcetianarum descriptio," which was reprinted in 1688, in 4to. with engravings, and considerable additions. He died in 1703, much regretted by the inhabitants of Aix, having, by his writings, so recommended the waters, as considerably to increase the resort of patients there. Eloy. Dict. Hist.

BLONDEL, JAMES AUGUSTUS, of a French family, but born in England, and admitted licentiate of the college of physicians in London, about the year 1720; published, in 1727, "The strength of imagination in pregnant women examined, and the opinion that marks and deformities in children arise from thence, demonstrated to be a vulgar error," 12mo. Though Dr. B. had not put his name to this work, yet his neighbour and colleague Dr. Turner, discovering that he was the writer, and considering it as an attack upon what he had said on the subject, in the 12th chapter of his treatise on the diseases

of the skin, in which he gives numerous instances of marks and deformities in the bodies of children, impressed on them by the disturbed imaginations of the parents, thought himself called upon to explain and to defend what he had there advanced. He therefore, in an appendix to his treatise on gleans, published the following year, gave some additional observations on the subject, in further proof of the influence of the affections of the mother over the fœtus in utero. To this Dr. Blondel replied, in 1729, and with much humour, as well as argument, shewed the absurdity and fallacy of the opinion maintained by his antagonist; who, if he insisted on his point, must admit that animals, and even plants, are under the influence of the same affections; their fœtuses being frequently produced equally defective and monstrous as those of the human species. The answer is entitled, "The power of the mother's imagination over the fœtus examined, in answer to Dr. Daniel Turner's book, entitled, 'A Defence of the 12th chapter of his treatise, de morbis cutaneis.'" This drew a more serious reply from Dr. Turner, addressed immediately to his opponent, under the title of "The force of the mother's imagination upon the fœtus in utero still farther considered, in the way of a reply to Dr. Blondel's last book, by, &c." 1730, 8vo. But though the doctor supports himself with the authority of Schenckius, Hildanus, Horstius, and many other collectors of wonderful and extraordinary stories, the good sense of his antagonist prevailed, and he has the merit of having contributed very largely towards removing the prejudices on this subject, which had prevailed for ages, and, with them, the solicitude and anxiety which never failed to torment the minds of such women as had the misfortune, while pregnant, to see or hear any thing, strongly affecting their imaginations, lest their offspring should be born with some defect or deformity. It is now pretty generally known, that no such consequences follow, and that the few cases in which children are produced defective, with redundant parts, or in any way distorted, happen indifferently, where the mother has or has not, in the course of her pregnancy, received some shock or alarm. The power of the imagination in marking, distorting, or deforming the fœtus in utero is vanished, with the witches, ghosts, and hobgoblins, formerly equally objects of distress and terror. Haller. Bib. Chir. et Med. Pract. Eloy. Dict. Hist.

There is another writer of the name mentioned by bibliographers.

BLONDEL, JACQUES, surgeon of Lille in Flanders. He translated the Chirurgia militaris of Nicolas Godin, under the title of "La Chirurgie militaire, tres utile a tous ceux qui veulent suivre un camp, en tems de guerre, pareillement a tous autres en condition pestilente ou dysenterique, ecrite en Latin, par Nic. Godin," Anvers, 1558, 8vo.

BLONDEL, JOHN FRANCIS, was born at Rouen in 1705; and was known, not only as architect to the king, member of the Academy of Architecture, and royal professor of the art at the Louvre, but by several useful publications; as "A Discourse on Architecture," 12mo.; "A Treatise on the decoration of buildings," 1738, 2 vols. 4to.; "A Course of Architecture," 6 vols. 8vo. 1771—1773. The two last were published in 1777, 3 years after his death. M. de Bastide also published, in 1774, a posthumous work of Blondel, entitled, "L'homme du monde éclairé, par les Arts," 8vo. 2 vols. Blondel was the author of the articles relating to architecture in the Encyclopedie. He died Jan. 9, 1774. Encycl.

BLONDIN, PETER, a native of Picardy, born Dec. 18th 1682, was a disciple of Tournefort, by whose advice he travelled over Picardy, Normandy, and the Isle of France, to improve himself in botany. In the course of his excursion, he

discovered upwards of an hundred and twenty plants, which had not been before described, and several others, which had been supposed peculiar to America. In 1708, he was admitted doctor in medicine at Rheims; and, in 1712, he was received into the French academy, in quality of eleve of M. Reneaume, an honour he did not long enjoy, being cut off in the following year, by an inflammation of the lungs. M. Fontenelle, who spoke his funeral eulogium, attributed to him a small work, published in his life-time, in which he had made some corrections in Tournefort's arrangement of certain species of plants; he also says, he left some curious memoirs on the subject of botany, intended for publication, and which were prevented being printed by his premature death. But his name does not appear in Haller's Bib. Botan. nor in the catalogue of botanical works contained in the splendid library of sir Joseph Banks, lately published by Dr. Dryander. Eloy Dict. Hist.

BLONDVAURY, in *Geography*, a town of France, in the department of the Charente, 5 leagues east of Confolens.

BLONDUS, or BIONDI, MICHAEL ANGELO, in *Biography*, was born at Venice, May 4th 1497. After studying under Augustin Niphus, a celebrated teacher of that time, he settled at Naples. He was a voluminous writer. The titles of the most distinguished of his works follow. "Epitome ex libris Hippocratis de nova et prisca arte medendi deque diebus decretoriis," Romæ, 1528, 1545, 8vo.; "Libellus de morbis puerorum," Venetiis, 1539, 8vo.; "De partibus icthi sectis citissime sanandis, et medicamento aquæ, nuper invento. In plurimorum opinionem de origine morbi Gallici, deque ligni Indici ancipiti proprietate," Venetiis, 1542, 8vo. For wounds made with a cutting instrument, and recently inflicted, he recommends the application of simple water, as a most valuable and useful remedy. He does not admit that the venereal disease was a new complaint, originating in the West Indies, but believes it to have been known to Hippocrates, and other ancient physicians, and described in their writings. He had used the *lignum sanctum* in his attempts to cure the disease, but ineffectually; the disease returning, he says, after discontinuing the medicine, with increased violence. He placed his principal dependence on mercury, but does not give the rationale, or method of using it. This work is inserted by Conrad Gesner in his "Collectio scriptorum optimorum de chirurgia," 1555, fol. For the titles of the remainder of his works, see Eloy's Dict. Histor. Med. Astruc. de Morb. Vener. Haller. Bib. Med. Pract. et Botan.

BLONSK, in *Geography*, a district of Poland, belonging to the territory of Warsaw, in the palatinate of Czerk, or Masovia.

BLOOD, is the nutritive fluid of animals. In the human subject it circulates through the arteries and veins (see CIRCULATION), being of a scarlet colour in the former, and of a purple colour in the latter; it is of considerable consistence; of a slightly saline taste, and peculiar smell; its specific gravity is estimated at 1.0527. When blood is drawn into a basin, it first congeals into a tremulous, jelly-like mass; and then spontaneously separates into a solid, heavier substance termed the crassamentum, cruor, or the clot of the blood, and a supernatant pale liquor called the serum. If the crassamentum of the blood be washed with water, all the red colour may be washed out of it, and a firm whitish substance will remain. This substance, which did exist in a state of subtle fluidity, so as to be capable of permeating the minute vessels of the body, and which thus spontaneously concretes, has been, therefore, called the coagulating lymph of the blood. If the blood be stirred with a wisp,

this substance concretes in a fibrous form round about it, and it was in consequence formerly termed the fibrous part of the blood. By this latter denomination, it is also now generally known and described. Thus it appears, that there are three parts readily distinguishable in the blood; the serum; the fibrous part or basis of the crassamentum; and the colouring matter; to the more particular consideration of these we now proceed.

Of the Serum.

The Serum of the blood is of a light greenish yellow colour, and its mean specific gravity is estimated at 1.0287. If it be heated to about 165° of Fahrenheit's thermometer, the fluid serum becomes converted into a tremulous solid substance; which being cut in pieces and compressed, there can be squeezed out of it a muddy and somewhat glutinous fluid, which is termed the serosity of the blood. If the remainder be boiled, part of it will be found to be insoluble; and this has all the properties of albumen, or that insoluble matter which is contained in the white of the egg; for an account of which, see the article ALBUMEN. That part of the serum which is dissolved in boiling water, becomes a jelly, if the water be evaporated to a certain degree, and it be suffered to become cold. It is again soluble, if more water be added. This modification of animal matter is now termed gelatine, and to that article the reader is referred for a more full account of its properties. The serosity of the blood appears to contain animal mucilage, but no accurate chemical examination has as yet been made of it. The serum of the blood turns the syrup of violets green; which effect is owing to soda, that is contained in it. If coagulated serum be heated in a silver vessel, the silver becomes blackened by being converted into a sulphuret; in consequence of the serum containing sulphur. If the salts of the serum be dissolved in boiling water, and afterwards crystallized, they are found to be carbonat of soda, muriat of soda, phosphate of soda, and phosphate of lime.

Of the fibrous Matter of the Blood.

This matter spontaneously concretes in open and in close vessels, in the temperature of the animal, or in a much lower degree of temperature, though with some little variation as to the time in which the coagulation happens. Dilution of albumen by water prevents its coagulation, even by those chemical agents which suddenly and firmly coagulate it in its natural state, such as heat, spirit, and acids. No dilution of the blood by water has hitherto prevented even the spontaneous coagulation of its fibrous part. The basis of the crassamentum, or fibrous part of the blood, is found to be a whitish solid elastic substance, of greater specific gravity than the serum. This substance, which is insoluble in water or alcohol, and which resembles the muscular fibres in its chemical properties, has been denominated by the French chemists fibrine, or fibrina, to which article the reader is referred for a more particular account of it. It is tight however here to remark, that chemical analysis ultimately converts all animal substances into azot, hydrogen, and carbon; and that the proportion of the former is greater in the fibrous part of the blood than in albumen, or perhaps in any other animal compound.

Of the colouring Matter of the Blood.

The colouring matter of the blood has an attraction to water and dissolves in it, forming a transparent red liquor. This attraction is perceived in macerating flesh in water; for the colouring part, which is specifically heavier than any other part of the blood, and readily sinks in the serum, yet rises up and becomes dissolved in the water. The watery solution of this part of the blood turns the syrup of violets green, and contains both soda and albumen. If the red

part of the blood be incinerated by fire, it is found to contain much iron, which Fourcroy and Vauquelin discovered was combined with phosphoric acid in the state of subphosphate of iron; and this is the only part of the blood which is found in analysis to contain any of that metal. Fourcroy examined the blood of the fetus, and found that the colouring matter was darker and more abundant than in the adult subject. He also found that the blood of the fetus contained no fibrine, but much more gelatine than in the adult.

The colouring matter of the blood is found, by examination with the microscope, to be composed of very minute globular particles. They were particularly attended to by Leeuwenhoeck, and afterwards examined and described by others, chiefly by Senac, Hewson, and Fontana. They are so small as scarcely to admit of an accurate examination in this climate by the common microscope. This assertion will probably be readily admitted, if it be granted that they do not exceed a 200,000th part of an inch in diameter; yet such dimensions may be stated as the average estimate of their size, drawn from the accounts of various observers. Haller says, that he saw them as large as peas by the solar microscope, and it was by the aid of that instrument that we are enabled to give the following account of them. A drop of blood, much diluted with water, was put upon a micrometer or piece of glass, ruled by a diamond in squares of $\frac{1}{32}$ th of an inch, and put before the lens of the solar microscope. The squares were magnified upon the screen to eight inches diameter. The globules of the blood were seen undulating to and fro in vast numbers; they all appeared exactly of the same size; and a few which were separated from the rest were attentively examined. These had all the appearance of globules; they were circular in their disk, and were regularly illumined on one side, and shaded on the other, with the prismatic colours arranged in the middle or greatest convexity; the violet being next to the light, and the red next to the shade. On varying the focal distance of the lens, indeed, an alteration of appearance took place, some shading appeared in the middle just in the manner represented by Fontana. Upon again varying the position of the lens, the globules appeared as at first. This shadowy appearance, in the middle probably led Mr. Hewson to suppose that they contained a central solid particle. It is, however, generally admitted, that the colouring particles of the blood are spherical; and if their size be calculated from the preceding account, they will be found to be less in diameter than the 200,000th part of an inch.

If, for instance, the square of $\frac{1}{32}$ th of an inch be magnified to a square of eight inches, and the globules appear $\frac{1}{32}$ th of an inch in diameter, then 64 may be placed in a line on one side of the square, and $64 \times 64 = 4096$, is the number that will stand within that surface. Now, this square is but $\frac{1}{32}$ th of an inch, magnified on the screen to a square of 8 inches; then, multiply 4096 by 50, and it gives 204,800, as the number of these globules which would stand in the square of one inch.

The preceding account of the blood imperfect as it is, yet affords us much satisfactory information. We perceive that there are contained in the blood, in a state of subtle fluidity, the materials of which the body is constructed, and which are capable of becoming solid fibres of various degrees of solubility. We find in it also that aqueous liquor which fills all the interstices of the solid parts. It is true, that we find in the animal body many substances which do not exist formally in the blood, and which are new compounds of matter made out of that fluid; and for an account of which the reader is referred to glandular secretion.

With respect to that change which the animal matter undergoes from a fluid to a solid state, and which is called coagulation, but little is satisfactorily known. It seems to have been a problem amongst chemists. Scheele attributed it to the agency of caloric; Fourcroy, to that of oxygen; and Dr. Thomson has of late accounted for it, without supposing the addition of any other substance to the coagulated matter. With reference to the last opinion, it should be observed, that in coagulation, a change in the chemical properties of the coagulated substance takes place, which implies, that a chemical alteration has also taken place; and that even if the theory were true with respect to albumen, it will not account for the coagulation of the fibrine of the blood. Where chemistry fails to explain phenomena incident to living bodies, it is fair to inquire if life may not have some share in their production.

Mr. Hunter thought that the coagulation of the blood depended on its living powers, and supported his opinion by many ingenious arguments. To remove any objection which might be made to a fluid or unorganized substance being alive, he adverts to what happens with respect to the yolk and white of the egg, which, in consequence apparently of their possessing a principle of life, are preserved from putrefaction during incubation, and which resist the effects of heat and cold in a degree and manner similar to the lower kinds of animals. His chief arguments in evidence of the coagulation of the blood depending upon life are, that in some cases where death has been caused by lightning, or by violent fatigue in running, as in animals who are hunted to death, or by blows on the stomach, the irritability of the muscles has been destroyed, and the blood has remained fluid, and never coagulated. Mr. Hunter also mentions, that he mixed infusions of bitter vegetables, which are generally considered as tonics, with blood, and these did not retard its coagulation, but that a solution of opium had that effect. As a prosecution of this hint, the writer of the present article caused blood to be much diluted with water, and infusions of noxious vegetables to be stirred into it; yet in these experiments the fibrine still coagulated, and that in a sudden manner.

The vegetable infusions were those of opium, tobacco, and the atropa belladonna. It may be proper to relate the particulars of one of these experiments, in order to give a general idea of the whole. Eight ounces of blood were drawn from the arm into ten pints of water of 95° of Fahrenheit's thermometer, containing a strong infusion of the atropa belladonna. It was stirred with a glass rod; the two fluids appeared transparent and homogeneous. In eight minutes, the temperature being 93°, a considerable quantity of flocculent coagulum at once suddenly formed, and no additional coagulation afterwards took place. The thermometer was attentively observed, but no change was remarked in it during this coagulation. The gentleman who performed these experiments, wishing to repeat them with some variety in the mode of conducting them, observed, however, that heat was given out during the coagulation of the blood, as will be seen in the following experiment.

Ten ounces of blood were drawn into a wooden bowl, in which a thermometer was held. The temperature of the blood, while flowing from the vein, was 93°. In six minutes the thermometer had sunk to 89°, and coagulation commenced on the surface; on elevating the bulb of the thermometer to the coagulum on the surface, the quicksilver rose to 90 and $\frac{1}{2}$; on depressing it to the bottom of the bowl, it sunk to 89. This was repeated twice with nearly the same result, and on the third trial the quicksilver rose to 91°; and on depressing it again, it was perceived that the blood was coagulated

coagulated throughout. After this, the quicksilver regularly continued to descend, and was no longer influenced by changing the situation of the bulb of the thermometer.

With respect to the use of the red particles, Boerhaave supposed, that they might tend to keep the dissimilar parts of the blood incorporated, as shot agitated in a mixture of sand and water would prevent the subsidence of the former from the latter. It seems, however, no improbable opinion, that this is the matter which has the very peculiar properties of forcibly attracting oxygen gas, even through the medium of the blood vessels, and combining with it, and becoming in consequence of a scarlet colour, yet, of holding it so loosely as to part with it in the round of the circulation to carbon and probably to hydrogen, and thus contributing to the production of animal heat. The writer of the present article is of this opinion, because he has exposed the red parts of the blood to air containing oxygen gas, and always found the oxygen gas diminished in proportion to the quantity of blood which had acquired a scarlet colour by exposure to it. On the contrary, he has exposed the serum of the blood to similar kinds of air, and never perceived any abstraction of oxygen gas by that fluid. Thus probably we discover the principles of nutrition of the body and the cause of its heat. For a further account of the effects of respiration on the blood and its consequences, see LUNGS, *function of*.

Haller's elements of physiology may be consulted for an account of all that had been done respecting the investigation of the nature of the blood till his time; the works of Mr. Hewson and Mr. Hunter may be referred to for additional information on this subject; the works of Fontana, for microscopical observations; and for novel chemical experiments, the writings of Fourcroy, Vauquelin, &c. in the *Annales de Chimie*, and those of Deyeux and Parmentier in the *Journal de Physique*, and Dr. Thomson's excellent summary contained in his *System of Chemistry*.

BLOOD, *transfusion of*. See TRANSFUSION.

BLOOD, *injecting liquors into it*. See INJECTION.

BLOOD, *spitting of*. See HEMOPTYSIS.

BLOOD, *cooling of*. Lord Bacon has suggested that the prosecution of experiments on this subject might possibly lead to the means of prolonging life. But this great philosopher appears to have entertained erroneous notions respecting the animal economy, on this and some other points. Nothing accurate was known, in those days, on the subject of animal heat. If the blood were cooled below a certain standard, disease and death, and not longevity, would be the consequence. However, when the quantity of animal heat exceeds what is natural, the excess is carried off by an increased evaporation from the surface of the body, in other words, by perspiration. And in this way, or by the direct application of water of a low temperature to the skin, the blood, as well as every other part of the body, may be said to be cooled, and disease prevented or removed. But this is not what Lord Bacon meant in his proposal for cooling the blood.

BLOOD, *Depuration of*. See SECRETION.

BLOOD, *Flux of*, is called an HÆMORRHAGE. The periodical ones of women, MENSES. Those after child-birth, LOCHIA. That ordinarily happening on the first coition is by some called and considered as the test of virginity.

BLOOD, *staunching of*. See STYPTIC.

BLOOD, *vomiting of*. See HEMATEMESIS.

BLOOD, *Circulation of the*. See CIRCULATION.

BLOOD, *morbid alterations of*. The alterations which the blood undergoes in various diseases are such as claim the attentive observation of physicians. But, in order to form

a just conception of them, it is necessary previously to consider what are the component parts of this vital fluid, and their relative proportions, in the natural and healthy state.

By the accurate analyses of modern chemists it has been proved, that, besides water, and various saline matters (such as soda, phosphates of lime, of soda, and of ammonia, and muriates of soda and ammonia), the blood consists of what is termed fibrin, albumen (coagulable lymph), and a colouring principle, viz. oxyd of iron combined with phosphoric acid. These several materials constitute the fluid called blood, which, in its natural state, is kept in constant motion, under a temperature of 98° or 100° (in some animals the temperature is rather higher) of Fahrenheit's thermometer. A large proportion of fibrin, some albumen, and the colouring matter, constitute the cruor, or crassamentum; while the serum is composed of water, with a large proportion of albumen, and the saline substances above mentioned.

Now, it is probable, that considerable alterations take place in the relative proportions of these ingredients, whenever the living body, whether of man or brute, becomes long or violently disturbed in its action, and especially (as Mr. Hewson has shewn) whenever the energy of the vascular action is much increased. But in accounting for any remarkable alterations in the blood, there are several other circumstances, besides that of vascular action, which require to be noticed; and particularly the circumstances connected with respiration, such as the temperature, and purity or impurity of the surrounding air, its greater or less degree of humidity, &c. These, by their chemical agency, must have a considerable influence in the production of the various morbid alterations which take place.

Many variations, however, in regard to the relative proportion of the constituent parts of the blood, and other chemical changes in its qualities, which in all probability frequently take place, are not obvious to the senses, in some diseases, whilst in others they are very conspicuous: for instance, in pleurisy, peripneumony, acute rheumatism, &c. In these disorders, the blood drawn from the veins, and suffered to stand in the cup until it is cold, becomes covered with a tough buff-coloured coat, or size, and is usually called *inflamed*, or *inflammatory blood*. This size is formed (says Mr. Hewson) by the coagulable lymph (which consists of albumen and a portion of fibrin) being fixed or coagulated, after the red particles have subsided. The blood in these cases does not appear to be thicker, but on the contrary thinner than natural. It is slower in coagulating than healthy blood. The coagulation is owing to the action of the air. Perhaps in pleurisy, acute rheumatism, and other disorders belonging to the phlegmatic of notological writers, some chemical change is produced in the fibrous matter of the blood (see Fourcroy, *Connoissances Chimiques*, article *Sang*), whereby it is preternaturally softened or liquefied; or there may be an over-proportion of albumen, and that of an altered quality. Whatever be the real chemical difference, we cannot think with Mr. Hewson, that it is wholly occasioned by the increased force or energy of vascular action, since it sometimes occurs in cases where the action of the heart and arteries is not more vigorous than natural, and even where their action appears to be below the natural standard. Thus a size has been sometimes observed upon the blood drawn from patients affected with typhus (Parmentier and Deyeux in Fourcroy, as above referred to), and even on the blood taken from scorbutic patients. (Ibid.) And Mr. Hewson himself remarks, that it is a common occurrence in pregnant women. Increased energy of vascular action is doubtless a principal cause of the changes observ-

B L O O D.

able in fizy blood; but much is also to be ascribed, in this business, to the circumstances connected with respiration as before mentioned.

This fizy blood being so constantly seen in pleurisy, peripneumony, acute rheumatism, and other inflammatory diseases, it has been considered as a proof of the existence of inflammatory action in all other cases, wherein it has been observed; and has accordingly been deemed by many practitioners the best and surest test or index when venesection should be repeated or withheld, as also concerning the quantity of blood which should be drawn at each operation. But this is a very wrong mode of proceeding. We have shewn that this appearance (the size or buffy coat of the blood) is not restricted to disorders belonging to the class of phlegmasie, but that it occurs in other instances, where the free and frequent employment of phlebotomy would be useless, or even pernicious. Indeed, we have often found it necessary to repeat the use of the lancet, where this appearance of the blood has been wanting; and to abstain from a repetition of it, where it has been present. In regulating, therefore, the abstraction of blood, it is necessary to attend not only to the appearances of the blood, but more especially to the kind of inflammatory action, to the state of the pulse and respiration, to the degree and seat of the pain, and to the age and constitution of the patient. Further, the term inflammatory blood, as being liable to misconception and abuse, should be discontinued; and the expression *fizy blood*, or *blood with a buffy coat*, should be employed in its place. But if the term *inflamed blood* be improper, that of *putrid blood* is much more so. This was never yet drawn from any living animal, man or brute. Putridity is easily known. The smell affords an obvious test; but the chemical products obtained from animal substances in a state of putrefaction, are the surest tests. Yet those expert chemists, Messrs. Parmentier and Deyeux, could trace no marks of putridity in the blood taken from patients labouring under the worst forms of typhus, or what are commonly called putrid fevers. Such blood did not yield, by distillation in a water bath, any volatile alkali; nor in a moderate temperature did it run into putrefaction sooner than the blood of a healthy person. The blood in these cases, however, has its peculiar appearances; which, until we arrive at something more certain in regard to the cause thereof, we should be content to call *typhus-fever blood*. In like manner, the dark-coloured blood of scorbutic patients (which some ascribe to a deficiency of oxygen, and we would add of albumen also,) we should be content to call *scorbutic blood*, until we have better data to proceed upon. Again, it is conjectured that the pale colour and dilute quality of the blood, in chlorotic and dropical patients, may be owing to a deficiency of the colouring matter (iron) of the blood, as well as an under-proportion of the fibrous and albuminous matter. But we know not of any experiments by which this has been demonstrated. Hence we must for the present be content to name such blood *chlorotic* and *hydroptic blood*; taking care at the same time to have it understood, that in using these terms, it is by no means intended to convey the idea, that such a state of the blood is the cause of chlorosis or dropsy, but merely the concomitant of those disorders. Whoever wishes to investigate the subject of the morbid appearances of the blood more fully, should consult the writings of Hewson and John Hunter; and for what relates to the chemical part of the inquiry, Fourcroy.

BLOOD, *Uses of the*, are either in the animal œconomy (see BLOOD *Supra*, and LUNGS,) or in medicine, religion, diet, arts, manufactures, &c.

BLOOD, *mechanical and commercial uses of the*, are chiefly in agriculture, where it is found an excellent manure for fruit-trees; among lapidaries; in the manufacture of sugar, &c.; in building, boards are sometimes rubbed with blood to turn them brown. Some also pretend it has anciently been used in the mortar of old walls. Blood is the basis of that noble colour called by painters *Prussian Blue*. See PRUSSIC ACID.

BLOOD, *eating of*. This practice appears to have been prohibited to Noah (Gen. ix. 3, 4), which prohibition was renewed by Moses (Lev. xvii. 10—14.), and observed by the Jews, principally with a view to the use of sacrifices in divine worship, and as a token of respect to the altar, at which the blood of every victim was presented before God. The prohibition was repeated by the apostles at the council of Jerusalem (Acts, xv. 28, 29.), confirmed and defended by all the fathers except St. Augustin, and the universal practice both of the eastern and western churches till his time; and in many churches, even of the West, much longer, as low as the middle of the 10th, some say the 11th and even the 12th century. The practice of the primitive Christians seems to intimate that they understood the apostolical prohibition to be absolute and perpetual, as they abstained from the use of blood for many centuries. When they were charged with meeting in the night, and drinking blood, by way of binding one another to secrecy, in some immoral practices, Tertullian replies to this charge, that it was well known that no Christian would eat blood at all; inasmuch, that it was usual with heathens, when they wanted to know whether any person was a Christian, to set blood-puddings before him as a very sufficient test. Moreover, blood is not eaten by Christians in any part of the East, or by the Greeks, or Russians, who are of the Greek church, to this day; and it has been alleged, that the use of blood was not introduced into this western part of the world till a very late period. When the Pomeranians were converted to Christianity, in 1120, they were particularly enjoined to abstain from blood, as a badge of their profession. It was not allowed to be eaten in the West in the time of Bede, or a century afterwards; and blood was not eaten in any part of Swisserland, till Calvin introduced the practice from some other place. Dr. Lardner, however, says (*ubi infra*), that little regard was paid to these regulations of the apostolical decree by the Latin Christians, from the end of the fourth century.

The question is, whether the apostolical precept to abstain from blood, should be considered as only temporary and occasional, a sort of accommodation to the weakness of the Jewish converts; or perpetual, founded on moral principles, and consequently still obligatory. The former opinion seems the more probable, and is the most generally received. For the prohibition in the law of Moses, two reasons have been assigned; one is, that the blood was appointed to make atonement on the altar for offence against the law. The prohibition, according to this reason of it, must be restricted to Jews and others circumcised after the manner of Moses; for no other persons could offer sacrifices, or be cut off for transgressing the Levitical laws, but such as were of that people. The other reason is thus expressed: "It is the life of all flesh; the blood of it is for the life thereof." (Lev. xvii. 14.); that is, as some have interpreted the passage, it is the nourishment of the animal, and not fit for your nourishment; and because it was not fit for food, and was useless and offensive, therefore it was to be poured out upon the earth, or covered with dust, that is, buried in the earth; and this order is frequently repeated. Lev. xvii. 13. Deut. xii. 16. 24. xv. 23. Hence we may account for the conduct

duct of David, when his three warriors brought him water from the well of Bethlehem, at the extreme hazard of their lives (1 Chron. xi. 18.); considering the water as if it were their blood, which they hazarded to obtain it, he refused to drink it; and there being no rule or reason for offering such water upon the altar, he did what seemed to be next to offering it; "he poured it out before the Lord." The Jewish ordinance answered two obvious ends; it served, with other regulations and restrictions, to keep the Jewish people separate from other nations; and it also promoted their bodily health and vigour. But there is no foundation, either in the reason of the thing, or in the prohibition, to support the opinion of those who imagine the eating of blood to be an immoral thing; if this had been the case, God would not have permitted the Israelites (Deut. xiv. 21.) to tell a creature that died in his blood to an alien or stranger, that he might eat it. If, therefore, the eating of blood cannot be reckoned an immorality, the prohibition in the apostolical decree cannot be binding upon all men in all times, but only at some seasons, when the circumstances of things render forbearance or abstinence expedient. Accordingly, if blood be thought disagreeable and unwholesome, as food, the use of it may be avoided for the sake of health; but we are not obliged to abstain from it upon a religious account, or in virtue of this decree, which would be no better than superstition. It has been supposed, by some approved writers, and especially by Dr. Lardner, that this was only a temporary provision, designed to prevent giving offence to the believing Jews, and to facilitate civil converse and religious communion between believing Jews and Gentiles. Dr. Lardner also supposes that the decree is not to be understood as a precept or commandment, but as delivering advice and counsel concerning some matters of prudence and expedience, considering the circumstances of things and persons in that time. It has been farther urged as an argument against the perpetuity of the apostolical decree, that the apostle Paul never quotes, or alludes to it in his writings.

On the other hand it has been argued, that the prohibition to eat blood, given to Noah, seems to be obligatory on all his posterity: and as it accompanied the first express grant of animal food, it seems to be reserved, by way of acknowledgment to God, as the giver of life, and of the food which supports it. This respect paid to blood, which is shed when animals are killed for food, and which is the most apparent vehicle of life, may also be intended to inculcate a respect for life, as the most valuable gift of God, and to warn us not to deprive any animal of it, and much less man, without necessity. It has also been pleaded, as an additional argument for abstaining from blood, that it is not a wholesome aliment, especially in hot countries, promoting leprous and scorbutic disorders. The advocates of this opinion farther argue, that blood is prohibited because it tends to make men savage; that the prohibition is joined with that of fornication, which is an immorality in the common sense of the term, but which Dr. Lardner understands as denoting marriage with heathens, from which the apostle Paul so earnestly dissuades the Christians at Corinth: and that God has enjoined abstinence from blood on all Christians, in order to manifest his supreme dominion over all their enjoyments. Helden, de Jure Gentium, &c. l. vii. c. 1. Shuckford's Conn. vol. i. p. 93, &c. Lardner's Remarks on Dr. Ward's Dissertations in works, vol. xi. p. 329, &c. Priestley's Institutes, vol. ii. p. 439, &c.

Blood, *religious uses of*. Among the ancients, blood was used for the sealing and ratifying of covenants and alliances, which was done by the contracting parties drinking

a little of each other's blood; for appeasing the manes of the dead, in order to which blood was offered on their tombs, as part of the funeral ceremony. Thus we read, that twelve youths were sacrificed at the funeral of Patroclus: and eight at that of Pallas. Homer. Il. φ. ver. 27. Virgil. Æn. lib. x. ver. 518.

The blood of victims was the portion of the gods, both among Jews and Heathens; and accordingly was poured or sprinkled on the altars, in oblation to them.

Some have asserted, that the Romans offered human blood to appease their deities, which is denied by others.

The priests made another use of blood, viz. for divination: the streaming of blood from the earth, fire, and the like was held a prodigy, or omen of evil.

The Roman priests were not unacquainted with the use of blood in miracles; they had their fluxes of blood from images, ready to serve a turn; witness that said to have streamed from the statue of Minerva at Modena, before the battle at that place. But in this their successors have gone beyond them. How many relations in ecclesiastical writers of Madonas, crucifixes, and wafers bleeding! At least the liquefaction of the blood of St. Januarius, at Naples, repeated annually for so many ages, seems to transcend by far all the frauds of the Grecian or Roman priesthood. But the chemists are got into the secret, and we find M. Neumann at Berlin performed the miracle of the liquefaction of dried blood, with all the circumstances of the Neapolitan experiment. See JANUARIUS.

BLOOD, in the *Romish Church*, is used in speaking of the wine in the eucharist; which they suppose miraculously converted, by the priest's consecration, into the real blood of Christ. See TRANSUBSTANTIATION, &c.

BLOOD, is also used abusively for the sap of plants; as having much the same office, in the vegetable, as the other in the animal œconomy. In a sense not unlike this, wine is sometimes also denominated the *blood of the grape*.

BLOOD is also applied, in *Pharmacy*, to certain vegetable juices, tears, &c. as dragon's blood gum. Dragon's blood, *sanguis draconis*, is also used by the Arabs for the juice of the anchusa.

BLOOD, *satyrion*, a ruddy liquor produced from the roots of *satyrium*, baked with bread; and liquefied, as it were, into blood, by a long digestion.

BLOOD, in *Chemistry* and *Alchemy*, is a denomination given to several artificial compositions, chiefly on account of their red colour.

BLOOD is more peculiarly used by the alchemists for the tincture of a thing. In which sense we meet with *blood of mercury*, denoting the tincture of it; dragon's blood, denoting the tincture of antimony.

BLOOD, *Dragon's*. See DRAGON'S BLOOD.

BLOOD is also used, in *Middle Age Writers*, for supreme jurisdiction, exercised by the lord of the fee, in cases where blood is spilt. This is also called "judgment of blood," "justice of blood," sometimes "cognizance of blood."

BLOOD, *avenger of*, among the Jews, was the next of kin to the person murdered, who was to prosecute the murderer. Ecclesiastical judges retire when judgment is to be given in cases of blood, because the church is supposed to abhor blood: it condemns no person to death; and its members become irregular, or disabled from their functions, by the effusion of blood.

BLOOD of *Christ*, is the denomination of a military order instituted at Mantua, in 1698, by Vinc. Gonzangua IV. Its device was "Domine probasti me;" or, "Nilhil hoc triste recepto." Herment speaks of this order, and observes that it took its name from some drops of the blood of Christ

said to have been preserved in the cathedral church of Mantua. The number of knights was restrained to twenty, besides the grand-master; the office whereof was annexed to himself and his successors.

BLOOD, in *Farricry*, denotes a distemper in cattle's backs, which makes them in going draw their heads aside, or after them; the cure is by slitting the length of two joints under the tail, and thus letting the beast bleed plentifully. If he bleed too much, the farriers knit his tail next the body, and then bind salt and nettles bruised on the part.

BLOOD-running itch, is a species of itch in a horse, proceeding from an inflammation of the blood by over-heating, hard riding, or other fore labour; which getting between the skin and flesh, makes the beast rub and bite himself; and if let alone, sometimes turns to a grievous mange, highly infectious to all nigh him.

BLOOD, field of, in Syriac *aceldama*, was a field purchased by the Jews, with the thirty pieces of silver which had been given to Judas for betraying his master, and which he had restored. It still serves for a burial-ground, in which all pilgrims, who die in their pilgrimage at Jerusalem, are interred. See *ACELDAMA*.

BLOOD-flower, in *Botany*. See *HÆMANTHUS*.

BLOOD-hound. See *HOUND*.

BLOOD-letting. See *BLEEDING*.

BLOOD, precious, in *Ecclesiastical History*, a denomination given to a reformed congregation of Bernardine nuns at Paris, first established under that name in 1661.

BLOOD, Princes of the, in France, are those descended from the blood royal.

BLOOD-spotten, in *Surgery*, a distemper of the eyes, wherein the blood-vessels are greatly distended, so as to make the eyes appear red. See *OPHTHALMIA*.

BLOOD-stone. See *HÆMATITES*.

BLOOD of sulphur, *sanguis sulphuris*, is a preparation of liver of sulphur, ground with the oil of tartar *per deliquium*, then digested with dulcified spirit of nitre. It is reputed a good pectoral and diuretic, but rarely prescribed.

BLOOD-vessels, in *Anatomy*, usually include only the veins and arteries; though, in a larger sense, all the vessels in the body, as the nerves, lymphatics, &c. to the very hair, may be comprehended under the denomination. See *ARTERY*, and *VEIN*.

BLOOD-snake. See *Blood-SNAKE*.

BLOOD-wite, in *Ancient Law Writers*, signifies blood, and a customary amercement paid as a composition for the shedding or drawing of blood.

The word is also written *blodwite*, *blodwita*, *blodwyta*, *blodwüt*, *blodwüt*, *bloudwüt*, and *bluidweit*; and is formed from the ancient Saxon *blud*, *blood*, and *wite*, or *wite*, a *fine* or *penalty*.

The word also denotes an exemption from this penalty, granted by the king to certain persons and communities, as a special favour. Thus, king Henry II. granted to all tenants within the honour of Wallingford—"Ut quieti sint de hidagio et blodwite et bredwite."

BLOOD-wood. See *HÆMATOXYLON*.

BLOOD-wort or *Bloody Dock*, in *Botany*. See *RUMEX*.

BLOOD, Corruption of, in *Law*. See *CORRUPTION of Blood*.

BLOOD, inheritable, denotes such a regular descent as gives a person legal right to inherit the estate of an ancestor. See *ATTAINDER*, *ESCHEAT*, *INHERITANCE*, &c.

BLOOD, Restitution in. See *CORRUPTION of blood*, and *PARDON*.

BLOOD, Royal, is applied to the regular descendants of the royal family. See *ROYAL Family*.

BLOOD, whole and half; a kinsman of the whole blood

is he that is derived from the same pair of ancestors; whereas a person of half blood descends from either of them singly, by a second marriage. Blackst. Com. vol. ii. p. 227. See *DESCENT*.

BLOODY CRIME, *Sanguineum Crimen*, in *Writers of the Middle and Barbarous Age*, that which is punished with the blood or life of the offender.

BLOODY Flux, in *Medicine*. See *DYSENTERY*.

BLOODY Hand, in *Law*, one of the four kinds of trespasses in the king's forest, by which the offender being taken with his hands or other part bloody, is judged to have killed the deer, though he be not found either hunting or chasing. In Scotland, in such crimes, they say, taken in the fact, or with the red hand. See *BACKBEROND*.

BLOODY-beel Cock. See *HEELER*.

BLOODY Island, in *Geography*, an island in the harbour of Port Mahon, in the island of Minorca.

BLOODY Point, a cape on the south-west coast of the island of St. Christopher's. N. lat. 17° 24'. W. long. 62° 41'.

BLOODY Bay, a bay on the north side of the island of Egnont, or New Guernsey.

BLOODY-Farland Point, a remarkable head-land on the northern coast of the county of Donegal, Ireland, nearly opposite to Tory island. N. lat. 55° 9' 30". W. long. 8° 11'. M^cKenzie. Beaufort.

BLOODY Rains. See *RAIN*.

BLOODY Sweat. Many instances of this are recorded, in which it has been owing to bodily disorder, or extreme mental agitation and agony. See particularly Aristotle's Hist. Animal. lib. iii. cap. 19. apud Oper. tom. ii. Thuanus Hist. Temp. &c. lib. ii. apud Oper. tom. i. Melanges d'Histoire et de Literature, &c. par M. V. Marville, tom. iii. p. 149. Acta Physico-Med. Norimbergæ, vol. i. p. 84. and vol. viii. p. 428. See *AGONY*.

BLOODY Urine, in *Medicine*. See *HÆMATURIA*, and *URINE*.

BLOOM, in the *Iron works*, a term used by the miners for a four-square mass of hammered iron, about two feet long, and three quarters of a hundred weight, made from part of a sow of cast iron. The bloom, however, is not yet become iron fit for the smith's use, but must undergo many hammerings, and be first made what they call the *ancony*; which see.

BLOOM, half, a round mass of metal, which comes out of the fiery of an *iron work*. See *BLOMERY*.

BLOOMS, in *Sea Language*, hot burning winds, blowing from the land to the sea.

BLOOMFIELD, in *Geography*, a township of America, in Ontario county, New York. By the state census of 1726, 151 of the inhabitants were electors.

BLOOMING VALE, a tract of land, in the township of Manlius, and state of New York, or Butternut creek.

BLOSSOM, in a general sense, denotes the flower of any plant. See *FLOWER*. In a more proper sense, the word is restrained to the flowers of trees, which they put forth in the spring, as the forerunners of their fruit, otherwise called their *bloom*. The office of the blossom is partly to protect, and partly to draw nourishment to the embryo fruit, or seed. Phil. Trans. N° 399. p. 329.

BLOSSOM, in *Botany*, denotes one of the parts of a flower. See *COROLLA*.

BLOSSOM is also used in the *Manège*, for the colour of a horse, which has his hair white, but intermixed all over with sorrel and bay hairs, called also *peach-coloured*.

Horses of this colour generally are hard and insensible, both in the mouth and the flank; so that they are little valued; besides they are apt to turn blind.

BLOSSOM, in respect of sheep. See *BLISSOM*.

BLOT L'ÉGLISE, or *Blot à Roche*, in *Geography*, a town of France, in the department of the Allier, 10 miles W. of Gannat.

BLOTTED China Ware, a name given by some to a sort of china that is loaded with colours in an irregular manner. This pleases some people, but it is a defective sort of ware, the large blotches of colours having been only laid on to cover the blemishes or faults in the first baking.

BLOTNO, in *Geography*, a town of Lithuania, in the palatinate of Wilna, on the river Rawie, 16 miles N. of Lida. N. lat. 54° 5'. E. long. 25° 34'.

BLOTTING PAPER, a species of paper, made without size or stiffening, serving to imbibe the wet ink in books of account, and prevent its setting off, or blotting the opposite page.

BLOTTING-book, a sort of minute book, or memorandum book, used by some merchants for making imperfect entries in a present hurry, which are to be copied out fairer and fuller at sight into the journal.

BLOUNT, THOMAS, in *Biography*, a learned English writer, was born at Bordesley, in Worcestershire, in 1619; and, without the advantage of an university education, made a considerable progress in literature. By profession he was a barrister of the Inner Temple. Upon the breaking out of the popish plot in the reign of Charles II., he was much alarmed on account of his being a zealous Roman Catholic, and seized with a palsy, which terminated in his death, in 1679. His works were numerous, and are as follow: viz. "The Academy of Eloquence;" "Glossographica, or a dictionary interpreting such hard words, Hebrew, Greek, Latin, Italian, &c. introduced into the English tongue," 1656, 8vo; "The Lamps of the Law, and the Light of the Gospel, &c.;" "Boscobel, or the History of his Majesty's Escape after the battle of Worcester," 1660, 8vo; the second part was printed in 1681, 8vo; "The Catholic Almanac for 1661, 62, 63, &c.;" "Booker refuted," or Animadversions on Bocker's Ephemeris, 1665, 4to.; "A Law Dictionary," 1671, fol.; "Animadversions upon sir Richard Baker's Chronicle, &c." 1672, 8vo; "A World of Errors discovered in the New World of Words, &c." 1673, fol.; "Fragmenta Antiquitatis, ancient tenures of lands, &c." 1679. Biog. Dict.

BLOUNT, SIR HENRY, was born at the seat of his father sir Thomas Pope Blount, at Tittenhanger, in Hertfordshire, in 1602; and having completed his education at Trinity college, Oxford, he commenced the study of the law at Gray's Inn. Being resolved to travel, he set out on his tour in 1634, and visited the Turkish dominions in Europe, and also several parts of Egypt. After a long stay at Grand Cairo, he returned to England, in 1636, and published an account of his travels under the title of "A Voyage into the Levant, &c." Lond. 1636, 4to. which had a rapid sale, though it was not held in high estimation by the most competent judges. Charles I. appointed him one of the band of pensioners; and, on his father's death, in 1638, he succeeded to the family seat at Blount's hall in Staffordshire, and a considerable estate. In the civil war he joined the royal party; but abandoning the royal cause, he was well received in London by persons in power. In 1651, he became one of the committee for reforming the practice of the law; and he was very zealous against tythes, and for the reduction of the stipends of all parish ministers to an equal and moderate provision. His general knowledge recommended him to the office of one of the commissioners for advancing the trade and navigation of the commonwealth. His brother's death, in 1654, made way for his succession to the Hertfordshire estate. At the Restoration he was

favourably received by the king; and in 1661 he served the office of high-sheriff for the county of Herts. From this time, till his death in 1682, he lived as a retired English gentleman; but he seems to have acquired from his travels an inclination to freedom of opinion, and to have adopted several singular and paradoxical notions. Six comedies, entitled "Court Comedies" and published under the name of John Lilly, have been ascribed to him. Biog. Brit.

BLOUNT, SIR THOMAS POPE, eldest son of the preceding, was born at Upper Holloway, near London, in 1649, and educated under the immediate inspection of his father. Having established an early reputation for learning and worth, he was created a baronet by Charles II. in 1679. He represented first the borough of St. Alban's, and afterwards the county of Herts, and was always esteemed as a friend of liberty, and a true patron of literature. Of his erudition he gave evidence in his learned work, entitled, "Censura Celebrorum Authorum," printed at London, in 1690, folio, and reprinted at Geneva in 1694 and 1710, 4to. This work is an accurate and useful compilation, containing an account of the characters and writings of both ancient and modern authors. His work "De Re Poetica," published in 1694, 4to. is a similar compilation, comprehending an account of ancient and modern poets. His "Natural History," printed 1693, 12mo. is a kind of common-place book, containing observations, many of which are uncommon, selected from the best modern writers. Of his talents as an original writer, we have a specimen in his "Essays on several subjects," 8vo. in which he discusses many curious points; such as the influence of the priesthood; the regard due to the ancients; the variety of opinions; the uncertainty of human knowledge; the effects of custom and education, &c. He died at Tittenhanger in 1697, and left a numerous family. Biog. Brit.

BLOUNT, CHARLES, brother of the preceding, was born at Upper Holloway in 1654, and possessed distinguished talents, which were assiduously cultivated by his father, who assumed the direction of his studies. As he was the favourite of his father, he encouraged his marrying and settling in an independent estate at the early age of eighteen years. If we except a little treatise, published without his name, and entitled "Mr. Dryden vindicated, &c." his literary career commenced in 1678 or 1679, with the publication of his "Anima Muodi, or an historical narration of the opinions of the ancients concerning man's soul after this life, according to unenlightened nature;" in the composition of which he is said to have been assisted by his father. This work contained free opinions, which gave great offence; and though it had been previously licensed, was suppressed by order of Compton, bishop of London; and during his absence burned by some officious zealot. Several answers to it were written; and it was particularly animadverted upon in the second volume of Nichols's Conference with a Theist. In the same year Mr. Blount published some extracts from Hobbes's Leviathan, in a single sheet, entitled "Mr. Hobbes's last Words and dying Legacy;" and intended to expose, probably, the political principles of this writer. To these, his ardent zeal for liberty rendered him peculiarly adverse; and his zealous attachment to this cause was soon after manifested in a pamphlet, under the signature of "Junius Brutus;" designed to alarm the nation with regard to a popish plot, and the prospect of a popish successor to the crown. In 1680 he published his translation of "the Two First Books of Philostratus, concerning the life of Apollonius Tyanæus, with philological notes on each chapter," fol. which, being considered as a dangerous attempt to reproach and injure the Christian religion, was immediately suppressed, so that

few copies of it could be obtained. This was followed, in the same year, by a work entitled "Great is Diana of the Ephesians, or the Original of Idolatry, together with the political institutions of the Gentiles' Sacrifices;" which, though professedly written against the impositions of the Heathen priests, was thought to be aimed at the Christian priesthood, and indirectly against all revelation. The author was now considered as the head of the Deistical sect, and he is charged with having taken great pains, by conversation and correspondence, to propagate and defend his opinions. In a letter to Dr. Sydenham, however, he acknowledged, that in point of practice, Deism was less satisfactory than the Christian scheme. The clamour occasioned by his former publications made him somewhat more cautious and reserved; and accordingly he studiously concealed his being the author of a treatise, entitled "Religio Laici," published in 1683, and laid, by Dr. Leland, in his Deistical writers, vol. i. p. 37. to be little more than a translation of Lord Herbert's work, under the same title; and he also abandoned the design which he had formed of writing a life of Mahomet. From this time he seems to have changed the objects of his study; for in 1684 he published "Janua Scientiarum; or an Introduction to Geography, Chronology, Government, History, Philosophy, and all genteel sorts of learning;" 8vo. which was intended to assist young persons at an early age in the acquisition of principles of philosophy and science, without pursuing the tedious course that had been usually prescribed to them in schools.

Mr. Blount was one of those who cordially concurred in the revolution; and in a letter addressed to W. Leveson Gower concerning corporations, and inserted in the "Oracles of Reason," he expresses his wish, that those counsellors of the late king, who had injured the independence of parliament, might be punished, justly considering the purity of representation as the essence of a free constitution. About this time he wrote his treatise entitled "A Just Vindication of Learning, and of the Liberty of the Press;" which is esteemed one of his best performances, and a summary of all the principal arguments that can be urged upon this topic. In his zeal for the cause of king William, he wrote a pamphlet in 1693, intended to prove the right of William and Mary to the crown, on the ground of conquest; and in explanation of this design, so dissonant, one would imagine, with his principles, and no less obnoxious than ill-founded, he declares that he wrote "with an especial regard to such as have hitherto refused the oath, and yet allow of the title of conquest, when consequent to a just war." By this performance he gave such offence, that, on a complaint being brought before the house of commons against this pamphlet, entitled "William and queen Mary Conquerors," it was ordered to be burnt by the hands of the common hangman; and in the same censure was involved a pastoral letter of bishop Burnet, in which the same notion was advanced, probably with the same views.

Mr. Blount, having lost his wife, became ardently enamoured of her sister, a lady of great beauty and merit, who seemed disposed to return his affection; but as the ecclesiastical laws opposed their union, he drew up a case strongly argued, and referred it to certain divines, who of course gave their opinions against his wishes. As the lady refused to comply, after such a determination, Mr. Blount sunk into despair, and at length shot himself through the head.

After this act of phrensy, he languished for some days, receiving no nourishment but from the hands of the object of his affection, till at last death released him, August 1693. Many of his private letters and some small tracts were published, together with a preface, by Gildon, in 1693, before the author's death, in a work entitled "The Oracles of

Reason;" which was afterwards re-printed, with some additional pieces, after his decease, in 1695, in a collection of "The Miscellaneous Works of Charles Blount, esq." by the same Mr. Gildon, who prefixed to it an account of the life and death of the author. The learning of Mr. Blount is unquestionable, and he seems to have possessed a strong and ardent mind; but his early dislike of superstition precipitated him into some very considerable errors, and inclined him to believe all revealed religion to be priestcraft, because he perceived that some priests had converted religion to their own secular advantage. His sentiments on the subject of religion were divulged in his writings without disguise, and sufficiently warrant our referring him to the class of deists; but the charge of atheism alledged against him by some foreign divines, is certainly unfounded. See an account of Mr. Blount's writings by Dr. Leland, in the fourth letter of his View of the Deistical Writers, vol. i. By this author we are informed that Mr. Gildon, who published the "Oracles of Reason," and communicated them to the world, was afterwards, upon mature consideration, convinced of his error, and in 1705 published his retractation in a book, entitled "The Deist's Manual." The greatest part of this book is intended to vindicate the doctrines of the existence and attributes of God, his providence and government of the world, the immortality of the soul, and a future state. And his avowed reason was, because many of the deists, with whom he was well acquainted, did really deny those great principles, which lie at the foundation of all religion, or at least, represented them as doubtful and uncertain. And their not admitting natural religion in its just extent, formed some of their principal prejudices against the Christian revelation. Biog. Brit.

BLOUNT, in *Geography*, a new county of the State of Tennessee, in America, bounded southerly by lands retained by the Indians. It contains 5526 inhabitants, of whom 339 are slaves.

BLOUNTSVILLE, a town of America, in North Carolina, on the post-road from Halifax to Plymouth, 49 miles from Plymouth, and 55 from Williamstown.

BLOW, in a general sense, denotes a stroke given either with the hand, a weapon, or instrument. The effect of a blow is estimated like the force of percussion, and accordingly it is expressed by the velocity of the body multiplied by its weight.

In *Fencing*, blows differ from thrusts, as the former are given by striking, the latter by pushing. We say to give, to return, to parry a *blow*. (See PARRYING.) Blows on the sword make a kind of pursuit, called BEATING.

BLOW, *blind*, *idus orbis* or *cæcus*, is that which does not appear, or is not attended with effusion of blood; in contradistinction from that followed by a wound, discolouring, *tumour*, or the like, called *idus apertus* or *apparens*, an open *blow*.

In the ancient laws, we find blows for remembrance, given to make persons remember some transaction, and enable them to become better witnesses of it in future times.

BLOW, *military*, *alapa militaris*, that given with the sword on the neck or shoulder of a candidate for knighthood, in the ceremony of dubbing him. The custom seems to have taken its rise from the ancient ceremony of manumission.

In giving the blow, the prince used this form: "esto bonus miles;" upon which the party rose a complete knight, and qualified to bear arms in his own right. Sometimes a double or even triple blow was given, called *trina percussio*.

BLOW, DR. JOHN, in *Biography*, born at North Collingham, in Nottinghamshire, was one of the first set of children of the chapel royal after the restoration, that was brought up under captain Cook. He likewise received instructions

from Hingeston, domestic organist to Oliver Cromwell, and Dr. Christ. Gibbons. In 1673, he was sworn one of the gentlemen of the chapel; and in 1674, upon the decease of Humphrey, appointed master of the children. In 1685, he was nominated one of the private music to king James II. and in 1687, he was likewise appointed almoner and master of the choristers in the cathedral church of St. Paul: but, in 1693, he resigned this last place in favour of his scholar Jeremiah Clark.

Blow had his degree of doctor of music conferred on him by the special grace of archbishop Sancroft, without performing an exercise for it in either of the Universities. On the decease of Purcell, in 1695, he was elected organist of St. Margaret's, Westminster; and, in 1699, appointed composer to the chapel of their majesties, king William and queen Mary, at a salary of 40*l.* a year, which afterwards was augmented to 73*l.* A second composer, with the like appointment, was added in 1715, when John Weldon was sworn into that office; at which time it was required that each should produce a new anthem on the first Sunday of his month of waiting.

That Blow was a composer of anthems, while a singing-boy in the chapel royal, appears from Clifford's Collection of the Words of the Services and Anthems used in our collegiate and cathedral churches, 1664; for among the ecclesiastical composers mentioned in this book, amounting to upwards of sixty, are included the names of Pelham Humphrey, John Blow, and Robert Smith, children of his majesty's chapel. Humphrey was born in 1647, and Blow in 1648; so that at the restoration, the first being only thirteen, and the second but twelve, their composing anthems fit for the chapel royal, before they had attained the age of sixteen or seventeen, would now be regarded as wonderful proofs of precocity, if Purcell, soon after, at a more early period of his life, had not produced compositions that were still superior to these.

Dr. Blow died in 1708, at sixty years of age: and though he did not arrive at great longevity, yet, by beginning his career, and mounting to the summit of his profession so early, he enjoyed a prosperous and eventful life. His compositions for the church, and his scholars who arrived at eminence, have rendered his name venerable among the musicians of our country.

Though his church music was never collected in a body, yet, besides the three services and ten full and verse anthems printed by Boyce, in Dr. Tudway's MS. collection, nineteen of his choral productions have been preserved; and in Dr. Aldrich's collection in Christ-church there are five more. The aggregate of which, amounting to upwards of forty different compositions of this elaborate kind, is but a small part of what might be found in the chapel and choir-books of our cathedrals.

Some of his choral productions are doubtless in a very bold and grand style; however, he is unequal, and frequently unhappy, in his attempts at new harmony and modulation; but, as a composer who ranked so high among our most classical masters should not be praised or censured indiscriminately, we shall point out a few instances of his great, and to our conceptions, unwarrantable licentiousness, as a counterpart.

We are as sorry to see, as to say, how confused and inaccurate a harmonist he was; but as it is necessary to speak of an artist so celebrated and honoured by his contemporaries, to dissemble his faults would surpass candour, and incur the censure of ignorance and partiality; for it is as much the duty of an historian to blame as to praise, when justice and integrity require it. Indeed, upon whatever subject a man

writes, he should aspire at nothing so much as speaking truth, if he wishes for the approbation of his conscience, which is not only the most comfortable of all praise, but, luckily, the most within his own power. The abilities of the dead, we can have no interest in depreciating; and if our opinion should be unjust, the mischief will recoil on ourselves; for the dead have more friends than the living, who are ever ready to vindicate such wrongs.

Though there are strokes of pathetic and subjects of fugue in Blow's works that are admirable; yet we have examined no one of them that appears to be wholly unexceptionable, and free from confusion and crudities in the counterpoint. Of the two-part anthem with choruses, "Lord how are they increased," the first movement is very plaintive and expressive; but there are licences in the harmony which look and sound quite barbarous. Indeed, these crudities are so numerous as to throw a doubt on his learning, as well as genius. Whether they are notes of passion, effusions of an unruly spirit, or of ignorance and affectation, we will not venture to determine; but to our ears, they have the full effect of jargon and want of principles.

It does not appear that Purcell, whom he did himself the honour to call his scholar, or Crofts, or Clark, his pupils; ever threw notes about at random, in his manner, or insulted the ear with lawless discords, which no concords can render tolerable.

In an anthem, "Turn thee unto me, O Lord," printed by Henry Playford in the second collection of Divine Harmony, there are so many wanton violations of rule, particularly in the last chorus, that it would be endless to point them out; but they seem such as no rule, authority, or effect, can justify; 7ths resolved on the 8th, ascending and descending; 2ds treated with as little ceremony as 3ds. Indeed, we never saw so slovenly a score in print; and it may, in general, be said of his faults in counterpoint, that there are unaccounted millions of them to be found in his works.

He has been celebrated by Dr. Boyce, for "his success in cultivating an uncommon talent for modulation;" but how so excellent a judge of correct and pure harmony could tolerate his licences, or reconcile them to his monumental character, and the additional praise he has himself bestowed upon him, is as unaccountable as any thing in Blow's compositions, considering the knowledge and known probity of the late worthy editor of Cathedral Music.

Many of his ballads, though only in two parts, are full of crude discords unprepared and unresolved; the cause of which, in some measure, may be ascribed to the *ground-bases*, on which it was now the fashion to write: for melody being scarce, both that and the harmony were frequently injured by this Gothic restraint. But the passing-notes and notes of embellishment of the composers, in general, of this period, were uncouth in melody, and licentious in harmony. Perhaps those of the present times, in less than a century, will be equally unpleasing to the ears of posterity; and yet we fancy that both melody and harmony have received their last polish.

The ballads of Dr. Blow are in general more smooth and natural than his other productions, and, indeed, than any other ballads of his time; there is more melody than in those of Henry Lawes, or any composer of the preceding reign; yet it is not of that graceful kind in which the Italians were now advancing towards perfection, with great rapidity. It is either of a Scots cast, or of a languid kind, that excites no other sensation than fatigue and drowsiness.

His pastoral, "Since the Spring comes on," is, however, as *chantant* as any mongrel mixture of Scots, Irish, French, and English, that has been since compiled.

BLOW-PIPE.

piled. The first movement particularly, seems to have been the model of most of the Vauxhall songs of the last fifty years.

"Fill me a bowl," p. 52, has the same kind of merit.

The collecting of his secular compositions into a folio volume in 1700, under the title of "Amphion Anglicus," was doubtless occasioned by the great success of the "Orpheus Britannicus," a similar collection of Purcell's dramatic and miscellaneous songs, published by his widow, in 1698. But whether Dr. Blow was stimulated to this publication by emulation, envy, or the solicitation of his scholars and friends, by whom there are no less than fifteen encomiastic copies of verses prefixed to the work, the ungrateful public seems to have remained always insensible to these strains of the modern *Amphion*, which were not only incapable of building cities, but even of supporting his own tottering fame.

Some of his innumerable deformities from the *Amphion Anglicus* are added to those of his church music, in the third vol. Gen. Hist. Mus. "Go perjured man," is the best of all his secular productions; but that, which was an imitation of a duet by Carissimi, "Dite, O celi," is overloaded in his "Amphion Anglicus," with a laboured and unmeaning accompaniment. P. 44 and 46 of this collection, contain two of his best ballads, "Sabina has a thousand charms," and "Philander do not think of arms." In these ballads the union of Scots melody with the English, is first conspicuous. The subject of a song, p. 168, "Orithæa's bright eyes," is likewise broad Scots.

BLOWS, in *Common Law*. See BATTERY.

BLOWS, *fly*, the ova of flies deposited on flesh, or other bodies proper for hatching them.

BLOW, in the *Sea Language*: when the wind increases from a moderate breeze, it is said to blow; and, according to the various degrees of strength with which the wind blows, it receives different appellations.

BLOW-PIPE, *Tubus ferruminatorius*, Lat.; *Löthrobr*, *Blasferobr*, Germ.; *Chalumeau*, Fr. A blow-pipe is a wind instrument for the purpose of increasing the heat of a candle or lamp, in the same manner as a pair of bellows is employed for raising the temperature of a common fire or furnace. It is not known at what time or by whom this very useful instrument was invented, but it appears to have been employed by glass-workers, enamellers, and jewellers, long before it was adopted as an article of chemical apparatus. The first intimation of its value to the chemist is to be found in Kunkel's treatise on glass-making.

The common glass-blower's lamp is represented in *Plate X. fig. 1.* (*Chemistry*). *A*, is a wooden table, within the frame of which is fixed a pair of double bellows *B*, that are worked by the foot of the artist; from the nozzle of the bellows proceeds a pipe of lead, or tinned iron, *CC*, which, first rising perpendicularly, is then brought under the top of the table to *D*, where it penetrates the wood, and terminates on its upper surface, in a recurved hollow cone *E*, the apex of which is pierced with a minute round hole. A shoe-lamp, *F*, is placed on the table, so that its wick is somewhat below, and about half an inch distant from the aperture of the pipe; the bellows being then worked, a constant stream of air is thrown upon the wick of the lamp, producing a long conical horizontal flame, *G*, of very considerable intensity. The increased heat of the flame appears to depend, in part, on a more rapid and complete combustion of the oil, and in part, also, on the concentration of the flame, by the action of the blast. The flame, upon examination, will be found to consist of an exterior yellow cone, inclosing another of a lighter yellow colour, at the extremity of which last is the focus of greatest heat.

The shoe-lamp (more distinctly represented in *fig. 2.*) is so called from its resemblance to a shoe. It is made of tinned iron, and consists of two parts; the exterior, *a*, serves to hold the proper lamp, and to retain the oil, which occasionally drops from the wick; the lamp, *b*, has a fixed cover, except at the tip, *c*, where a circular aperture is left for the wick *d*, which consists of a bundle of cotton threads, about an inch in diameter; at *e* is a hinge, by which that part of the lid nearest the wick may be raised, in order to pour in fresh oil, or to renew or raise the wick.

The glass-worker's blow-pipe is, however, not sufficiently portable for the use of the chemist and mineralogist, and it was a happy thought of Swab, the Swedish mineralogist, to substitute the lungs for the bellows. Gahn, Engeström, and Bergman suggested various improvements in the construction of this instrument, which now appears to have attained as great a degree of perfection, as it is perhaps capable of.

The common chemical blow-pipe consists of five parts; (*Chemistry, Plate XI. fig. 3.*) the mouth piece, *a*; a plain tube, *b*; a bulb, *c*; a curved tube, *d*; and a nut, *e*.

The mouth-piece (more distinctly represented by *fig. 5.*) is made of ivory, the rest of the apparatus being of brass, and fits closely into the pipe, *b*, so as to be air-tight; the bulb, *c*, is divided into two hemispheres, which screw into each other, and is designed to collect and condense the moisture of the breath; into the lower hemisphere is fixed the recurved tube, *d* (as represented in *fig. 4.*), in such a manner as to prevent the condensed vapour from escaping out of the bulb; the nut, *e*, is a hollow cylinder sufficiently wide at one end to receive the extremity of the curved tube, and perforated at the other with a small round hole, to allow a passage for the air; each blow-pipe has generally three of these nuts (*fig. 6.*), with apertures of different sizes, the largest of which does not exceed the diameter of the smallest pin.

In using the portable blow-pipe, the only difficulty is to keep up a constant stream of air; which is to be done by performing the function of respiration through the nostrils alone, diverting from time to time a portion of the expiration into the mouth for the supply of the blow-pipe, and forcing it through the tube by the action of the muscles of the cheek. This knack is by some acquired in an instant, while others are a long time in making themselves masters of it. To those who experience any difficulty in the free use of this instrument, the following directions may be of service. First, let the learner accustom himself to breathe freely with the mouth shut; then in making an expiration, let him transfer the air into the mouth, till the cheeks are moderately inflated, and retaining it there, let him discharge the surplus of the expiration through the nostrils, and then make two or three easy inspirations and expirations through the nostrils, without allowing the air in the mouth to escape. When practice has rendered this easy, which may be effected in half an hour, let the nut with the smallest aperture be fixed on the curved tube of the blow-pipe, and introduce the mouth-piece within the lips; then inflate the cheeks by an expiration, and continue breathing easily through the nostrils, till nearly the whole of the air has passed out of the mouth through the tube; then renew the air as before, and, after a few days' practice, the muscles of the mouth will be accustomed to this new mode of exertion, and an uniform uninterrupted stream of air may be kept up for half an hour without any extraordinary fatigue. A wax candle, *f*, having burnt long enough to allow the wick to be turned down, in the manner represented in the plate, the nut of the blow-pipe is to be applied to the arch of the wick, and the air, as it comes through, will bend the flame into a neat horizontal cone, the exterior part of which is yellow, and the interior

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ficer under the denomination of *sufflator*, or *fire-blower*. The Roman mint-men were distinguished by the appellation of blowers of gold, silver, and brass, &c. *fiatores auri, argenti*.

BLOWER, among dealers in horses, a term used for such horses as wheeze much, without wanting wind. See **WHEEZING**.

BLOWING, in *Medicine*. One method of administering medicines is by inflation, or blowing them into the part by a tube; thus it is they sometimes convey powders into the eye, and sometimes up the nose, for the cure of a polypus.

BLOWING, *exsufflatio*, was also a ceremony in the ancient administration of baptism, whereby the catechumen, upon rehearing the renunciation, blew three blasts with his mouth, to signify that he rejected or cast the devil absolutely off.

Something like this is still retained in the Russian church. In the sacramentary of St. Gregory, the priest who administers baptism, is enjoined to blow thrice on the child's face, making the sign of the cross with his hand, and pronouncing the words *exi ab eo Satān*. Justin Martyr, Tertullian, St. Cyril, and St. Augustin speak of this ceremony as used in their times.

BLOWING of a *fire arm*, is when the touch-hole is run or gulled, and become wide, so that the powder will flame out.

BLOWING is also used in speaking of the natural motion or course of the wind.

In the *Sea-Language*, the wind is said to *blow home*, or *blow through*, when it does not cease, or grow less, till it comes past the place where the speaker is. To *blow through* is sometimes also used to denote, that the wind will be so great as to blow afunder the sails. When a wind increases so much that they cannot bear any top sails, they say, they were *blown into their courses*, i. e. they could only have out the sails so called. To express an extraordinary great wind, they sometimes say, it will blow the sail out of the bolt-ropes.

BLOWING is also used in speaking of the force and effect of kindled gunpowder on bodies which happen to be over it. In this sense we say to blow up a house. Engineers at sieges make mines wherewith to blow up walls, bastions, and other defences. Powder-mills are apt to blow up by the iron gudgeons growing hot, and setting fire to the powder dust flying about.

BLOWING, among *Gardeners*, denotes the action of flowers whereby they open and display their leaves. In which sense, blowing amounts to much the same with flowering and blossoming.

BLOWING OF **GLASS**, one of the methods of forming the divers kinds of works in the glass manufacture. It is performed by dipping the end of an iron pontoglio, or blow-pipe, in the melted glass, and blowing through it with the mouth, according to the circumstances of the glass to be blown.

BLOWING of *tin*, a term used by the Cornish miners for the fusion or reduction of tin-ore to the metallic state, after having been roasted to get rid of the sulphur and arsenic.

BLOWING *Machine*, is used in metallurgical operations on a great scale, for the purpose of exciting combustion in furnaces appropriated for the smelting and reducing of ores.

The history and improvement of machinery of this nature have kept pace with the other branches of our national manufacture, and, in many instances, may be justly said to have gone beyond them.

In the smelting of lead and tin ores, the size and powers

of the blowing machine have been less a subject of alteration and improvement, than those used at furnaces and works where iron ore is smelted.

The natural fusibility and easy volatilization of the former metals, in temperatures beyond a bright red heat, have prescribed the size of the furnace, the measure of the blast, and the nature of the fuel.

In the manufacture of copper, air-furnaces are generally used, except where precipitated oxyd of copper is revived in small blast-furnaces, resembling those called cupolas, used at iron founderies.

The construction of a lead smelting machine, or what is commonly called a "Lead Mill," is extremely simple. A water wheel is erected in the middle of a square building. To the shaft of this wheel are attached four small wheels of cast iron, about 18 inches diameter. Four pairs of bellows, two pairs on each side of the shaft, are placed at equal distances, and supported upon a strong framing of wood. As the water wheel shaft revolves, the small wheels are carried round, and alternately, or two and two together, depress the extremity of a lever attached by an iron chain to an equipoised beam, the descent of this lever elevates the opposite end of the beam, to which is also attached, by means of another iron chain, the upper or moveable surface of the bellows. The blast produced in this way is in general soft, much inferior in point of either quantity or density to what is found necessary at iron furnaces. The bellows in common measure 10 feet in length, and 5 or 6 feet across the breach, moving about 30 strokes per minute.

In the manufacture of iron it has always been, particularly since the introduction of pit coal, the unceasing object of the iron-maker to improve his blowing apparatus; for uniformly he has found, that in proportion as he can raise air, and make it enter the furnace, so will his weekly quantity of metal be increased.

In the early history of this interesting manufacture, when charcoal of wood was the matter of fuel made use of, the affinities betwixt the latter and the ore were established with more facility. Small furnaces, called bloomeries, were sufficiently large, and deemed of profitable capacity, if they produced a bloom or two of iron per day, of 90 to 120 lbs. each.

Hand bellows, and what were called fuel blasts, were sufficiently large for the minor operations. After the general introduction of the refinery furnaces, and the division of the manufacture into the making of pig iron, and the refining of this into bar or malleable iron, the advantages of a powerful blast were immediately perceived. Water wheels, working two pairs or more of leather bellows, were found to produce powerful effects, and, in consequence, almost every situation that presented a command of materials and a waterfall, became the seat of an iron-mill.

The simple mode of blowing furnaces by means of a trompe, was at the same time introduced; but in general it was found, that much greater advantage could be derived from the descent of water upon a wheel, either as to density or quantity, than by means of the best constructed trompe.

The use of water wheels and leather bellows continued general throughout the iron business, until the principles and mechanism of the steam engine were established upon unerring grounds. This wonderful invention was soon applied with the happiest effect in many situations rich with mineral treasures, but to which nature had denied the advantage of water sufficient to turn machinery. Cylinders, composed of wood, firmly jointed and looped, were first introduced as a substitute for leather bellows: these were soon after replaced by bored cylinders of cast iron; and with

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with this great discovery and application of the art of caitting, the blowing machine assumed a general and well-proportioned form.

This took place nearly 40 years ago, and continued with a few temporary deviations until the introduction of Bolton and Watt's highly improved engine. The following may serve for an outline of the old blowing steam engine.

A steam cylinder, working with atmospheric pressure from 3 to 7 lbs. upon every square inch of the area of the piston. The diameter of the cylinder for one furnace varied from 25 to 36 inches, and for two furnaces from 36 to 50 inches. Upon the opposite of the main or working beam, sometimes at equal, and sometimes at unequal distances from the centre, was placed the air-pump or blowing cylinder. This was, in common, equal to four or five times the area of the former; and, with the small working power of the steam cylinder, seldom condensed the air beyond $1\frac{1}{2}$ to $1\frac{3}{4}$ lbs. per square inch. The air-pump was commonly constructed open below, as may be seen in *Plate II. fig. 1. (Ch. mistry.)* The plan was sometimes deviated from, and the cylinder inverted. The blowing piston was loaded with weights, and the air expressed by its descent. In this mode of working, the act of the steam piston, descending in vacuo raised the air-pump piston loaded with weights. Upon the return of the stroke, or while the steam piston ascended in the cylinder, this piston loaded with weights sunk the whole length of the stroke, and by means of this loading, proportioned to the powers of the engine, forced the air either into the regulator or the furnace.

Above, or parallel to the air-pump, was placed the regulating cylinder, as may be seen in the plate above mentioned. This had a valve of communication, which opened every stroke the engine made, and admitted the whole discharge of air. The piston of the cylinder, frequently called the fly piston, was loaded with weights, and kept constantly vibrating; so that when any deficiency of pressure arose from the remitting action of the air-pump piston, the blast was comparatively equalized by the pressure of the fly piston upon the included air. The size of this cylinder was generally in the proportion of 9 to 6 of the air-pump.

The chief objections to this mode of blowing, even when in universal use, were founded upon the great inequality of the blast, and a very considerable waste of air that took place at the *snort*, or safety valve, to prevent the fly piston being blown entirely out of the cylinder. The snort was an opening made in the top of the air-pump cylinder, on which rested a heavy iron valve, faced with leather stuffed with wool; this was, by means of an upright iron rod, attached to a lever, which run across the top of the regulating cylinder. As soon as the fly piston arose to a certain height, a block of wood, or other contrivance, lifted the one end of the lever, and along with it the valve, to a certain height, and permitted a quantity of the denser air to escape, sufficient to insure the safety of the piston. Notwithstanding these precautions, many accidents and stops ensued; the breaking of a pin, or the loosing of a key, frequently ejected the piston from its cylinder, though loaded with several tons of weight.

Some iron masters, more ingenious than others, contrived to take the spare or waste air from the snort, to receive it in an inverted chest above water, and blow to its extent smithy and fiery fires. Endeavours of this kind to husband and economise air, raised and condensed at a great expence, were sufficient proofs that a method was still wanting to complete the blowing machine, to render its motions steady and uniform, and to equalize the density of the blast throughout the whole stroke.

This was completely accomplished by inverting large chests, or cylinders, in cisterns of wood, stone, or iron. The space betwixt the inner and outer cisterns was constructed of sufficient capacity to oppose to the expansive force of the blast a column of water of equal or superior resistance.

This invention was called the water blast, water pressure, water regulator, &c. The dimensions differed materially from each other; this circumstance being much regulated by convenience, opinion, and the size of the engine.

Plate XIV. fig. 1. (Chemistry) represents a ground plan of a very capacious water regulator, sunk in the ground, and built of stone and bricks.

A, the inverted chest made of plates of cast iron, 40 feet long, 12 feet wide, and 12 feet high. The square superficies of this chest is equal to 480 feet, and its cubical contents are 5760 feet. Its weight will amount to nearly 30 tons.

B, the opening to which the air-pipe is attached; 2 feet diameter.

CCCC, open space betwixt the inverted chest and stone cistern, for the column of water to ascend; $3\frac{1}{2}$ feet wide.

DDDD, stone or brick-work, of which the great cistern is built. This work requires to be well jointed, as the motion of the water has a great tendency to open the spaces betwixt the stones. This cistern is 47 feet long, 19 feet broad, and 14 feet high; its cubical measurement amounting to 12,500 feet, and capable of containing 93,500 gallons wine measure.

EEEE, an opening of one foot in breadth left in the middle of the building. This is compactly filled with well trod clay, called puddling, and prevents the escape or circulation of water through the building. Beyond this the common building extends to a sufficient thickness to give general security to the whole.

Fig. 2. is a cross section of the water regulator at B, *fig. 1.* The letters in this view correspond with those in the plan.

F, the blast pipe from the cylinder entering the chest, and branching to the two blast furnaces.

GG, large hewn stones, on which the chest is supported about two feet from the bottom of the cistern, at intervals of six feet from each other.

H, loading of hewn stone, which for this cistern requires to be equal in all to 90 tons. If the chest weighs 30, then 60 tons of loading will be requisite. This is supposing that the power of the blowing machine is calculated to press equal to 3 lbs. upon every square inch, which many of them are constructed to perform.

To comprehend distinctly in what manner the water regulator performs its functions, and upon the supposition that the compressing power of the engine is equal to 3 lbs. upon every square inch, we shall suppose the engine at rest, and water introduced into the regulator, till it rise to the level of the dotted line *b*, 5 feet from the lower edge of the chest, and 7 feet in total depth of water. As soon as the engine is set to work, the compression of the air immediately sets the water in motion; every stroke making the water rise in the space CC, and proportionally falling towards GG, in the interior of the chest.

When the inverted chest becomes filled with air, and the condensation has reached the maximum of the power of the blowing machine, the water will be found elevated $3\frac{1}{2}$ feet to *i*, and the gauge will exhibit a depression in the interior of the chest, from *b* to *k*, $3\frac{1}{2}$ feet, making in all 7 feet from *k* to *i*.

At every turn of the engine stroke the water maintained at *i* falls a few inches, and elevates itself above *k* in the interior

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terior of the chest, a similar height. This description takes it for granted, that the spaces CC are equal to the area of the inverted chest; so that every inch of water forced out of the chest adds exactly one inch to the height of the column.

A blowing machine, capable of blowing to purpose two blast furnaces, ought to have the inverted chest of the regulator equal to three or four hundred square feet of area. There cannot arise any error from having this large enough; the want of space and capacity frequently proves a real detriment.

In calculating the proportions and dimensions of water regulators in general, the principle is, to allow the space around the inverted chest equal in point of superficial measurement to the area of the interior of the chest, that the descending column of water may displace no more in the perpendicular ascent, than it is itself absolutely depressed.

If the area or space in which the water rises and falls, is only equal to half the area of the inverted chest, then for every foot of water which is depressed in the bottom of the chest, a column of two feet will be raised and maintained on the outside. On the contrary, if the outside space for water be equal to twice the area, then every foot of water depressed in the chest will only elevate the external column six inches.

It will appear evident from these general facts, that a considerable latitude may at any time be assumed in constructing the water regulator, particularly in old established works, where local circumstances and conveniency confine its situation to one spot.

Where it is not inconvenient to use a high perpendicular column of water, the inverted chest may be increased one half, double, or even triple the superficial measurement of the outside space; so that if the power of the blowing machine is equal to 3 lbs upon the square inch, the water in the chest will be depressed $3\frac{1}{2}$ feet nearly, and raised in the perpendicular column 5 feet 3 inches in the first, 7 feet in the second, and $10\frac{1}{2}$ feet in the last case. This plan to suit former establishments may be adopted with considerable modifications, always keeping in mind, that every foot of area gained upon the surface of the water is a material acquisition to the equalizing powers of the regulator.

One imperfection attends this want of equilibrium on the two spaces for the action and re-action of the water.—Whatever space the waters would fall, at the return of the stroke, supposing the inside and outside columns exactly balanced, would in this case be increased one half, double, or triple.

Again, where situation does not admit of the perpendicular column being raised beyond, or not even to the extent of the depression, that takes place within the inverted chest, and where an additional space cannot be procured for an increase of its diameter, an inverted chest of much less height than common may be used, loaded with a material of great weight, such as iron. The water in that case would distribute itself over the surface of the chest, instead of rising in perpendicular height.

One serious objection, however, is made to chests or cylinders, where the eduction pipe approaches within a short space of the surface of the water: namely, water rising in the pipes, and being conveyed along with the air into the furnace. This may take place in two ways; by an insensible and uniform discharge of water into the furnace, making the blast at the tuyere visible, like the respiration of the human body in a frosty day; or in quantity, threatening utter destruction to the furnace and buildings. The former is occasioned by the air from the eduction pipe, at the com-

mencement of the stroke, impinging violently upon the surface of the water, and raising a portion of it in the state of spray. This is speedily dissolved or entangled in the mass of condensed air before the return of the next stroke, and becomes expressed along with the blast into the furnace. The other hazardous consequence is occasioned chiefly by undulation in the column of water, when the blowing machine is, by derangement or accident, working under its proper power or number of strokes. In these cases, when the pause at the end of the stroke is prolonged, an exhaustion sometimes takes place in the air-pipes, the water rises and is carried in a stream through the blow-pipe into the furnace.

The same casualties may more readily occur, if the surface of the water is upon a level, or nearly so, with the tuyere.

In judicious erections this is most carefully avoided; the surface of water in the inverted chest or cylinder is kept at least 8, 9, and 10 feet under the level of the tuyere, even at the last period of return, when the water has risen to its greatest height within.

This very proper precaution ensures an advantage of much importance. A large space is obtained betwixt the top of the chest and the depressed surface of the water; this becomes a spacious reservoir for the condensed air, and, by generating a considerable portion of elasticity, prevents any violent perturbation upon the water at any period of the stroke. The increased distance betwixt the surface of the water, and the pipe which conducts the air from the cylinder, has a complete tendency to prevent the elevation of the aqueous particles, and always ensures a quantity of air comparatively free from moisture.

Upon the principles formerly noticed, it is possible to construct a blowing apparatus of this nature, wherein there could be little or no visible motion in the perpendicular column of water even with the same engine.

Let us suppose a machine of this nature at work, with an accurately balanced column of water, the fall of which, at the return of the stroke, was equal to 12 inches. It is evident, that if the outside space was enlarged so much over its surface as to contain this foot of water, without adding any perceptible height to the column; that included within the chest would, at the return of the stroke, being fed from a more capacious limb, rise a foot, without any sensible diminution taking place in the perpendicular height of the external fluid. It is equally obvious, in this as in every case with water regulators, that the rise and fall of the inside column of water will remain the same, under every modification and form, while the pace and powers of the engine remain the same.

The application of water regulators to blowing machines was soon followed by an attempt to further improvement, by the introduction of the air-vault; the principle of which was to form a receiver of such capacity, that the elasticity or spring of the condensed air would be sufficient to express and equalize the blast during the return of the stroke.

To effect this, an immense magazine was requisite; to erect which of any metallic substance would have been ruinously expensive, and, if constructed of wood, insufficient for retaining the air. It became therefore requisite to try the experiment upon building, or by excavation from the solid rock. In both these ways has the air-vault been tried, and found to produce an excellent effect, as to equalizing the density of the blast; but it has been conceived with such indifferent consequences as to quantity, that the plan is for the present given up.

BLOWING.

Air-vaults were constructed both at the Clyde and Muirkirk iron works in Scotland, and a constant current of air produced; but nearly one half the quantity lifted by the air-pump escaped through the walls and arches of the building. This was at any time made visible by rubbing soapy water upon the external walls.

At Devon iron works in Scotland, an air-vault was excavated from the solid rock, 72 feet long, 14 feet wide, and 13 feet high; equal to 13,000 feet of cubical measurement. This immense excavation was made comparatively air-tight, by caulking the seams and fissures of the rock, plastering and then covering the whole with alternate layers of pitch and close wove paper.

This was the most perfect experiment ever tried upon the air-vault; and if an opinion is to be formed of the perfection of the apparatus by the quantity of iron at one time manufactured, a very trifling portion of air indeed must have been lost.

It has been frequently noticed in Scotland, that at works where the materials were in any degree similar, 3000 to 3500 cubical feet of air per minute will, in the course of a week, produce from 30 to 35 tons of pig iron, whatever may be the density at which it is thrown into the furnace.

The Devon furnace at one time averaged 33 tons weekly for 9 months running, and consumed of air, per data furnished by Mr. Roebuck in his paper published in Nicholson's Journal, vol. iv. nearly 3400 cubical feet per minute, under a pressure of $2\frac{3}{4}$ lbs. per square inch. Notwithstanding this powerful demonstration, strong prejudices were entertained to its disadvantage; and many believed, that had any other mode of regulator been attached to the blowing machine, abundance of air would have been obtained to have blown two furnaces equally well. That this idea was incorrect, may be easily gathered by calculation from the area of the air-pump, the length of the working stroke, and the number of strokes per minute, all of which are particularly stated by Mr. Roebuck.

For the general construction of an air-vault formed by building, see *Plate XV. (Chemistry.)*

Fig. 1. is a section of the vault constructed under the bridge-house, or place where the materials are proportioned, previously to their being thrown into the furnace. One half a blast furnace outline, is seen as connected in point of situation and blast to the air magazine.

A, the termination of the blast pipes that convey the air from the blowing cylinder into the receiver, 3 feet diameter; the length depends upon the contiguity of the engine to the vault.

B B B B, four vaults, 13 feet wide each, 25 feet deep, and 10, 11, 12, and 13 feet high to the springing of the arches; total height to the crown of the arches, $16\frac{1}{2}$, $17\frac{1}{2}$, $18\frac{1}{2}$, and $19\frac{1}{2}$ feet. These cells communicate with each other by arched openings in the cross-walls, which may be distinctly seen in the ground plan at L.

C C, the education pipes that carry the air to the furnace; 18 inches diameter.

D, end view of the range of laying pipes at the tuyere of the furnace. The dotted lines betwixt D and C are meant to represent the horizontal range of the pipes.

E, part of the outline of a blast furnace to shew its proper situation to the air vault.

F F F F, floor of the respective vaults, composed of a mixture of two parts of boring dust, two of fine riddled lime, and one part of fine roasted iron stone, mixed up into

plaster with water containing a considerable portion of salt.

G G, end walls of bricks or stone, four feet thick.

H H H, lining of brick-work, built in the most accurate manner, with fine riddled mortar, and run every second or third course with mortar made thin and very liquid. These walls are two feet and a half in thickness, are carefully plastered, and afterwards covered with several layers of strong paper and pitch, to prevent the escape of air. The roofs of the vaults are finished in the same manner.

I, door arch into the vaults; entrance obtained by means of a ladder or wooden stairs suspended within.

K, space above the arches, filled with rubbish, to prevent any spring, and to raise the floor to the level of the furnace top.

L, the range of the floor, or acclivity to the furnace mouth.

Fig. 2. is a ground plan of the bridge-house containing the air-vaults, and exhibits one half the ground plan of the furnace through the centre of the tuyere arches.

B B B B, corresponding to the same letters in the elevation.

C C, pipes for taking off the blast into the furnace.

D, corresponding to the same letter in the section.

E, main pillar of the furnace, same as E in the section.

G G G G, and H H H, correspond with the same letters in the elevation.

I, square for receiving the furnace hearth.

K, part of the ground view of the hearth, and the approaching blast pipes.

L L L, openings of the cross arches, which communicate the vaults with each other.

The cubical contents of a vault constructed according to these dimensions, will amount to 20,000 feet.

In general, it may be remarked upon the construction of the blowing machine, that since the period of the introduction of Mr. Watt's engine, the air-pump, or blowing cylinder, has been constructed so as to discharge a cylinder full of air every ascent and descent of the piston. This, instead of travelling 4 to 5 feet per stroke, more generally moves 8 feet; and the number of cylinders per minute are seldom under 24.

Formerly, in the common atmospheric engine, the movement of the piston from top to bottom, and back again, produced only one cylinder full of air from the air-pump, and the number of cylinders discharged per minute seldom exceeded 16. A steam cylinder of 40 to 44 inches diameter, and an air-pump of 6 feet diameter, the piston moving about 5 feet per stroke, were deemed sufficient in the construction of a blowing machine for two blast furnaces. The quantity of air pumped up and thrown into the furnaces by such an engine seldom exceeded 3000 cubical feet per minute. This, and even a larger quantity, is now thrown into one furnace, and the produce by such means increased from 15 to 35 tons weekly.

The first set of tables following are calculated to shew the quantity of air that would be discharged by blowing cylinders of various diameters, the length and number of the strokes being given.

The second set, to shew what diameter of blowing cylinder is requisite, with a given steam power, to raise the air to a certain density per square inch. See *ENGINE, WATER REGULATOR, and REGULATING VAULT.*

BLOWING.

TABLE I. of Blowing Cylinders, their Capacity, Area, and Quantity of Air discharged by a Four-Foot Stroke, &c.

Di- am. of Air in Inch.	Area in Circles in Inch. s.	Area in Square Inches.	Capacity of the Stroke in Cubic Feet.	Air disch'd at the Rate of 5 Cylinders per Minute.	Air discharge at the Rate of 4 Cylinders per Minute.	Air discharged at the Rate of 3 Cylinders per Minute.	Air discharged at the Rate of 2 Cylinders per Minute.	Air discharged at the Rate of 1 Cylinder per Minute.	Air disch'd at the Rate of 1 Cylinder per Minute.			
36	1295	1017.8784	28.2744	1413.7200	1130.9760	848.2320	706.8600	565.4880	424.1160	339.2928	282.7440	
37	1369	1075.8670	29.8670	1493.3500	1194.6800	896.0100	746.6750	592.3400	448.0050	358.4040	298.6700	
38	1444	1134.1176	31.5032	1575.1600	1260.1280	945.0960	787.5800	630.1280	472.5480	378.0384	315.0320	
39	1521	1194.5934	33.1831	1659.1550	1327.3240	995.4930	829.5775	663.6620	497.7465	398.1972	331.8310	
40	1600	1256.6400	34.9055	1745.2750	1396.2200	1047.1656	872.6375	698.1100	523.5825	418.8650	349.0550	
41	1681	1320.2574	36.6738	1833.6900	1466.9520	1100.2140	916.8450	733.4760	550.1020	440.0856	366.7380	
42	1764	1385.4456	38.4834	1924.1700	1539.3360	1154.5020	962.0850	769.6680	577.2510	461.8008	384.8340	
43	1849	1452.2046	40.3390	2016.9500	1613.5600	1210.1700	1008.4750	806.7800	605.0850	484.0680	403.3900	
44	1936	1520.5344	42.2370	2111.8500	1689.4800	1267.1100	1055.9250	844.7400	633.5550	506.8440	422.3700	
45	2025	1590.4350	44.1787	2208.9350	1767.1480	1325.3610	1104.4765	883.5740	662.6805	530.1444	441.7870	
46	2116	1661.9064	46.1640	2308.2090	1845.5600	1384.9200	1154.1000	923.2800	692.4600	553.6680	461.6400	
47	2209	1734.9486	48.1930	2409.6500	1927.7200	1445.7900	1204.8750	963.3600	722.8950	578.3160	481.9500	
48	2304	1809.5616	50.2656	2513.2800	2010.6240	1507.9680	1256.6400	1005.3120	753.9840	603.1872	502.6560	
49	2401	1885.7545	52.3818	2619.0900	2095.2720	1571.4540	1309.5450	1047.6160	785.7270	628.5816	523.8180	
50	2500	1963.5000	54.5416	2727.0800	2181.6640	1636.2480	1363.5400	1090.8320	818.1240	654.4992	545.4160	
51	2601	2042.8254	56.7451	2837.2550	2269.8040	1702.3530	1418.6275	1124.9020	851.1760	680.9412	567.4510	
52	2704	2123.7216	58.9944	2948.2200	2358.5760	1768.9320	1474.1100	1179.2800	884.4660	707.5728	589.6440	
53	2809	2206.1886	61.2830	3064.1500	2451.3200	1838.4900	1532.0750	1220.6600	919.2450	735.3960	612.8300	
54	2916	2290.2264	63.6173	3180.8650	2544.6920	1908.5190	1590.4327	1272.3410	954.2595	763.4076	636.1730	
55	3025	2375.8350	65.9954	3299.7700	2639.8160	1979.8620	1649.8850	1319.9080	990.9310	791.9448	659.9540	
56	3136	2463.0144	68.4107	3422.2050	2736.4280	2052.3210	1710.2675	1363.2140	1026.1605	820.9284	684.1070	
57	3249	2551.7646	70.8823	3544.1150	2835.2920	2126.4690	1772.0575	1417.6460	1063.2345	850.5876	708.8230	
58	3364	2642.0856	73.3913	3669.5650	2935.6520	2201.7390	1834.7825	1467.8260	1100.8695	880.6956	733.9130	
59	3481	2733.9774	75.9438	3797.1900	3037.7520	2278.3140	1898.5950	1518.8760	1139.1520	911.3256	759.4380	
60	3600	2827.4400	78.5400	3927.0000	3141.6000	2356.2000	1963.5000	1570.8000	1178.1000	942.4800	785.4000	
61	3721	2922.4734	81.1798	4058.9900	3247.1920	2435.3740	2029.9950	1623.5960	1217.6870	974.1576	811.7980	
62	3844	3019.0776	83.8632	4193.1500	3354.5280	2515.8960	2096.5750	1677.2640	1257.9480	1006.3584	838.6320	
63	3969	3117.2526	86.5703	4325.3650	3462.8120	2597.1090	2162.6825	1731.4060	1298.5545	1038.8436	865.7030	
64	4096	3216.9984	89.3332	4466.6600	3573.3280	2679.9960	2233.3300	1786.6640	1339.9960	1071.9984	893.3320	
65	4225	3318.3150	92.1754	4608.7200	3687.0160	2765.2200	2304.3600	1843.5080	1382.6300	1106.0848	921.7540	
66	4356	3421.2024	95.0334	4751.6700	3801.3360	2850.9020	2375.8350	1900.1680	1425.4510	1140.4008	950.0840	
67	4489	3525.6606	97.9350	4895.7500	3917.4000	2938.0500	2448.3750	1958.7000	1469.0250	1175.2200	979.3500	
68	4624	3631.6896	100.8802	5044.0100	4035.2080	3026.4060	2522.0050	2017.6040	1513.2030	1210.5624	1008.8020	
69	4761	3739.2894	103.8691	5193.4550	4154.7640	3116.0730	2596.7275	2077.3800	1558.0365	1246.4294	1038.6900	
70	4900	3848.4600	106.9017	5345.0850	4276.0680	3207.0510	2672.5425	2138.0340	1603.5255	1282.8204	1069.0170	
71	5041	3959.2014	109.9778	5498.8000	4399.1120	3299.3340	2749.4450	2199.5560	1649.6620	1319.7336	1099.7780	
72	5184	4071.5136	113.0976	5654.8800	4523.9040	3392.9280	2827.4400	2261.9520	1696.4610	1357.1512	1130.9760	
73	5329	4185.3976	116.2610	5813.0500	4650.4400	3487.8300	2906.5250	2325.2200	1743.9150	1395.1320	1162.6000	
74	5476	4300.8504	119.4630	5973.4000	4778.7200	3584.0400	2986.7000	2389.3600	1792.0200	1433.6160	1194.6800	
75	5625	4417.8750	122.7187	6135.9350	4908.7480	3681.5610	3067.9675	2454.3740	1840.7805	1472.6244	1227.1870	
76	5776	4536.4704	126.0130	6301.5500	5040.5200	3780.3900	3150.7750	2520.2600	1890.1950	1512.1560	1260.1300	
77	5929	4656.2366	129.3232	6466.1600	5172.9280	3879.6960	3233.0800	2586.4640	1939.8400	1551.8784	1293.2320	
78	6084	4778.3736	132.7326	6633.6300	5309.3040	3979.19780	3316.8150	2654.6520	1990.4890	1592.7912	1327.3760	
79	6241	4901.6814	136.1578	6804.8900	5446.3120	4084.7340	3403.9450	2723.1560	2042.3670	1633.8936	1366.5780	
80	6400	5026.5600	139.5266	6981.3300	5585.0640	4188.7980	3490.6650	2792.5320	2094.3990	1675.5192	1396.2660	
81	6561	5153.0094	143.1391	7156.9550	5725.5640	4294.1730	3578.4775	2862.7820	2147.0865	1717.6692	1431.3910	
82	6724	5281.0296	146.6932	7334.7600	5867.8080	4400.8560	3667.3800	2938.9040	2200.4280	1760.3424	1469.4520	
83	6889	5410.5206	150.2950	7514.7500	6011.8000	4508.8500	3757.3750	3015.4000	2254.4250	1803.5400	1527.7000	
84	7056	5541.7824	153.9386	7696.9300	6157.5440	4618.1580	3848.4650	3098.7720	2309.0790	1847.5048	1539.8860	
85	7225	5674.5150	157.6254	7881.2700	6305.0160	4728.7620	3940.6350	3152.5080	2364.3810	1891.5048	1576.2540	
86	7396	5808.8184	161.3560	8067.8000	6453.2400	4840.6800	4033.9000	3226.6200	2420.3400	1936.2720	1613.3100	
87	7569	5944.6926	165.1303	8256.5150	6605.2120	4953.9090	4128.2575	3302.6068	2476.9545	1981.5636	1651.3030	
88	7744	6082.1376	168.9482	8447.4100	6757.9280	5068.4440	4223.7050	3378.9640	2534.2230	2027.3784	1689.4820	
89	7921	6221.1534	172.8098	8640.4900	6912.3920	5184.2940	4307.2450	3456.1960	2592.1470	2073.7186	1728.0980	
90	8100	6361.7400	176.7150	8835.7500	7068.6000	5301.4500	4417.8750	3534.3000	2650.7250	2120.5800	1767.1500	
91	8281	6503.8974	180.6638	9033.1900	7226.5520	5419.9140	4516.5950	3613.2760	2709.9570	2167.9656	1806.6380	
92	8464	6647.6256	184.6562	9232.8100	7386.2480	5539.6860	4616.4550	3693.1240	2769.8430	2214.3076	1846.0620	
93	8649	6792.9246	188.6923	9434.6150	7547.6920	5660.7690	4717.3075	3773.8460	2830.3845	2263.2640	1886.4230	
94	8836	6939.9144	192.7720	9638.6000	7709.8800	5783.1600	4819.3000	3854.9400	2891.5800	2312.7448	1927.4700	
95	9025	7088.2350	196.8954	9844.7700	7875.8160	5906.8620	4922.3850	3937.9080	2953.4310	2412.7512	1968.9540	
96	9216	7238.2464	201.0626	10053.1300	8042.5040	6013.1870	5026.5650	4021.2520	3015.9390	2463.2760	2010.6260	
97	9409	7389.8286	205.2730	10263.6500	8210.9200	6118.1900	5131.8250	4105.4600	3079.0950	2514.3254	2002.7300	
98	9604	7542.9816	209.5272	10476.3000	8381.0880	6225.8160	5238.1800	4190.5400	3147.9080	2565.9012	2095.2720	
99	9801	7697.7054	213.8251	10691.2550	8553.0040	6414.7530	5345.6275	4276.5020	3207.3765	2615.8744	2138.2510	
100	10000	7854.0000	218.1666	10908.3300	8726.6640	6544.9980	5454.1650	4363.3320	3272.4990	2670.9992	2181.6660	

BLOWING.

TABLE II. of Blowing Cylinders, their Area, Capacity, and Quantity of Air, discharged by a Five-Foot Stroke.

Number of Cylinders.	Area in Circular Inches.	Area in Square Inches.	Capacity of the Stroke in Cubical Feet.	Air discharged at the Rate of 50 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 40 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 30 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 25 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 20 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 15 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 12 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 10 Cylinders per Minute in Cubical Feet.
36	1296	1017.8784	35.3430	1767.1500	1413.7210	1060.2900	883.5750	706.8605	530.1450	424.1160	353.4302
37	1369	1075.8670	37.3337	1866.6850	1493.3480	1120.0110	933.3425	746.6740	560.0005	448.0044	373.3370
38	1444	1134.1176	39.3790	1966.9500	1575.1600	1181.3700	984.4750	787.5800	590.6350	472.5480	393.7900
39	1521	1194.5984	41.4788	2073.9400	1659.1520	1244.3640	1036.9700	829.5760	622.1820	497.7456	414.7880
40	1600	1256.6400	43.6319	2181.5950	1745.2760	1308.9570	1090.2975	872.6380	654.4785	523.5828	436.3190
41	1681	1320.2574	45.8422	2292.1100	1833.6880	1375.2660	1146.0550	916.3440	687.6330	550.1064	458.1720
42	1764	1385.4456	48.1042	2405.2100	1924.1680	1443.1260	1202.6050	962.0840	721.5630	577.2504	481.0420
43	1849	1452.2046	50.4237	2521.1850	2016.9480	1512.7110	1260.5925	1008.4740	756.3350	605.0844	504.3370
44	1936	1520.5344	52.7962	2639.8100	2111.8480	1583.8860	1319.9050	1055.9240	796.9430	633.5544	527.9620
45	2025	1590.4350	55.2233	2761.1650	2209.9320	1656.6300	1382.5825	1104.4660	828.3495	662.6796	552.2330
46	2116	1661.9064	57.7050	2885.2500	2308.2000	1731.1500	1442.6250	1154.1000	865.5750	692.4600	577.0500
47	2209	1734.9486	60.2412	3012.0600	2409.6480	1807.2360	1506.0300	1204.8240	903.6180	722.8944	602.4120
48	2304	1809.5616	62.8320	3141.6000	2513.2800	1884.9700	1570.8000	1256.6400	942.4800	753.9840	628.3200
49	2401	1885.7545	65.4772	3273.8600	2619.0880	1964.3160	1636.4500	1309.5440	982.1800	785.7264	654.7720
50	2500	1963.5000	68.1770	3408.8500	2727.0800	2045.3100	1704.4250	1363.6500	1022.6550	818.1240	681.7700
51	2601	2042.8254	70.9313	3546.5650	2837.2520	2127.9390	1773.2825	1418.6260	1013.9695	831.1756	709.3130
52	2704	2123.7216	73.7055	3685.2750	2948.2200	2211.1650	1842.6375	1474.1100	1105.5825	884.4660	737.0550
53	2809	2206.1886	76.6037	3830.1850	3064.1480	2298.1100	1915.0925	1532.0740	1149.0570	919.2444	761.0370
54	2916	2290.2264	79.5216	3976.0800	3180.8640	2385.6480	1988.0400	1590.4320	1192.8240	954.2592	795.2160
55	3025	2375.8350	82.4642	4124.7100	3299.7680	2474.8260	2062.3550	1649.8840	1237.4130	979.9304	824.9420
56	3136	2463.0144	85.5021	4275.1050	3420.0840	2565.0630	2137.5525	1710.0420	1282.5315	1026.0242	855.0210
57	3249	2551.7646	88.6028	4430.1400	3544.1120	2658.0840	2215.0700	1772.0560	1329.0420	1063.2336	886.0280
58	3364	2642.0856	91.7591	4586.9550	3669.5640	2752.1730	2293.4775	1834.7320	1376.6865	1100.8692	917.3910
59	3481	2733.9774	94.9297	4746.4850	3797.1880	2847.8910	2373.2425	1898.5940	1423.9455	1139.1562	949.2970
60	3600	2827.4400	98.1750	4908.7500	3927.0000	2945.2500	2454.3750	1963.5000	1472.6250	1178.1000	981.7500
61	3721	2922.4734	101.4747	5073.7350	4058.9880	3044.2410	2536.8675	2029.4910	1522.1205	1217.6924	1014.7470
62	3844	3019.0776	104.8290	5241.4500	4193.1600	3144.8700	2620.7250	2096.5800	1572.4350	1257.9480	1048.2900
63	3969	3117.2516	108.2428	5410.6400	4328.5120	3246.3840	2705.3200	2164.2560	1623.1920	1298.5536	1082.1280
64	4096	3216.9884	111.6665	5583.3250	4466.6600	3349.9950	2791.6125	2233.3300	1674.9975	1339.9980	1116.6650
65	4225	3318.3150	115.2192	5760.9600	4608.7680	3456.5760	2880.4500	2304.3840	1728.2880	1382.6304	1152.1920
66	4356	3421.2024	118.7927	5939.6350	4751.7080	3563.7810	2969.8175	2375.8540	1781.8905	1425.5124	1187.9270
67	4489	3525.6506	122.4187	6120.9350	4896.7480	3672.5610	3060.4675	2449.3740	1826.2805	1469.0244	1249.1870
68	4624	3631.6896	126.1002	6305.0100	5044.0080	3783.0660	3152.5050	2522.0040	1891.5030	1513.2024	1261.0020
69	4761	3739.2894	129.8362	6491.8150	5193.4520	3895.0890	3245.9075	2596.7260	1947.5440	1558.0356	1298.3360
70	4900	3848.4600	133.6271	6681.3550	5345.0840	4008.8130	3340.6775	2672.5420	2004.4065	1603.5252	1336.2710
71	5041	3959.2014	137.4722	6873.6100	5498.8880	4124.1660	3436.8050	2749.4440	2062.0830	1649.6664	1374.7220
72	5184	4071.5130	141.3720	7068.6000	5654.8800	4241.1660	3534.3000	2827.4400	2120.5800	1696.4640	1413.7200
73	5329	4185.3966	145.3262	7266.3100	5813.0480	4359.7860	3633.1550	2906.5240	2179.8930	1743.9144	1453.2620
74	5476	4300.8504	149.3350	7466.7500	5973.4000	4478.0500	3733.3750	2986.7000	2240.0250	1792.0200	1493.3500
75	5625	4417.8750	153.3983	7669.9150	6135.9380	4601.9490	3834.9575	3067.9690	2300.9745	1840.1796	1533.9345
76	5776	4537.4774	157.5192	7875.8100	6300.6480	4725.4860	3937.9052	3150.3240	2367.7430	1890.1911	1575.1620
77	5929	4659.1636	161.6540	8082.7000	6466.1600	4847.6200	4041.3500	3233.0800	2424.8100	1939.8480	1616.5400
78	6084	4782.9376	165.9155	8295.7850	6633.6280	4971.4710	4147.8925	3318.3140	2488.7300	1990.9874	1659.1570
79	6241	4908.8034	170.1972	8509.8600	6807.5880	5105.9160	4254.9300	3403.9440	2552.9580	2042.3601	1701.9720
80	6400	5036.7500	174.5332	8723.6600	6981.3280	5235.9960	4363.3300	3490.6640	2667.6980	2094.3984	1745.3320
81	6561	5166.8024	178.9238	8946.1900	7156.9520	5367.7140	4473.0950	3578.4760	2683.8570	2147.0856	1789.2380
82	6724	5298.9696	183.3696	9168.4500	7334.7600	5501.0700	4584.2250	3667.3400	2750.5350	2200.4282	1833.6900
83	6889	5432.2526	187.8697	9393.4350	7514.7480	5635.0160	4696.7175	3757.3740	2818.0305	2254.4244	1878.6870
84	7056	5567.6514	192.4232	9621.1600	7696.9280	5772.6660	4810.5800	3848.4640	2886.3480	2309.2784	1924.2320
85	7225	5704.1560	197.0317	9851.5850	7881.1268	5910.9510	4925.7925	3940.6340	2955.4755	2364.3804	1970.3170
86	7396	5841.8684	201.6950	10084.7500	8067.8000	6050.8500	5042.3750	4033.9000	3025.4250	2420.3400	2016.9500
87	7569	5980.6926	206.4128	10320.6400	8256.5120	6192.3840	5160.3200	4128.2560	3096.1920	2476.9536	2064.1280
88	7744	6120.6376	211.1855	10559.2600	8447.1040	6335.5560	5279.6300	4223.7540	3167.7710	2534.2224	2111.8770
89	7921	6261.7134	216.0122	10800.6100	8640.4880	6480.3660	5400.3050	4320.2440	3240.1880	2592.1464	2160.1220
90	8100	6403.9200	220.8937	11044.6350	8835.7480	6626.8110	5522.3425	4417.8740	3313.4005	2650.7244	2208.9370
91	8281	6548.2894	225.8297	11291.4850	9033.1800	6774.9910	5645.7425	4516.5940	3387.4450	2709.9554	2258.2970
92	8464	6694.8256	230.8265	11541.2900	9234.6240	6925.9680	5771.6400	4617.3120	3462.4840	2770.3872	2308.6560
93	8649	6843.5244	235.8855	11793.2650	9438.6120	7075.9590	5905.6325	4717.3060	3538.7975	2830.3836	2358.6530
94	8836	6994.3944	240.9566	12047.1000	9644.2400	7228.6800	6023.9000	4819.1200	3614.3400	2891.4720	2409.6100
95	9025	7147.4256	246.1187	12295.9500	9844.7480	7383.5600	6152.9175	4922.2740	3691.7800	2953.4244	2461.3740
96	9216	7302.7284	251.3282	12549.4500	10053.1280	7539.8460	6283.2050	5026.5640	3761.9230	3015.9344	2513.2820
97	9409	7460.2826	256.5911	12809.5000	10263.6800	7697.7360	6414.7800	5131.8240	3848.8680	3079.0944	2565.0120
98	9604	7620.0916	261.9090	13075.4500	10476.3600	7857.5700	6547.7250	5238.6100	3929.7850	3142.4080	2619.3400
99	9801	7782.1554	267.2815	13346.6550	10691.2520	8018.4390	6682.0325	5345.6260	4009.2195	3207.3756	2672.3130

BLOWING.

TABLE III. of Blowing Cylinders, their Area, Capacity, and Quantity of Air Discharged by a Six-Foot Stroke.

Diameter in Inches.	Area in square Inches.	Capacity of the Stroke in Cubic Feet.	Air discharged at the Rate of 50 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 40 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 30 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 25 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 20 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 15 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 12 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 10 Cylinders per Minute in Cubical Feet.	
36	1296	1017.8784	42.4116	2120.5800	1696.4640	1272.3480	1060.2900	848.2320	636.1740	508.9392	424.1160
37	1369	1075.8670	44.8005	2240.0250	1792.0200	1344.0150	1120.0125	896.0100	672.0075	537.6060	448.0050
38	1444	1134.1176	47.2348	2362.7400	1890.1920	1417.6440	1181.3700	945.0960	708.8220	567.0576	472.5480
39	1521	1194.5934	49.7746	2488.7300	1990.9840	1493.2380	1244.3650	995.4920	746.6190	597.2952	497.7460
40	1600	1256.6400	52.3582	2617.9100	2094.3280	1570.7460	1308.9550	1047.1640	785.3730	628.2986	523.5820
41	1681	1320.2574	55.0107	2750.5350	2200.4280	1650.3210	1375.2675	1100.2140	825.1605	660.1284	550.1070
42	1764	1385.4456	57.7451	2886.2550	2309.0040	1731.7530	1443.1275	1154.5020	865.8765	692.7012	574.2510
43	1849	1452.2046	60.5035	3025.4250	2420.3400	1815.2550	1512.7125	1210.1740	907.6275	726.1020	605.0870
44	1936	1520.5341	63.3555	3167.7750	2534.2200	1900.6650	1583.8875	1267.1100	950.3325	760.2660	633.5500
45	2025	1590.4350	66.2680	3313.4000	2650.7200	1988.0400	1656.2000	1325.3600	999.0200	795.1960	662.6800
46	2116	1661.0064	69.2460	3462.3000	2769.8400	2077.5800	1731.1500	1384.4200	1038.6900	830.9520	692.2100
47	2209	1734.9486	72.2895	3614.4750	2891.5800	2168.6850	1807.2375	1445.2900	1084.3425	867.4740	722.6450
48	2304	1809.5616	75.3984	3769.9200	3015.9360	2261.9520	1894.9600	1507.9680	1130.9760	904.7808	753.9840
49	2401	1885.7545	78.5727	3928.6350	3142.9080	2357.1810	1964.3175	1571.4540	1178.5950	942.8724	785.7270
50	2500	1963.5000	81.8124	4090.6200	3272.4960	2454.3720	2045.3100	1636.4980	1227.6860	981.7488	818.2490
51	2601	2042.8254	85.1176	4255.8800	3404.7040	2553.5280	2127.9400	1702.3520	1276.7640	1024.4112	851.1760
52	2704	2123.7216	88.4466	4422.3300	3537.8640	2653.3980	2211.1650	1768.9320	1326.6940	1061.3592	884.4660
53	2809	2206.1886	91.9246	4596.2300	3676.9840	2757.7380	2298.1155	1838.4920	1378.8690	1103.0952	919.4920
54	2916	2290.2264	95.4259	4771.2950	3817.0360	2862.7770	2385.6475	1908.5180	1431.3885	1143.1108	954.2590
55	3025	2375.8350	98.9931	4947.6550	3959.7240	2969.7930	2474.8275	1979.8620	1484.8965	1184.9172	989.9310
56	3136	2463.0144	102.6025	5130.1250	4104.1000	3078.0750	2565.0625	2052.0500	1539.0375	1231.2300	1026.0250
57	3249	2551.7646	106.3234	5316.1700	4252.9360	3189.7020	2668.0850	2126.4680	1594.3510	1275.8604	1063.2340
58	3364	2642.0856	110.0869	5504.3450	4402.7560	3302.6070	2772.1725	2201.3780	1651.3035	1321.0428	1100.6890
59	3481	2733.9774	113.9157	5695.7850	4556.6280	3417.4710	2874.7825	2278.3140	1708.7355	1366.8884	1139.1570
60	3600	2827.4400	117.8100	5890.5000	4712.4400	3534.3000	2984.5200	2356.2000	1767.1500	1413.7200	1178.1000
61	3721	2922.4734	121.7697	6088.4850	4870.7800	3653.0910	3044.2425	2435.3900	1826.5450	1461.2364	1217.6950
62	3844	3019.0776	125.7948	6289.7400	5031.7920	3773.8440	3144.8700	2515.8960	1886.9220	1509.5376	1257.9480
63	3969	3117.2526	129.8544	6492.7200	5194.1640	3895.6320	3246.3600	2592.0820	1947.8160	1558.2528	1296.0410
64	4096	3216.9984	133.9998	6699.9900	5359.9920	4019.9940	3349.9950	2679.9960	2009.9970	1609.9976	1339.9980
65	4225	3318.3150	138.2631	6913.1550	5530.5220	4147.8930	3456.5750	2765.2620	2073.9465	1659.1572	1382.6310
66	4356	3421.2024	142.5501	7127.5050	5702.0040	4276.5030	3563.7525	2851.0020	2138.2515	1710.6012	1425.5010
67	4489	3525.6606	146.9025	7345.1250	5876.1090	4407.0750	3672.5625	2938.0500	2203.5375	1762.8300	1469.0250
68	4624	3631.6896	151.3203	7566.0100	6051.8120	4539.6090	3783.0075	3026.4060	2269.8045	1815.8436	1513.2030
69	4761	3739.2894	155.8036	7790.1800	6232.1440	4674.1080	3895.0900	3116.0720	2337.0540	1869.6432	1558.0360
70	4900	3848.4600	160.3525	8017.6350	6414.1000	4810.5750	4008.8125	3207.0500	2405.2875	1924.2300	1603.5250
71	5041	3959.2014	164.9667	8248.3350	6598.6880	4949.0010	4124.1675	3299.3340	2474.5050	1979.6004	1649.6670
72	5184	4071.5136	169.6464	8482.3200	6785.8560	5089.3920	4241.1600	3392.9280	2544.6960	2035.7568	1696.4640
73	5329	4185.3966	174.3915	8719.5750	6975.6600	5231.7450	4357.7875	3487.8300	2615.8725	2092.6980	1743.9150
74	5476	4300.8504	179.2020	8960.1000	7168.0800	5376.6000	4470.0520	3584.0400	2688.0300	2150.4240	1792.0200
75	5625	4417.8750	184.0780	9203.9000	7363.1200	5522.3400	4601.9500	3681.5600	2761.1700	2208.0360	1840.7800
76	5776	4536.4704	189.0195	9450.9750	7560.7800	5670.5850	4735.4875	3780.3900	2835.2925	2268.2340	1890.1950
77	5929	4656.6366	193.9848	9699.2400	7759.3920	5819.5440	4849.6020	3879.6960	2909.7720	2327.8176	1939.8480
78	6084	4778.3736	199.0980	9954.9900	7963.9560	5972.9670	4977.4745	3981.9780	2986.4835	2399.1868	1990.9980
79	6241	4901.5814	204.2367	10211.8350	8169.4680	6127.1010	5105.9175	4044.7340	3063.5505	2450.8404	2041.3760
80	6400	5026.5600	209.4399	10471.9950	8377.5960	6283.1970	5235.9975	4188.7980	3141.5985	2513.2788	2094.3990
81	6561	5153.0294	214.7086	10735.4300	8588.3440	6441.2580	5367.7150	4294.1720	3220.1292	2576.5032	2147.0860
82	6724	5281.0296	220.0478	11002.1400	8801.7120	6601.2840	5501.0700	4400.3560	3300.6425	2640.5136	2200.1780
83	6889	5410.6206	225.4425	11272.1350	9017.7000	6763.2750	5636.0625	4508.8500	3381.6375	2705.3100	2254.4250
84	7056	5541.7824	230.8879	11545.3950	9236.3160	6927.2370	5772.6975	4618.1580	3462.6185	2770.8948	2309.0790
85	7225	5674.5150	236.4881	11821.9050	9457.5240	7093.1430	5910.9525	4728.7620	3546.5715	2837.2572	2364.3810
86	7396	5808.8184	242.2040	12101.7000	9681.3600	7261.0200	6050.8500	4840.1800	3629.5100	2904.4080	2420.0900
87	7569	5944.6226	247.6954	12384.7700	9907.8160	7430.8020	6192.3850	4953.9080	3715.3410	2972.3448	2476.9540
88	7744	6082.0376	253.4223	12671.1150	10136.8620	7603.6690	6335.5575	5068.4460	3801.3345	3041.0676	2534.2230
89	7921	6221.1534	259.247	12960.7350	10368.5880	7776.4410	6480.3075	5184.2940	3883.2205	3110.5764	2592.1470
90	8100	6361.7400	265.0725	13253.6250	10602.9000	7952.1750	6626.8125	5301.4500	3976.0875	3180.8500	2650.7250
91	8281	6503.8774	270.9957	13549.7850	10839.8280	8129.8710	6774.8925	5419.9140	4064.9350	3251.9484	2709.9570
92	8464	6647.6256	276.9843	13849.2150	11079.3760	8309.5290	6924.6075	5539.6860	4154.7445	3323.8160	2769.8430
93	8649	6792.9246	283.0384	14151.9200	11321.5320	8491.1520	7075.9600	5660.7680	4245.5760	3397.6608	2830.3440
94	8836	6939.7944	289.1580	14457.9000	11566.3200	8671.7400	7228.4500	5783.1600	4337.3700	3479.8560	2891.5300
95	9025	7088.2350	295.3431	14767.1550	11813.7240	8860.2930	7383.5750	5906.8620	4430.1465	3544.1172	2953.4310
96	9216	7238.2464	301.5939	15079.6950	12063.7560	9047.8170	7539.8475	6031.8780	4523.9085	3619.1268	3015.9390
97	9409	7388.9116	307.9095	15395.4750	12316.3800	9231.2850	7697.7375	6158.1900	4618.6475	3694.9140	3079.9950
98	9604	7540.2886	314.3008	15715.0400	12572.0320	9419.0240	7857.5200	6286.0160	4714.5120	3771.6096	3143.0000
99	9801	7692.7054	320.7376	16036.8800	12829.5040	9612.1280	8018.4400	6414.7520	4811.0640	3848.8512	3207.3760
100	10000	7846.0000	327.2499	16362.4950	13089.9960	9817.4970	8181.2475	6544.0980	4908.7485	3926.9786	3272.4990

BLOWING.

TABLE IV. of Blowing Cylinders, their Area, Capacity, and Quantity of Air discharged by a Seven-Foot Stroke.

Diameter of Cylinders.	Area in Circular Inches.	Area in Square Inches.	Capacity of Cylinders in Cubical Feet.	Air discharged at the Rate of 10 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 20 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 30 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 40 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 50 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 60 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 70 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 80 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 90 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 100 Cylinders per Minute in Cubical Feet.
35	1296	1017.8784	49.4772	2473.5100	1978.8080	1484.1060	1236.7550	989.4040	742.0530	593.6424	494.7020		
37	1369	1075.8670	52.2572	2613.3600	2090.6880	1568.0160	1306.6300	1045.3440	784.0080	627.2064	522.6720		
38	1444	1134.1176	55.1306	2756.5300	2205.2240	1653.9180	1378.2650	1102.6120	826.9590	661.5672	551.3060		
39	1521	1194.5934	58.0705	2903.5250	2322.8200	1742.1150	1451.7625	1161.4100	871.0575	696.8460	580.7050		
40	1600	1256.6400	61.0845	3054.2250	2443.3800	1832.5350	1527.1125	1221.6900	918.2675	733.0140	610.8450		
41	1681	1320.2574	64.1791	3208.9550	2567.1640	1925.3770	1604.4775	1283.5820	972.6865	770.1492	641.7910		
42	1764	1385.4456	67.3459	3367.2950	2693.8360	2020.3730	1683.6475	1346.9180	1010.1885	808.1508	673.4590		
43	1849	1452.2046	70.5932	3529.6600	2823.7280	2117.3300	1764.8300	1411.8640	1058.6150	847.1184	705.9320		
44	1936	1520.5344	73.9110	3695.5500	2936.4400	2217.3300	1847.7750	1468.2200	1108.6600	886.9320	734.1100		
45	2025	1590.4350	77.3126	3865.6300	3092.5040	2319.3780	1932.815	1546.2520	1159.6890	927.7512	773.1260		
46	2116	1661.9064	80.7870	4039.3500	3231.4800	2423.6100	2019.6750	1615.7400	1211.8050	969.4440	807.8700		
47	2209	1734.9486	84.3377	4216.8850	3373.5080	2501.1310	2108.4425	1686.7540	1265.055	1012.0524	843.3750		
48	2304	1809.5616	87.9648	4398.2400	3518.5920	2638.9440	2199.1200	1759.2960	1319.4720	1055.5776	879.6480		
49	2401	1885.7550	91.6681	4584.4050	3666.7240	2759.0430	2292.2050	1833.5020	1375.0215	1100.0172	916.6810		
50	2500	1963.5000	95.4478	4774.3900	3817.9120	2863.4340	2386.1950	1908.9560	1431.2120	1145.3756	954.4780		
51	2601	2042.8254	99.3038	4968.4400	3972.1520	2979.1140	2482.7200	1986.0760	1489.5570	1191.6450	993.0380		
52	2704	2123.7216	103.1877	5159.3850	4127.5080	3095.6310	2579.6925	2063.7540	1547.8150	1238.2524	1031.8770		
53	2809	2206.1886	107.2453	5302.2650	4289.8120	3217.3590	2681.1325	2144.9060	1608.1795	1286.9436	1072.4530		
54	2916	2290.2264	111.3302	5506.5100	4453.2080	3339.9060	2783.2550	2226.6040	1669.9530	1335.9624	1113.3020		
55	3025	2375.8350	115.4919	5774.5950	4619.6760	3464.4750	2887.2975	2309.8380	1732.3785	1385.9028	1154.9140		
56	3136	2463.0144	119.7029	5985.1450	4788.1160	3591.0870	2992.5725	2394.0580	1795.5435	1436.4348	1197.0290		
57	3249	2551.7646	124.0439	6202.1950	4961.7560	3721.3170	3101.0975	2480.8780	1860.6585	1488.5468	1240.4390		
58	3364	2642.0856	128.4347	6421.7350	5137.3880	3853.0410	3210.8675	2568.6940	1926.5205	1541.2164	1284.3470		
59	3481	2733.9774	132.9016	6644.8020	5316.0640	3987.0480	3322.5400	2658.0320	1993.5240	1594.8192	1329.0160		
60	3600	2827.4400	137.4450	6872.2500	5497.8000	4123.3500	3436.1250	2748.4000	2061.6750	1649.3400	1374.2000		
61	3721	2922.4734	142.0646	7103.2300	5682.5840	4261.9380	3551.6150	2841.2920	2130.9690	1704.7752	1420.6460		
62	3844	3019.0766	146.7606	7338.0300	5870.4240	4402.8180	3669.0150	2935.2120	2201.4090	1761.1272	1467.6060		
63	3969	3117.2526	151.4968	7574.8400	6059.8720	4544.9040	3787.4200	3029.9360	2272.4520	1817.9616	1514.9680		
64	4096	3216.9984	156.3331	7816.6550	6253.3240	4689.9930	3908.3275	3126.6620	2344.9965	1875.9972	1563.3310		
65	4225	3318.3150	162.1664	8108.3200	6486.6560	4864.9920	4054.1600	3243.3280	2432.4960	1945.9968	1621.6640		
66	4356	3421.2024	168.3084	8315.4400	6652.3360	4989.2520	4157.7200	3326.1630	2494.6260	1995.7008	1663.0815		
67	4489	3525.6606	174.3462	8560.3100	6855.4480	5141.5860	4284.6500	3427.7240	2570.793	2056.6344	1713.8620		
68	4624	3631.6896	176.5493	8827.0150	7061.6120	5296.0090	4413.5075	3530.8060	2648.1045	2118.4836	1765.4030		
69	4761	3739.2894	181.7708	9088.5400	7270.8320	5453.1240	4544.2700	3635.4160	2726.5620	2181.2496	1817.7080		
70	4900	3848.4600	187.0779	9353.8950	7483.1160	5612.3370	4676.9475	3741.5580	2805.1685	2244.9348	1870.7790		
71	5041	3959.2014	192.4611	9623.0550	7698.4440	5773.8330	4811.5275	3849.2220	2886.9165	2309.5332	1929.6110		
72	5184	4071.5126	197.9210	9906.0500	7916.8400	5937.0300	4948.0250	3958.4200	2968.8150	2375.0520	1979.2100		
73	5329	4185.3966	203.4576	10172.8350	8138.2680	6103.7010	5086.4175	4069.1240	3051.8505	2441.4804	2034.5670		
74	5476	4300.8524	209.0690	10453.4500	8362.7600	6272.0720	5226.7250	4181.3800	3136.0350	2508.8280	2090.1900		
75	5625	4417.8750	214.7576	10737.8800	8590.3040	6442.7280	5368.9400	4295.1520	3221.3640	2577.0912	2147.5760		
76	5776	4536.4740	220.5227	11026.1350	8820.9040	6615.6410	5513.0675	4410.4540	3307.8405	2646.2724	2205.2270		
77	5929	4656.2366	226.3751	11315.7800	9052.6240	6789.4680	5657.8900	4526.3120	3394.7340	2715.7872	2263.1560		
78	6084	4778.3736	232.2820	11614.1000	9291.2800	6968.4600	5807.0500	4645.6400	3484.2300	2787.8840	2322.8200		
79	6241	4901.6844	238.3093	11915.4650	9532.3720	7192.2790	5957.7325	4766.1860	3574.6395	2859.7116	2383.0930		
80	6400	5025.5600	244.3465	12217.3250	9773.5600	7330.1950	6108.6625	4886.9300	3665.197	2932.1580	2443.4650		
81	6561	5153.0094	250.4933	12524.6650	10019.7320	7514.7990	6261.3325	5009.8660	3757.3995	3005.9196	2504.6330		
82	6724	5281.0296	256.7196	12835.8300	10268.6640	7701.4980	6417.9150	5134.3320	3850.7490	3080.5992	2567.1660		
83	6889	5410.6206	263.0161	13150.8100	10520.6480	7890.4400	6575.4050	5260.3240	3945.213	3156.1944	2630.1620		
84	7056	5541.7824	269.3925	13469.6250	10775.7000	8081.7770	6734.8125	5397.4500	4040.8875	3232.710	2693.9250		
85	7225	5674.5150	275.8444	13792.2200	11032.7760	8275.3320	6895.1100	5516.8880	4137.6665	3310.1328	2758.4440		
86	7396	5808.8184	282.3730	14118.6500	11294.9200	8471.1900	7059.3250	5647.4000	4235.5950	3388.4500	2823.7300		
87	7569	5944.6926	288.9779	14448.8950	11559.1160	8659.3370	7224.4475	5779.5580	4334.6685	3467.7348	2890.7790		
88	7744	6082.1376	295.6593	14782.9650	11826.3720	8869.7790	7391.4825	5913.1860	4434.8895	3547.9116	2956.5930		
89	7921	6221.1534	302.4171	15120.8550	12096.6400	9072.5130	7566.4275	6048.3420	4536.2565	3629.0052	3024.1710		
90	8100	6361.7400	309.2512	15462.5600	12370.0400	9277.5360	7731.2800	6185.0240	4638.7600	3711.0144	3092.5120		
91	8281	6503.8974	316.1616	15808.0800	12646.4640	9484.848	7904.0400	6323.2320	4742.2420	3793.9920	3161.6160		
92	8464	6647.6256	323.1442	16157.4150	12925.9320	9694.4490	8073.7075	6462.4600	4847.2245	3877.7796	3231.4830		
93	8649	6792.9244	330.2114	16510.5700	13208.4560	9906.3420	8255.2850	6604.2220	4953.1710	3962.5356	3302.1140		
94	8836	6939.7944	337.3510	16867.5500	13494.0400	10120.5300	8433.7750	6747.0200	5050.2650	4044.212	3373.1000		
95	9025	7088.2250	344.569	17228.3450	13782.6760	10337.0070	8614.1725	6894.3380	5168.5035	4133.5028	3445.6690		
96	9216	7238.2464	351.8595	17592.9750	14074.3800	10555.7850	8796.4875	7037.9000	5277.8925	4222.3140	3518.5950		
97	9409	7389.8286	359.3944	17969.7200	14375.7760	10781.8320	8984.8600	7177.8800	5390.9160	4312.7328	3593.9440		
98	9604	7542.9816	366.6842	18334.2100	14677.3680	11000.5260	9167.1050	7333.6840	5555.2630	4400.2104	3666.8420		
99	9801	7697.7034	374.1938	18709.6900	14967.7520	11225.8140	9354.3450	7483.8760	5612.9070	4490.3250	3741.9380		
100	10000	7854.0000	381.7915	19089.5750	15271.6600	11453.7450	9544.7875	7635.8300	5726.8725	4581.4980	3817.9150		

BLOWING.

TABLE V. of Blowing Cylinders, their Area, Capacity, and Quantity of Air, discharged by an Eight-Foot Stroke.

Diame- ters of Cylinders	Area in Circular Inches.	Area in Square Inches.	Capacity of the Stroke in Cubical Feet.	Air discharged at the Rate of 10 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 20 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 30 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 40 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 50 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 60 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 70 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 80 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 90 Cylinders per Minute in Cubical Feet.	Air discharged at the Rate of 100 Cylinders per Minute in Cubical Feet.
35	1296	1017.8784	56.5488	2827.4400	2261.9520	1696.4640	1413.7200	1130.9760	848.2320	678.5856	565.4880		
37	1369	1075.8670	59.7340	2986.7000	2389.3600	1792.0200	1493.3500	1194.6800	896.0100	680.8080	597.3400		
38	1444	1134.1176	63.0064	3150.3200	2520.2560	1890.1920	1575.1600	1260.1280	945.0960	756.0768	630.0640		
39	1521	1194.5934	66.3662	3318.3100	2654.6480	1990.9860	1659.1550	1327.3240	995.4930	796.3944	663.6620		
40	1600	1256.6400	69.8110	3490.5500	2792.4400	2094.3300	1745.2750	1396.2200	1047.1650	837.7320	698.1100		
41	1681	1320.2574	73.3475	3667.3800	2933.9040	2200.4280	1833.6900	1466.9520	1100.2140	880.1712	733.4760		
42	1764	1385.4456	76.9568	3848.3400	3078.6720	2309.0040	1924.1700	1539.3360	1154.5020	923.6016	769.6680		
43	1849	1452.2046	80.6780	4033.9000	3227.1200	2420.3400	2016.9500	1613.5600	1210.1700	968.1360	806.7800		
44	1936	1520.5344	84.4740	4233.7000	3378.9600	2534.2200	2116.8500	1689.4800	1267.1100	1013.6880	844.7400		
45	2025	1590.4350	88.3574	4447.8700	3534.2960	2650.2200	2208.9350	1767.1480	1325.3610	1062.4488	883.5740		
46	2116	1661.9064	92.3280	4676.4000	3693.1200	2769.8400	2308.2000	1846.5600	1384.9200	1107.9360	923.2800		
47	2209	1734.9486	96.3860	4919.3000	3855.4400	2891.5800	2409.6500	1927.7200	1445.7900	1156.6320	963.8600		
48	2304	1809.5616	100.5312	5026.5600	4021.2480	3015.9360	2513.2200	2010.6240	1507.9680	1206.3744	1004.3120		
49	2401	1885.7545	104.7636	5258.1800	4190.5440	3142.9080	2619.0900	2095.2720	1571.4540	1255.1032	1047.6360		
50	2500	1963.5000	109.0832	5545.1600	4363.3880	3274.4960	2727.0800	2181.6940	1636.2480	1308.9984	1090.8470		
51	2601	2042.8254	113.4902	5874.5100	4539.6080	3404.7060	2837.2550	2269.8040	1702.3530	1361.8824	1134.9020		
52	2704	2123.7216	117.9288	6248.4400	4717.1520	3537.8640	2948.2200	2358.5760	1768.9320	1415.1456	1179.2880		
53	2809	2206.1886	122.5660	6668.3000	4902.6400	3676.9800	3064.1500	2451.3200	1838.4900	1470.7920	1225.6600		
54	2916	2290.2264	127.2346	7148.7300	5089.3840	3817.9280	3180.8650	2544.6920	1908.5190	1526.8152	1272.3460		
55	3025	2375.8350	131.9900	7699.5400	5279.6320	3959.7240	3299.7700	2639.8160	1979.8620	1583.8896	1319.9080		
56	3136	2463.0144	136.8034	8340.1700	5472.1360	4104.1020	3420.0850	2736.0680	2052.0510	1641.6438	1368.0340		
57	3249	2551.7646	141.7646	9088.2300	5670.5840	4252.9380	3544.1150	2835.2920	2126.9990	1701.1752	1417.6460		
58	3364	2642.0856	146.7826	9949.1300	5871.3040	4403.4780	3669.5650	2935.6520	2201.7390	1751.3912	1467.8260		
59	3481	2734.9774	151.8876	10939.3800	6075.5040	4556.6280	3797.1900	3037.7520	2278.3140	1812.6312	1518.8760		
60	3600	2829.4400	157.0800	12088.0000	6283.2000	4712.4000	3927.0000	3141.6000	2356.2000	1884.9600	1570.8000		
61	3721	2922.4734	162.3596	13417.9800	6494.3840	4870.7880	4058.9900	3247.1920	2435.3940	1948.3152	1623.5960		
62	3844	3019.0776	167.7264	14986.3200	6709.0560	5031.7920	4193.1600	3354.5280	2515.8960	2012.7168	1677.2640		
63	3969	3117.2526	173.1406	16807.0300	6925.6240	5194.2180	4328.5150	3462.8120	2597.1040	2077.6872	1731.4010		
64	4096	3216.9984	178.6664	18933.3200	7146.6560	5359.9920	4466.6600	3573.3280	2679.9960	2144.1968	1786.6640		
65	4225	3318.3150	184.3508	2217.5400	7374.0320	5530.5240	4608.7700	3687.0160	2765.2620	2212.2096	1843.5080		
66	4356	3421.2024	190.0668	2603.3400	7602.6720	5702.0040	4751.6700	3801.3360	2851.0020	2280.8016	1900.1680		
67	4489	3525.6606	195.8700	3079.5000	7834.8000	5876.1000	4896.7500	3917.4000	2938.0500	2350.4400	1958.7000		
68	4624	3631.6890	201.7604	3668.0200	8070.4160	6052.8120	5044.0100	4035.2080	3026.4060	2421.1248	2017.6040		
69	4761	3739.2894	207.7382	4393.9100	8309.5280	6232.1460	5193.4550	4154.7640	3116.0730	2492.8584	2077.3820		
70	4900	3848.4600	213.8034	5280.1700	8552.1360	6414.1020	5345.0850	4276.0680	3207.0510	2565.6408	2138.0340		
71	5041	3959.2014	219.9556	6349.7800	8798.2240	6598.6680	5498.8900	4399.1120	3299.3340	2639.4672	2199.5560		
72	5184	4071.5136	226.1952	7609.7600	9047.8080	6785.8560	5654.8800	4523.9040	3392.9280	2714.3424	2261.9520		
73	5329	4185.3966	232.5220	9062.1000	9300.8800	6975.6600	5813.0500	4650.4400	3487.8300	2790.2640	2325.2200		
74	5476	4300.8504	238.9360	10746.8000	9557.4400	7168.0800	5973.4000	4778.7200	3584.4000	2867.2320	2389.3600		
75	5625	4417.8750	245.4374	12717.8700	9817.4960	7363.1220	6135.9350	4908.7480	3681.0610	2945.2488	2454.3740		
76	5776	4536.4704	252.0260	14981.3000	10081.0400	7560.7800	6300.6500	5040.5200	3780.3900	3024.3126	2520.2600		
77	5929	4656.6366	258.6464	17642.3200	10345.8560	7759.3920	6466.1600	5172.9280	3879.6960	3103.7568	2586.4640		
78	6084	4778.3736	265.4652	21737.2600	10618.6280	7963.9560	6636.6300	5309.3040	3981.9780	3185.5824	2654.6320		
79	6241	4901.6844	272.3156	27461.7800	10892.6240	8169.4680	6827.8900	5446.3120	4084.7340	3267.7872	2723.1560		
80	6400	5026.5600	279.2530	34966.6500	11170.1200	8377.5900	6981.3250	5585.0600	4188.7950	3351.0360	2792.5300		
81	6561	5153.0094	286.2782	44643.9100	11451.1280	8588.3460	7156.9550	5725.5640	4294.1730	3435.3834	2862.7820		
82	6724	5281.0296	293.3904	56909.5200	11735.6160	8801.7120	7334.7600	5867.8080	4400.8560	3520.6848	2933.5040		
83	6889	5410.6206	300.5900	72409.5000	12023.6000	9017.7000	7514.9500	6011.8000	4508.8500	3607.0800	3005.9000		
84	7056	5541.7824	307.8772	91933.8600	12315.0880	9236.3160	7696.6700	6157.5440	4618.1580	3694.5264	3078.2720		
85	7225	5674.5150	315.2508	11592.5400	12610.0320	9457.5240	7881.2700	6305.0160	4728.2620	3783.0096	3152.5080		
86	7396	5808.8184	322.7120	14835.6000	12908.4800	9681.3600	8067.8000	6454.2400	4840.6800	3872.5440	3227.1200		
87	7569	5944.6926	330.2606	18513.0300	13210.4240	9927.8180	8256.0150	6655.2120	4953.9090	3963.1272	3277.6060		
88	7744	6082.1376	337.8964	23894.8200	13515.8560	10136.8920	8447.4120	6757.4280	5068.4460	4054.7568	3328.7140		
89	7921	6221.1534	345.6196	31900.9400	13824.7840	10368.8880	8640.4900	6912.3920	5184.2940	4147.4352	3356.1960		
90	8100	6361.7400	353.4300	43771.5000	14137.2000	10602.9000	8835.7300	7068.6000	5301.4500	4241.1600	3334.3000		
91	8281	6503.8974	361.3276	59665.3800	14453.1040	10839.8280	9033.1900	7226.5520	5419.9140	4335.9312	3363.2760		
92	8464	6647.6256	369.3124	80665.6200	14772.4960	11079.3720	9232.8100	7386.2480	5539.6860	4431.7488	3393.1240		
93	8649	6792.9246	377.3844	108989.2300	15095.3840	11321.5380	9434.6150	7547.6920	5660.7600	4528.6152	3473.8460		
94	8836	6939.7944	385.5440	149277.2000	15421.7600	11566.3200	9638.2000	7710.8800	5783.1600	4626.5280	3553.4400		
95	9025	7088.2250	393.7900	19949.5400	15751.6320	11813.7240	9844.7700	7875.8160	5906.8620	4725.4896	3637.9080		
96	9216	7238.2164	402.1252	26906.2600	16085.0080	12063.7560	10053.1300	8042.5040	6031.8780	4825.5024	3721.2520		
97	9409	7389.8286	410.5460	36227.3000	16421.8400	12316.3800	10263.1500	8210.9200	6158.1900	4926.5520	3815.4600		
98	9604	7542.9816	419.0544	49720.7200	16762.1760	12571.6320	10476.3600	8381.8800	6285.8160	5028.6288	3919.5440		
99	9801	7697.7054	427.6502	67832.5100	17106.0080	12829.5060	10691.2500	8553.0040	6414.7530	5131.8024	4027.5020		
100	10000	7854.0000	436.3332	91816.6600	17453.3280	13089.9960	10908.3300	8726.6640	6544.9980	5235.9984	4136.3320		

BLOWING.

TABLE II. of the Powers of Steam Engines working at the Rate of 6 lbs. Avoirdupoise upon every Circular Inch, or 7.639 lb. upon every Square Inch of the Steam Piston applicable to Blowing Machinery; and the Areas and Diameters of Blowing Cylinders requisite to raise Air of various Densities from 1½ lb. to 4 lbs. upon each Circular Inch, or from 1.90 lb. to 5.092 lbs. Avoirdupoise upon each Square Inch of the Air Receiver.

Diameter of Steam Cylinder.	Area of Ditto.	Power of the Engine in H.P.	Blow 1 lb. per Circular Inch, or 1.60 lb. per Square Inch.		Blow 2 lb. per Circular Inch, or 2 1/2 lb. per Square Inch.		Blow 3 lb. per Circular Inch, or 3 5/8 lb. per Square Inch.		Blow 4 lb. per Circular Inch, or 4 5/8 lb. per Square Inch.		Blow 5 lb. per Circular Inch, or 5 1/2 lb. per Square Inch.		Blow 6 lb. per Circular Inch, or 6 1/2 lb. per Square Inch.		Blow 7 lb. per Circular Inch, or 7 1/2 lb. per Square Inch.		Blow 8 lb. per Circular Inch, or 8 1/2 lb. per Square Inch.		Blow 9 lb. per Circular Inch, or 9 1/2 lb. per Square Inch.		Blow 10 lb. per Circular Inch, or 10 1/2 lb. per Square Inch.			
			Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.	Area of Blowing Cylinder.	Diam. of Ditto.
20	400	2400	1600	40	1371	37	1200	34 3/4	1066	32 3/4	960	31	872	29 1/2	800	28 1/2	788	27 3/4	685	26 1/2	640	25 1/2	600	24 3/4
21	441	2646	1764	42	1512	38 1/2	1323	36 1/2	1176	34 3/4	1058	32 1/2	962	31	882	29 1/2	814	28 1/2	756	27 1/2	705	26 1/2	661	25 1/2
22	484	2904	1936	44	1659	40 1/2	1452	38	1290	36	1161	34	1056	32 1/2	968	31	830	28 1/2	829	27 3/4	774	26 3/4	726	25 3/4
23	529	3174	2116	46	1813	42 1/2	1587	39 3/4	1410	37 1/2	1269	35 1/2	1154	34	1058	32 1/2	976	31 1/4	909	30	846	29	793	28
24	576	3456	2304	48	1974	44 1/2	1728	41 1/2	1536	39	1382	37	1256	35 1/2	1152	34	1063	32 3/4	987	31 1/4	921	30 1/4	864	29 1/4
25	625	3750	2500	50	2142	46 1/2	1875	43 1/4	1666	40 3/4	1500	38 1/2	1363	37	1250	35 1/2	1153	34	1071	32 1/2	1000	31 1/2	937	30 1/2
26	676	4056	2704	52	2317	48	2028	45	1802	42 1/2	1622	40	1475	38 1/2	1352	37	1248	35 1/4	1159	34	1081	32 3/4	1014	31 1/4
27	729	4374	2916	54	2499	50	2187	46 3/4	1944	44	1749	41 3/4	1590	40	1458	38 1/4	1345	36 3/4	1249	35 3/4	1166	34	1093	33
28	784	4704	3136	56	2688	51 1/2	2352	48 1/2	2098	45 1/2	1880	43 1/4	1710	41 1/2	1568	39 1/2	1447	38	1344	36 1/2	1254	35 1/2	1176	34
29	841	5046	3364	58	2883	53 1/2	2523	50 1/2	2242	47	2018	45	1834	43	1682	41	1552	39 3/4	1441	38	1345	36 1/2	1261	35 1/2
30	900	5400	3600	60	3085	55 1/2	2700	52	2400	49	2160	46 1/2	1963	44 1/2	1800	42 1/2	1661	40 3/4	1542	39 1/4	1440	37 3/4	1350	36 3/4
31	961	5766	3844	62	3289	57 1/2	2883	53 3/4	2562	50	2306	48	2096	46	1922	42	1774	42	1645	40 1/2	1537	39	1441	38
32	1024	6144	4096	64	3510	59	3072	55 1/2	2730	52 1/2	2457	49 1/2	2234	47 1/2	2048	45 1/2	1819	43 1/2	1755	41	1638	40 1/2	1536	39 1/2
33	1089	6534	4356	66	3733	61	3267	57 1/2	2904	54	2613	51	2376	49	2178	46 3/4	2010	45	1866	43 1/4	1742	41 1/4	1633	40 1/4
34	1156	6936	4624	68	3963	63	3468	59 3/4	3082	55 1/2	2774	52 1/2	2522	50 1/2	2312	48	2134	46 1/2	1981	44 1/4	1849	43	1734	41 3/4
35	1225	7350	4900	70	4200	65	3675	62 1/2	3266	57 1/2	2940	54	2672	51	2450	49 1/2	2261	47 1/2	2100	45 1/4	1960	44 1/4	1837	43
36	1296	7776	5184	72	4443	66 3/4	3888	62 3/4	3456	59	3110	55 1/2	2827	53	2592	51	2392	49	2221	47	2070	46 1/4	1944	44 1/4
37	1369	8214	5476	74	4693	68 1/2	4107	64	3650	60 1/2	3285	57	2986	54 1/2	2738	52 1/2	2527	50 3/4	2346	48 1/4	2190	47 1/4	2053	45 1/4
38	1444	8664	5776	76	4950	70 1/2	4332	65 3/4	3850	62	3465	58 1/2	3150	56	2888	53 3/4	2662	51 1/2	2475	49 1/2	2310	48	2166	46 3/4
39	1521	9126	6084	78	5214	72 1/2	4563	67 1/2	4056	63	3650	60 3/4	3314	57	3042	55	2808	53	2607	51 3/4	2433	49 1/4	2281	48
40	1600	9600	6400	80	5485	74 1/2	4800	69	4266	65 1/2	3840	62	3490	59	3200	56 1/2	2953	54 1/2	2742	52 1/4	2560	50 1/2	2400	49
41	1681	10086	6724	82	5763	76	5043	71	4482	67	4034	63 1/2	3667	60 1/2	3362	58	3103	55 1/2	2881	53 3/4	2689	51 3/4	2521	50 3/4
42	1764	10584	7056	84	6048	77 3/4	5292	72 3/4	4704	68 1/2	4233	65	3848	62	3528	59 1/2	3246	57	3024	55	2822	53	2646	51 1/2
43	1849	11094	7396	86	6339	79 1/2	5547	74 1/2	4961	70 1/2	4485	66 1/2	4034	62 1/2	3698	60 3/4	3413	58 1/2	3169	56 1/4	2958	54 1/4	2773	52 1/4
44	1936	11616	7744	88	6637	81 1/2	5808	76 1/2	5160	72	4646	68	4224	64 1/2	3872	62	3574	60	3318	57 1/2	3097	55 1/2	2904	53 1/2
45	2025	12150	8100	90	6942	83 1/2	6075	78	5400	73 1/2	4860	69 1/2	4418	66 1/2	4050	63 1/2	3738	61 1/2	3471	59	3240	56 3/4	3176	55
46	2116	12696	8464	92	7254	85	6348	79 3/4	5642	75	5078	71 3/4	4616	68	4232	65	3906	62 1/2	3627	60 3/4	3385	58	3307	56 1/2
47	2209	13254	8836	94	7573	87	6627	81 3/4	5830	76 3/4	5301	73	4819	69 1/2	4418	66 1/2	4078	64	3786	63 1/4	3534	59 1/4	3313	57 1/4
48	2304	13824	9216	96	7899	88 1/2	6912	83 1/2	6144	78 1/2	5529	74 1/2	5026	71	4608	68	4253	65 1/2	3949	62 3/4	3686	60 3/4	3456	58 3/4
49	2401	14406	9616	98	8232	90 1/2	7203	84 3/4	6402	80	5762	76	5238	72 1/2	4802	69 1/2	4432	66 1/2	4116	64	3841	61 1/4	3600	59 1/4
50	2500	15000	10000	100	8571	92	7500	86 1/2	6666	81 1/2	6000	77 1/2	5454	74	5000	70	4613	68	4285	65 1/2	4000	63	3750	61
51	2601	15606	10404	102	8917	94	7803	88 1/2	6936	83 1/2	6242	79	5675	75 1/2	5202	72	4801	69 1/2	4458	66 1/2	4161	64 1/2	3901	62 1/2
52	2704	16224	10816	104	9270	96	8112	90	7210	85	6489	80 1/2	5899	77	5408	73 1/2	4992	70 1/2	4635	67 1/2	4326	65 1/2	4056	63 1/2
53	2809	16854	11236	106	9630	98	8427	91 1/2	7490	86 1/2	6741	82	6123	78 1/2	5618	75	5105	72	4815	69 1/4	4494	67	4213	64 1/2
54	2916	17496	11664	108	9997	100	8748	93 1/2	7776	88	6996	83 1/2	6362	79 1/2	5832	76 1/2	5338	73 1/2	4998	70 3/4	4663	68 1/4	4374	66
55	3025	18150	12100	110	10371	101 1/2	9075	95	8066	89	7260	85 1/2	6600	81 1/2	6050	77 1/2	5558	74 1/2	5185	72	4840	69 1/2	4537	67 1/2
56	3136	18816	12544	112	10752	103 1/2	9408	97	8362	91 1/2	7526	86 3/4	6842	82	6272	79 1/2	5789	76 1/2	5378	73 3/4	5017	70 3/4	4704	68 3/4
57	3249	19494	12996	114	11139	105	9747	98	8664	93	7797	88 3/4	7088	84	6428	80 1/2	5998	77 1/2	5569	74 1/2	5198	72	4873	69 1/2
58	3364	20184	13456	116	11533	107 1/2	10092	100	8970	94 1/2	8073	89 3/4	7339	85	6728	82	6210	78 3/4	5765	75 1/2	5382	73 1/2	5046	71
59	3481	20886	13924	118	11935	109 1/2	10443	102 1/2	9280	96 1/2	8354	91 1/2	7594	87	6962	83 1/2	6426	80	5967	77 1/2	5569	75 1/2	5221	72 1/2
60	3600	21600	14400	120	12342	111	10800	104	9600	98	8640	93	7854	88 1/2	7200	85	6616	81 1/2	6171	78 1/2	5760	75 1/2	5400	73 1/2
61	3721	22326	14884	122	12754	113	11163	105 1/2	9922	99	8930	94 1/2	8118	90	7442	86 1/2	6860	83	6378	79 1/2	5937	77 1/2	5581	74 1/2
62	3844	23064	15376	124	13179	114 1/2	11532	107 1/2	10250	101 1/2	9225	96	8386	91 1/2	7638	87 1/2	7096	84 1/2	6509	81	6150	78 1/2	5766	76
63	3969	23814	15876	126	13608	116 1/2	11907	109	10584	103	9525	97 1/2	8639	93	7938	89	7327	85 1/2	6604	82 1/2	6350	79 1/2	5953	77 1/2
64	4096	24576	16384	128	14043	118	12288	110 1/2	10922	104 1/2	9830	99	8936	94 1/2	8190	90	7561	87	7021	83 1/2	6553	80 1/2	6144	79 1/2
65	4225	25350	16900	130	14483	120 1/2	12675	112	11266	106 1/2	10140	100 3/4	9218	96	8450	92	7800	88	7242	85	676	82	6337	79 1/2
66	4356	26136	17424	132	14934	122 1/2	13068	114 1/2	11660	107 1/2	10454	102 1/2	9504	97 1/2	8712	93	8041	89	767	86 1/2	6969	83 1/2	6534	81 1/2
67	4489	26934	17956	134	15390	124	13476	116	11970	109 1/2	10773	103 1/2	9794	99	8978	94 1/2	8287	91	7695	87 1/2	7182	84 1/2	6733	82 1/2
68	4624	27744	18496	136	15853	126	13872	117 1/2	12230	111	11097	105 1/2	10088	100 1/2	9248	96	8536	92	792	89	7390	85 1/2	6936	83 1/2
69	4761	28566	19044	138	16323	127 1/2	14283	119 1																

BLOWING.

TABLE III. of the Powers of Steam Engines working at the Rate of 7 lbs. Avoirdupoise upon every Circular Inch, or 8.91 lbs. upon every Square Inch of the Steam Piston, applicable to Blowing Machinery; and the Areas and Diameters of Blowing Cylinders requisite to raise the Air Receiver.

Diameters of Steam Piston	Area of Piston	Power of Piston in H.P.	Blow 1 1/2 lb. per Cir. Inch, or 1.90 lb. per Square Inch.		Blow 2 lb. per Cir. Inch, or 2.27 lb. per Square Inch.		Blow 2 1/2 lb. per Cir. Inch, or 2.80 lb. per Square Inch.		Blow 3 lb. per Cir. Inch, or 3.41 lb. per Square Inch.		Blow 3 1/2 lb. per Cir. Inch, or 4.13 lb. per Square Inch.		Blow 4 lb. per Cir. Inch, or 4.77 lb. per Square Inch.		Blow 4 1/2 lb. per Cir. Inch, or 5.02 lb. per Square Inch.	
			Area of blowing Cylinder	Diameter of Ditto	Area of blowing Cylinder	Diameter of Ditto	Area of blowing Cylinder	Diameter of Ditto	Area of blowing Cylinder	Diameter of Ditto	Area of blowing Cylinder	Diameter of Ditto	Area of blowing Cylinder	Diameter of Ditto	Area of blowing Cylinder	Diameter of Ditto
20	400	2800	1866	43 1/4	1600	40	1400	37 1/2	1244	35 3/4	1120	33 1/2	1014	31 1/4	933	30 1/4
21	441	3087	2058	45 1/4	1764	42	1543	39 1/4	1372	37	1234	35	1122	33 1/2	1029	32
22	484	3388	2258	47	1936	44	1699	41	1505	38 3/4	1355	36 3/4	1232	35	1129	33 1/2
23	529	3703	2468	49 1/4	2116	46	1851	43	1645	40 1/2	1481	38 1/2	1346	36 1/2	1234	35
24	576	4032	2688	51 1/4	2304	48	2016	45	1792	42	1612	40	1466	38 1/4	1344	36 1/2
25	625	4375	2916	54	2500	50	2187	46 3/4	1944	43 1/2	1750	41 3/4	1590	40	1458	38
26	676	4732	3154	56	2704	52	2366	48 1/4	2103	46	1892	43	1720	41 1/4	1574	39 1/2
27	729	5103	3402	58 1/4	2916	54	2551	50 1/4	2268	47 1/4	2041	45	1855	43	1701	41
28	784	5488	3658	60 1/4	3136	56	2744	52 1/4	2439	49 1/4	2195	46 1/4	1995	44 1/2	1829	42 3/4
29	841	5887	3924	62 1/4	3364	58	2943	54 1/4	2616	51 1/4	2354	48	2104	46	1962	44 1/4
30	900	6300	4200	64 1/4	3600	60	3150	56	2800	53	2520	50	2290	47 1/2	2100	45 1/4
31	961	6727	4484	67	3844	62	3363	58	2989	54 1/4	2690	51	2446	49	2242	47 1/4
32	1024	7168	4778	69 1/4	4096	64	3584	59 3/4	3185	56 1/4	2867	53	2605	50 3/4	2389	48 1/4
33	1089	7623	5080	71 1/4	4356	66	3811	61 1/4	3388	58	3049	55	2772	52 1/2	2541	50 1/4
34	1156	8092	5394	73 1/4	4624	68	4046	63 1/4	3596	59 1/4	3236	56 3/4	2942	54 1/4	2697	52
35	1225	8575	5716	75 1/4	4900	70	4287	65 1/4	3811	61 3/4	3430	58	3118	56	2858	53 1/2
36	1296	9072	6048	77 1/4	5184	72	4536	67 1/4	4032	63 1/4	3628	60 1/4	3299	57 1/2	3024	55
37	1349	9583	6388	80	5476	74	4791	69	4259	65 3/4	3833	62	3484	59	3194	56 1/2
38	1444	10108	6738	82	5776	76	5054	71	4491	67	4043	63 1/2	3675	60 1/2	3399	58
39	1521	10647	7098	84 1/4	6084	78	5323	73	4732	68 3/4	4258	65 1/4	3872	62	3549	59 1/2
40	1600	11200	7466	86 1/4	6400	80	5600	75	4977	70 1/4	4480	67	4072	63 1/2	3733	61
41	1681	11767	7844	88	6724	82	5883	76 3/4	5229	72 1/4	4706	68 1/2	4278	65 1/4	3922	62 1/2
42	1764	12348	8232	90	7056	84	6174	78 1/2	5488	74	4939	70 1/2	4490	67	4116	64
43	1849	12943	8628	92	7396	86	6471	80 1/2	5752	75 3/4	5177	72	4706	68 1/2	4314	65 1/2
44	1936	13552	9034	95	7744	88	6776	82 1/2	6023	77 1/2	5420	73 1/4	4928	70	4517	67
45	2025	14175	9430	97 1/4	8100	90	7087	84 1/4	6300	79 1/4	5670	75 1/4	5154	71 1/4	4725	68 1/2
46	2116	14812	9834	99 1/4	8464	92	7406	86	6583	81	5924	77 1/2	5386	73 1/4	4937	70
47	2209	15463	10308	101 1/4	8836	94	7731	88	6872	82 3/4	6185	78 3/4	5622	75	5154	71 3/4
48	2304	16128	10752	103 1/4	9216	96	8064	89 3/4	7168	84	6451	80 1/2	5864	76 1/2	5376	72 3/4
49	2401	16807	11204	106	9604	98	8450	91 1/4	7469	86 1/4	6722	82	6111	78	5602	74 1/2
50	2500	17500	11666	108	10000	100	8850	93 1/4	7777	88	7000	83 1/4	6363	79 1/2	5833	76 1/2
51	2601	18207	12138	110 1/4	10404	102	9193	95 1/4	8092	90	7282	85 1/4	6620	81 1/4	6069	78
52	2704	18928	12618	112 1/4	10816	104	9464	97 1/4	8412	91 3/4	7571	87	6882	83	6309	79 1/2
53	2809	19663	1310	114 1/4	11236	106	9831	99 1/4	8739	93 1/4	7865	88 3/4	7150	84 1/2	6554	81
54	2916	20412	13608	116 1/4	11664	108	10206	101	9072	95 1/4	8164	90	7422	86	6804	82 1/2
55	3025	21175	14116	118 1/4	12102	110	10587	103	9411	97	8470	92	7700	87 1/2	7058	84
56	3136	21952	14634	121	12544	112	10976	104 1/4	9756	98 3/4	8780	93 3/4	7982	89	7317	85 1/2
57	3249	22743	15162	123 1/4	12996	114	11371	106 1/4	10108	100 1/2	9097	95 1/2	8270	90 1/4	7581	87
58	3364	23548	15698	125 1/4	13456	116	11774	108 1/4	10465	102	9419	97	8562	92 1/2	7849	88 1/2
59	3481	24367	16244	127 1/4	13920	118	12183	110 1/4	10829	104	9746	98 3/4	8860	94	8122	90
60	3600	25200	16800	129 1/4	14400	120	12600	112 1/4	11200	105 1/4	10080	100 1/2	9163	95 3/4	8400	91 1/2
61	3721	26047	17364	131 1/4	14884	122	13023	114	11573	107 1/4	10418	102	9471	97 1/4	8682	93
62	3844	26908	17932	134	15376	124	13454	116	11959	108 3/4	10763	103 3/4	9784	99	8969	94 1/2
63	3969	27783	18522	136	15876	126	13891	117 3/4	12348	111	11113	105 1/2	10102	100 1/2	9261	96
64	4096	28672	19124	138 1/4	16384	128	14336	119 1/4	12743	113	11488	107 1/2	10426	102	9557	97 1/2
65	4225	29575	19740	140 1/4	16900	130	14787	121 1/4	13144	114 3/4	11830	108 3/4	10754	103 3/4	9858	99
66	4356	30492	20328	142 1/4	17424	132	15246	123 1/4	13552	116 1/2	12196	110 1/2	11068	105 1/4	10164	100 1/2
67	4489	31423	20948	144 1/4	17956	134	15711	125 1/4	13965	118 1/4	12569	112	11426	107	10474	102
68	4624	32368	21578	146 1/4	18496	136	16184	127 1/4	14385	120	12947	113 3/4	1177	108 1/2	10789	103 1/2
69	4761	33327	22218	149	19044	138	16663	129	14812	121 1/2	13330	115 1/2	12119	110	11109	105 1/2
70	4900	34300	22866	151	19600	140	17150	131	15244	123 1/2	13720	117	12472	111 1/2	11433	107

BLOWING.

TABLE IV. of the Powers of Steam Engines working at the Rate of 8lbs. Avoirdupoise, upon every Circular Inch, or 10.18 lbs. upon every Square Inch of the Steam Piston, applicable to Blowing Machinery; and the Areas and Diameters of Blowing Cylinders requisite to raise Air of various Densities from 1½ lb. to 4 lbs. upon each Circular Inch, or from 1.90 lb. to 5.092 lbs. Avoirdupoise upon each Square Inch of the Air Receiver.

Diameter of Steam Cylind.	Area of Ditto.	Power of the Engine in H.P.	Blast 1½ lb. per Circular Inch, or 1.90 lb. per Square Inch.		Blast 2 lb. per Circular Inch, or 2.54 lb. per Square Inch.		Blast 2½ lb. per Circular Inch, or 3.18 lb. per Square Inch.		Blast 3 lb. per Circular Inch, or 3.81 lb. per Square Inch.		Blast 3½ lb. per Circular Inch, or 4.45 lb. per Square Inch.		Blast 4 lb. per Circular Inch, or 5.09 lb. per Square Inch.		Blast 4½ lb. per Circular Inch, or 5.73 lb. per Square Inch.		Blast 5 lb. per Circular Inch, or 6.37 lb. per Square Inch.							
			Area of Cylinder.	Diameter of Ditto.	Area of Cylinder.	Diameter of Ditto.	Area of Cylinder.	Diameter of Ditto.	Area of Cylinder.	Diameter of Ditto.	Area of Cylinder.	Diameter of Ditto.	Area of Cylinder.	Diameter of Ditto.	Area of Cylinder.	Diameter of Ditto.	Area of Cylinder.	Diameter of Ditto.	Area of Cylinder.	Diameter of Ditto.				
20	400	3200	2133	46½	1828	42¾	1500	40	1422	37¾	1280	36	1163	34	1066	32¼	984	31¼	914	30	853	29	800	28¼
21	441	3528	2352	48	2016	45	1764	42	1568	39¾	1412	37½	1282	35	1176	34	1085	33	1008	31½	940	30	882	29½
22	484	3872	2581	50	2212	47	1936	44	1720	41	1548	39	1408	37	1290	35	1191	34	1106	33	1032	32	968	31
23	529	4232	2821	53	2418	49	2116	46	1880	43	1692	41	1538	39	1410	37	1302	36	1209	34½	1128	33½	1058	32½
24	576	4608	3072	55	2633	51	2304	48	2048	45	1845	43	1675	41	1536	39	1417	37½	1316	36½	1228	35	1152	33½
25	625	5000	3333	57	2857	53	2500	50	2222	47	2000	44	1818	42	1666	40	1538	39	1428	37½	1333	36½	1250	35
26	676	5408	3605	60	3090	55	2704	52	2403	49	2163	46	1966	44	1802	42	1664	40	1545	39	1442	38	1352	36
27	729	5832	3886	62	3332	57	2916	54	2592	50	2332	48	2120	46	1944	44	1794	42	1666	40	1555	39½	1458	37
28	784	6272	4181	64	3584	59	3136	56	2787	52	2508	50	2280	47	2090	45	1929	44	1792	42	1672	41	1568	39
29	841	6728	4485	67	3844	61	3364	58	2990	54	2691	51	2446	49	2242	47	2069	45	1922	43	1794	42	1682	41
30	900	7200	4800	69	4114	64	3600	60	3200	56	2880	53	2618	51	2400	49	2215	47	2057	45	1920	44	1800	42
31	961	7688	5125	71	4393	66	3844	62	3417	58	3075	55	2795	52	2562	50	2365	48	2196	46	2050	45	1922	43
32	1024	8192	5461	74	4681	68	4096	64	3640	60	3276	57	2989	54	2730	52	2520	50	2340	48	2184	46	2048	45
33	1089	8712	5808	76	4978	70	4356	66	3872	62	3484	59	3168	56	2904	54	2680	51	2489	50	2323	48	2178	46
34	1156	9248	6165	78	5284	72	4624	68	4110	64	3699	60	3362	58	3082	55	2845	53	2642	51	2466	49	2312	48
35	1225	9800	6533	81	5600	74	4900	70	4355	66	3920	62	3563	59	3266	57	3015	54	2800	53	2613	51	2450	49
36	1296	10368	6912	83	5924	77	5184	72	4608	68	4147	64	3770	61	3456	58	3190	56	2962	54	2764	52	2592	51
37	1369	10952	7301	85	6258	79	5476	74	4867	69	4380	66	3982	63	3650	60	3308	58	3129	56	2920	53	2738	52
38	1444	11559	7713	87	6601	80	5776	76	5134	71	4620	68	4200	64	3850	62	3554	59	3300	57	3080	55	2888	53
39	1521	12168	8112	90	6953	83	6084	78	5408	73	4867	69	4424	66	4056	63	3744	61	3476	59	3244	57	3042	54
40	1600	12800	8533	92	7314	85	6400	80	5688	75	5120	71	4654	68	4266	65	3938	62	3657	60	3413	58	3200	56
41	1681	13448	8965	94	7684	87	6724	82	5976	77	5379	73	4890	70	4462	66	4137	64	3842	62	3586	59	3362	58
42	1764	14112	9408	97	8064	89	7056	84	6272	79	5644	75	5131	71	4794	68	4342	65	4032	63	3763	61	3528	59
43	1849	14792	9861	99	8453	92	7396	86	6574	81	5916	76	5378	73	4930	70	4520	67	4226	65	3944	62	3698	60
44	1936	15488	10325	101	8850	94	7744	88	6883	83	6195	78	5632	75	5162	71	4765	69	4425	66	4130	64	3872	62
45	2025	16200	10800	104	9257	96	8100	90	7200	85	6400	80	5890	76	5400	73	4984	70	4628	68	4320	65	4050	63
46	2116	16928	11285	106	9673	98	8464	92	7523	86	6771	82	6155	78	5642	75	5208	72	4836	69	4514	67	4232	65
47	2209	17672	11781	108	10098	100	8836	94	7854	88	7068	84	6426	80	5890	76	5437	73	5049	71	4712	68	4418	66
48	2304	18432	12288	110	10532	102	9216	96	8192	90	7372	85	6702	83	6144	78	5671	75	5266	72	4915	70	4608	68
49	2401	19200	12803	113	10976	104	9604	98	8536	92	7683	87	6984	85	6402	80	5910	77	5488	74	5122	71	4802	69
50	2500	20000	13333	115	11428	106	10000	100	8888	94	8000	89	7272	85	6666	81	6153	78	5714	75	5333	73	5000	71
51	2601	20808	13872	117	11888	109	10404	102	9248	96	8323	91	7566	87	6936	83	6403	80	5945	77	5548	74	5202	72
52	2704	21632	14421	120	12361	111	10816	104	9614	98	8652	93	7866	88	7210	85	6656	81	6180	78	5768	76	5408	73
53	2809	22472	14981	122	12841	113	11236	106	9987	100	8988	94	8135	90	7490	86	6914	83	6420	80	5992	77	5614	75
54	2916	23328	15552	124	13330	115	11664	108	10368	101	9331	96	8482	92	7776	88	7116	84	6665	81	6220	79	5832	76
55	3025	24200	16133	127	13828	117	12100	110	10755	103	9680	98	8800	93	8066	89	7446	86	6914	83	6453	80	6050	78
56	3136	25088	16725	129	14336	119	12544	112	1115	105	10035	100	9122	95	8362	91	7719	87	7168	84	6690	82	6272	79
57	3249	25992	17328	131	14852	121	12996	114	11552	107	10396	101	9451	97	8664	93	7997	89	7426	86	6931	83	6408	80
58	3364	26912	17940	134	15378	124	13456	116	11960	109	10764	103	9786	98	8970	94	8280	91	7699	87	7176	84	6728	82
59	3481	27848	18565	136	15905	126	13924	118	12376	111	11139	105	10126	100	9282	96	8568	92	7956	89	7426	86	6962	83
60	3600	28800	19200	138	16457	128	14400	120	12800	113	11520	107	10472	102	9600	98	8861	94	8228	90	7680	87	7200	85
61	3721	29768	19845	140	17010	130	14884	122	13230	114	11907	109	10824	104	9922	99	9159	95	8505	92	7938	89	7442	86
62	3844	30752	20381	142	17572	132	15376	124	13676	117	12308	111	11182	105	10250	101	9462	97	8786	93	8200	90	7688	87
63	3969	31752	21168	145	18144	134	15876	126	14112	119	12700	112	11454	107	10584	102	9769	98	9072	95	8467	92	7938	89
64	4096	32768	21845	147	18724	136	1638	128	14563	121	13107	114	11912	109	10922	104	10082	100	9362	96	8738	93	8192	90
65	4225	33800	22533	149	19314	139	16900	130	15022	122	13520	116	12290	110	11266	106	10400	102	9657	98	9014	95	8450	92
66	4356	34848	23232	152	19913	141	17424	132	15488	124	13939	118	12672	112	11614	107	10722	103	9956	99	9292	96	8712	93
67	4489	35912	23941	154	20521	143	17956	134	15960	126	14364	119	13058	114	11970	109	11049	105	10260	101	9576	98	8978	95
68	4624	36992	24661	157	21138	145	18496	136	16440	128	14760	121	13451	116	12330	111	11382	106	10569	103	9864	99	9248	96
69	4761	38088	25392	159	21764	147	19044	138	16924	130	15235	123	13847	117	12696	112	11719	108	10882	104	10156	100	9522	97
70	4900	39200	26133	162	22400	149	19600	140	17422	132	15680	125	14254	118	13066	114	12061	110	11200	106	10453	102	9800	99

BLOWING.

TABLE V. of the Powers of Steam Engines working at the Rate of 0lbs. Avoirdupoise, upon every Circular Inch, or 11.45lb. upon every Square Inch of the Steam Piston applicable to Blowing Machinery; and the Areas and Diameters of Blowing Cylinders requisite to raise Air of various Densities from 1½lb. to 4lbs. upon each Circular Inch, or from 1.90lb. to 5.09lbs. Avoirdupoise, upon each Square Inch of the Air Receiver.

Diameter of Steam Cyl.	Area of Ditto.	Power of the Engine in H.P.	Blatt 1½ lb. per Cir. Inch, or 1.90 lb. per Square Inch.		Blatt 2 lb. per Cir. Inch, or 2.22 lb. per Square Inch.		Blatt 2½ lb. per Cir. Inch, or 2.64 lb. per Square Inch.		Blatt 3 lb. per Cir. Inch, or 3.06 lb. per Square Inch.		Blatt 4 lb. per Cir. Inch, or 4.48 lb. per Square Inch.		Blatt 5 lb. per Cir. Inch, or 5.90 lb. per Square Inch.		Blatt 6 lb. per Cir. Inch, or 7.32 lb. per Square Inch.		Blatt 7 lb. per Cir. Inch, or 8.74 lb. per Square Inch.		Blatt 8 lb. per Cir. Inch, or 10.16 lb. per Square Inch.		Blatt 9 lb. per Cir. Inch, or 11.58 lb. per Square Inch.		Blatt 10 lb. per Cir. Inch, or 13.00 lb. per Square Inch.	
			Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.
20	400	3600	2.400	49	2057	45½	1800	42½	1600	40	1440	37½	1309	36	1200	34½	1107	33	1027	32	960	31	900	30
21	441	3969	2646	51½	2268	47½	1984	44½	1764	42	1587	39	1443	38	1323	36½	1221	35	1134	33½	1058	32½	992	31½
22	484	4356	2994	54	2489	49	2178	46½	1936	44	1742	41	1584	39½	1452	38	1340	36½	1244	35	1161	34	1089	33
23	529	4761	3174	56½	2720	52	2380	48½	2116	46	1904	43	1731	41½	1587	39½	1464	38	1360	36½	1269	35½	1190	34½
24	576	5184	3456	59	2962	54	2592	50½	2304	48	2073	45	1885	43½	1728	41	1593	39	1480	38½	1382	37	1296	36
25	625	5625	3750	61½	3214	56	2812	53	2500	50	2250	47	2045	45½	1875	43½	1730	41	1607	40	1500	38½	1406	37½
26	676	6084	4056	64	3476	59	3042	55	2704	52	2433	49	2212	47	2028	45	1872	43	173	41	1622	40	1521	39
27	729	6561	4374	66½	3749	61	3280	57½	2916	54	2620	51	2385	48	2187	46½	2018	45	1874	43	1749	41	1640	40½
28	784	7056	4704	68½	4032	63½	3528	59½	3136	56	2822	53	2565	50½	2352	48	2171	46½	2016	45	1888	43	1764	42
29	841	7569	5046	71	4325	65½	3784	61½	3364	58	3027	55	2752	52	2523	50	2322	48	2167	46	2018	45	1892	44½
30	900	8100	5400	73½	4628	68	4050	63½	3600	60	3240	57	2945	54½	2700	52	2492	50	2314	48	2160	46	2025	45
31	961	8649	5766	76	4922	70½	4324	65½	3844	62	3459	58	3145	56	2883	53	2667	51	2471	49	2306	47	2162	46½
32	1024	9216	6140	78½	5266	72	4608	68	4096	64	3686	60	3351	58	3072	55	2835	53	2633	51	2457	49	2304	48
33	1089	9801	6534	81	5600	74½	4900	70	4356	66	3920	62	3564	59	3267	57	3016	55	2802	53	2613	51	2450	49½
34	1156	10404	6936	83½	5945	77	5202	72	4624	68	4161	64	3783	61	3466	59	3201	56	2972	54	2774	52	2601	51
35	1225	11025	7350	85½	6300	79½	5512	74½	4900	70	4410	66	4009	63	3675	60	339	58	3150	56	2940	54	2756	52½
36	1296	11664	7776	89	6665	81	5832	76½	5184	72	4669	68	4241	65	388	62	3588	59	333	57	3110	56	2916	54
37	1369	12321	8214	90½	7040	84	6160	78½	5476	74	4928	70	4480	67	4107	64	3791	61	350	59	3285	57	3080	55½
38	1444	12996	8664	93	7426	86	6498	80½	5776	76	5198	72	4725	68	4312	65	3998	63	3713	61	3465	59	3249	57
39	1521	13689	9126	95½	7822	88	6844	82½	6084	78	5479	74	4977	70	4563	67	4212	65	3911	62	3650	60	3422	58½
40	1600	14400	9600	98	8228	90	7200	85	6400	80	5760	76	5236	72	4800	69	4430	66	4114	64	3840	62	3600	60
41	1681	15129	10086	100½	8645	93	7564	87	6724	82	6051	78	5501	74	5043	71	4655	68	432	65	4034	63	3782	61½
42	1764	15876	10584	103	9072	95½	7938	89	7056	84	6350	79	5773	76	529	72	4884	69	4536	67	4231	65	3969	63
43	1849	16641	11094	105½	9509	97	8320	91½	7396	86	6656	81	6051	78	5547	74	5120	71	4754	69	4437	66	4160	64½
44	1936	17424	11616	107½	9956	99	8712	93½	7744	88	6969	83	6336	79	5808	76	5361	73	4978	70	4646	68	4316	66
45	2025	18225	12150	110	10414	102	9112	95½	8100	90	7290	85	6620	81	6075	78	5607	75	5207	71	4860	69	4556	67½
46	2116	19044	12696	112½	10882	104½	9522	97	8464	92	7617	87	6925	83	6348	79	5859	76	5441	73	5078	71	4761	69
47	2209	19881	13254	115	11360	106	9940	99½	8836	94	7952	89	7229	85	6627	81	617	78	5680	75	5301	73	4970	70½
48	2304	20736	13824	117½	11849	108	10368	101½	9216	96	8294	91	7540	87	6912	83	6380	80	5923	77	5529	74	5184	72
49	2400	21600	14486	120	12348	111	10804	104	9604	98	8643	93	7857	88	7205	84	6648	81	6174	78	5762	76	5402	73½
50	2500	22500	15000	122½	12857	113	11250	106	10000	100	9000	95	8181	90	7500	86	6923	83	6428	80	6000	77	5625	75
51	2601	23409	15606	125	13376	115	11704	108½	10404	102	9360	96	8516	92	7803	88	7202	85	6688	81	6242	79	5852	76½
52	2704	24336	16224	127½	13906	118	12168	110½	10816	104	9734	98	8849	94	8112	90	7488	86	6953	83	6489	80	6084	78
53	2809	25281	16854	129½	14446	120	12640	112½	11236	106	10112	100	9193	95	8427	91	7778	88	7223	85	6741	82	6320	79½
54	2916	26244	17496	132	14996	122	13122	114½	11664	108	10497	102	9543	97	8748	93	8075	90	7498	86	6998	83	6561	81
55	3025	27225	18150	134½	15557	125	13612	116½	12100	110	10890	104	9900	99	9075	95	8376	91	7778	88	7260	85	6806	82½
56	3136	28224	18816	137	16128	127	14112	118½	12544	112	11289	106	10263	101	9408	97	8668	93	8064	89	7526	87	7056	84
57	3249	29241	19494	139½	16709	129	14620	121	12996	114	11694	108	10633	103	9747	98	8997	94	8354	91	7797	88	7310	85½
58	3364	30276	20184	142	17302	131	15138	123	13456	116	12110	110	11009	105	10092	100	9315	96	8650	93	8073	90	7569	87
59	3481	31329	20886	144½	17902	133	15664	125½	13924	118	12531	112	11392	106	10443	102	9637	98	8951	94	8357	91	7832	88½
60	3600	32400	21600	147	18514	136	16200	127½	14400	120	12960	114	11781	108	10800	104	9969	99	9257	96	8640	93	8100	90
61	3721	33489	22326	149½	19136	138	16744	129½	14884	122	13375	115	12177	110	11163	105	10304	101	9568	97	8930	94	8372	91½
62	3844	34596	23064	152	19769	140	17298	131½	15376	124	13838	117	12578	112	11532	107	10644	103	9884	99	9225	96	8649	93
63	3969	35721	23814	154½	20412	142	17860	133	15876	126	14243	119	12989	114	11907	109	10991	104	10206	101	955	97	8930	94½
64	4096	36864	24576	156½	21065	145	18432	135½	16384	128	14745	121	13405	115	12288	111	1134	106	10532	102	9300	99	9216	96
65	4225	38025	25350	158½	21728	147½	19012	138	16900	130	15210	123	13827	117	12675	112	11695	108	10864	104	10140	100	9506	97½
66	4356	39204	26136	161	22402	149	19602	140	17424	132	15681	125	14257	119	13068	114	12062	109	11201	106	10454	102	9801	99
67	4489	40401	26934	163½	23086	151	20200	142½	17956	134	16160	127	14691	121	13467	116	12431	111	11543	107	10773	103	10100	100½
68	4624	41616	27744	166	23777	154	20808	144½	18496	136	16646	129	15133	123	13872	117	12804	113	11890	109	11097	105	10404	103
69	4761	42849	28566	169	24485	156	21424	146½	19044	138	17139	130	15578	124	14281	119	13184	114	12242	110	11426	106	10712	103½
70	4900	44100	29400	172	25200	158½	22050	148½	19600	140	17640	132	16036	126	14700	121	13569	116	12600	112	11760	108	11025	105

BLOWING.

TABLE VI. of the Powers of Steam Engines working at the Rate of rolbs. Avoirdupoise upon every Circular Inch, or 12.73 lbs. upon every Square Inch of the Steam Piston applicable to Blowing Machinery; and the Areas and Diameters of Blowing Cylinders requisite to raise Air of various Densities from 1½ lb. to 4 lbs. Avoirdupoise upon each Circular Inch, or from 1.90 lb. to 5.09 lbs. upon each Square Inch of the Air Receiver.

Numbers of Steam Cylinders.	Areas of Dittos.	Powers of the Pumps.	Blatt 1 lb. per Circular Inch, or 4.90 lb. per Square Inch.		Blatt 1½ lb. per Circular Inch, or 5.22 lb. per Square Inch.		Blatt 2 lb. per Circular Inch, or 5.54 lb. per Square Inch.		Blatt 2½ lb. per Circular Inch, or 5.86 lb. per Square Inch.		Blatt 3 lb. per Circular Inch, or 6.18 lb. per Square Inch.		Blatt 3½ lb. per Circular Inch, or 6.51 lb. per Square Inch.		Blatt 4 lb. per Circular Inch, or 6.83 lb. per Square Inch.		Blatt 4½ lb. per Circular Inch, or 7.15 lb. per Square Inch.		Blatt 5 lb. per Circular Inch, or 7.47 lb. per Square Inch.						
			Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.	Area of blowing Cylinder.	Diameter of Ditto.			
20	400	4000	2666	51½	2285	47½	2000	44½	1777	42	1600	40	1454	38	1333	36½	1230	35	1142	34	1066	32½	1000	31½	
21	441	4410	2942	54	2520	50½	2205	47	1960	44½	1764	42	1603	40	1470	38½	1356	36½	1260	35	1176	34½	1102	33½	1102
22	484	4840	3226	57	2765	52½	2420	49½	2151	46½	1936	44	1760	42	1613	40	1489	38½	1382	37	1290	36	1210	35	1210
23	529	5290	3526	59½	3022	55	2645	51½	2351	48½	2116	46	1923	44	1763	42	1627	40½	1511	38	1410	37	1322	36½	1322
24	576	5760	3840	62	3291	57½	2880	53½	2560	50½	2304	48	2094	43½	1920	44	1772	42	1645	40	1536	39	1440	38	1440
25	625	6250	4160	64½	3571	59½	3125	56	2777	52	2500	50	2272	47	2083	45½	1923	44	1785	42	1666	40	1562	39½	1562
26	676	6760	4506	67	3862	62	3380	58	3044	53½	2704	52	2458	49	2253	47½	2080	45½	1931	44	1802	42	1690	41	1690
27	729	7290	4860	69½	4165	64½	3645	60	3240	57	2916	54	2650	51	2430	49½	2243	45½	2082	45	1944	44	1822	42½	1822
28	784	7840	5226	72	4480	67	3920	62	3484	59	3136	56	2850	53½	2613	51	2414	49	2240	47	2090	45½	1960	44	1960
29	841	8410	5606	74½	4805	69½	4205	64	3737	61	3364	58	3058	55½	2803	53	2587	50½	2402	49	2242	47	2102	45½	2102
30	900	9000	6000	77	5142	71½	4500	67	4000	63	3600	60	3272	57½	3000	54½	2769	52½	2571	50	2400	49	2250	47	2250
31	961	9610	6406	80	5491	74	4805	69	4271	65½	3844	62	3494	59	3203	56	2958	54½	2745	52½	2562	50	2402	49	2402
32	1024	10240	6826	82½	5851	76½	5120	71½	4560	67½	4096	64	3723	61	3413	58	3150	56	2925	54	2730	52½	2560	50½	2560
33	1089	10890	7260	85½	6222	79	5495	74	4842	69	4356	66	3960	63	3630	60	3350	58	3111	55½	2904	54	2722	52½	2722
34	1156	11560	7706	87	6605	81	5780	76	5137	71	4624	68	4203	65	3853	62	3556	59½	3302	57	3082	55½	2890	54	2890
35	1225	12250	8166	90½	6999	83½	6125	78½	5444	73½	4900	70	4454	67	4083	64	3781	61½	3500	59½	3266	57	3062	55½	3062
36	1296	12960	8640	93	7405	86	6480	80	5760	76	5184	72	4712	68½	4320	65	3987	63	3702	61	3456	58	3240	57	3240
37	1369	13690	9126	95½	7822	88½	6845	83	6084	78	5476	74	4978	70	4653	67	4212	65	3911	62	3650	60	3422	58½	3422
38	1444	14440	9620	98	8251	90½	7220	85	6417	80	5776	76	5250	72½	4813	69	4443	66½	4125	64	3850	62	3610	60	3610
39	1521	15210	10140	100½	8691	93½	7605	87½	6760	82	6084	78	5530	74½	5070	71	4680	68½	4345	66	4056	63	3802	61½	3802
40	1600	16000	10666	103	9142	95½	8000	89	7111	84	6400	80	5818	76	5333	73	4920	70	4571	67	4266	65	4000	63	4000
41	1681	16810	11206	105½	9605	98	8405	91½	7471	86	6724	82	6112	78	5603	75	5172	72	4802	69	4482	67	4202	64½	4202
42	1764	17640	11760	108	10080	100½	8820	94	7840	88	7056	84	6414	80	5880	76	5427	73½	5040	71	4704	68	4410	66	4410
43	1849	18490	12326	111	10565	102½	9245	96	8217	90	7396	86	6723	82	6167	78	5689	75	5282	72½	4930	70	4622	68	4622
44	1936	19360	12906	113½	11062	105	9680	98½	8604	92	7744	88	7040	84	6453	80	5956	77½	5531	74½	5162	72	4840	69½	4840
45	2025	20250	13500	116	11571	107½	10125	100	9000	95	8100	90	7363	85	6750	82	6220	79	5785	76	5400	73	5062	71	5062
46	2116	21160	14106	118	12091	110	10580	102½	9404	97	8464	92	7694	87	7053	84	6510	80½	6045	77	5642	75	5290	72½	5290
47	2209	22090	14726	121	12622	112½	11045	105	9817	99	8836	94	8032	89	7303	85	6798	82½	6311	79	5890	76	5522	74½	5522
48	2304	23040	15360	124	13166	114	11520	107	10244	101	9216	96	8378	91	7608	87	7079	84	6582	81	6144	78	5760	76	5760
49	2401	24010	16006	126½	13720	117	12005	109	10671	103½	9605	98	8730	93	8003	89	7387	86	6860	82	6402	80	6002	77½	6002
50	2500	25000	16666	129	14285	119½	12500	111	11111	105½	10000	100	9090	95	8333	91	7692	87½	7142	84	6666	81	6250	79	6250
51	2601	26010	17340	131½	14862	122	13005	114	11560	107	10404	102	9458	97	8670	93	8003	89½	7431	86	6936	83	6502	80½	6502
52	2704	27040	18026	134	15451	124½	13520	116½	12017	109	10816	104	9832	99	9013	95	8320	91½	7725	87	7210	85	6760	82	6760
53	2809	28090	18726	136½	16051	127	14045	118	12484	111	11236	106	10214	101	9363	96	8643	93	8025	89	7490	86½	7022	84	7022
54	2916	29160	19440	139	16662	129	14580	120	12960	113	11664	108	10603	103	9720	98	8972	94½	8331	91	7776	88	7290	85½	7290
55	3025	30250	20166	142	17285	131½	15125	123	13444	116	12100	110	11000	105	10832	100	9307	96	8642	93	8066	89	7562	87	7562
56	3136	31360	20906	144½	17920	133½	15680	125	13937	118	12544	112	11403	106	11045	102	9649	98½	8960	94	8362	91	7840	88½	7840
57	3249	32490	21660	147½	18565	136	16245	127	14440	120	12996	114	11814	108	11230	104	9997	100	9282	96	8664	93	8122	90	8122
58	3364	33640	22426	149	19222	138½	16820	129	14951	122	13456	116	12232	110	11414	106	10350	101	9611	98	8970	94	8410	91½	8410
59	3481	34810	23206	152½	19891	141	17405	132	1542	124	13924	118	12658	112	11603	107	10710	103	9943	99	9282	96	8702	93	8702
60	3600	36000	24000	155	20571	143½	18000	134½	16000	126	14400	120	13090	114	12000	109	11077	105	10285	101	9600	98	9000	94½	9000
61	3721	37210	24806	157½	21252	146	18605	136½	16537	128	14884	122	13530	116	12203	111	11449	107	10631	102	9922	99	9302	96½	9302
62	3844	38440	25626	160	21965	148½	19220	138½	17084	130	15376	124	13978	118	12413	113	11827	108	10982	104	10250	100	9610	98	9610
63	3969	39690	26460	162½	22622	150½	19845	140	17640	132	15876	126	14436	120	13230	115	12212	110	11340	106	10584	103	9922	99	9922
64	4096	40960	27306	165	23305	153	20480	143	18204	135	16384	128	14894	122	13653	117	12603	112	11702	108	10922	104½	10240	101½	10240
65	4225	42250	28166	167½	24022	155	21125	145	18777	137	16900	130	15363	124	14083	118	13000	114	12071	109	11266	106	10562	102	10562
66	4356	43560	29040	170	24781	158	21780	147½	19360	139	17424	132	15840	126	14520	120	13403	115	12445	111	11616	107	10890	104	10890
67	4489	44890	29926	173	25561	161	22445	149½	19950	141	17956	134	16322	127	14963	122	13812	117	12825	113	11970	109	11222	106	11222
68	4624	46240	30826	175½	26322	162	23120	152	20551	143	18496	136	16814	129	15413	124	14227	119	13211	115	12330	111	11560	107½	11560
69	4761	47610	31740	178½	27055	165	23805	154½	21160	145	19044	138	17309	131	15870	126	14616	121	13602	116	12666	112	11902	109	11902
70	4900	49000	32666	180½	28000	167½	24500	156½	21777	147	19600	140	17818	133	16333	128	15076	123	14000	118	13066	114	12350	110	12350

BLOWING of a Flower, among *Florists*, an artificial process in order to bring a flower to display itself with greater perfection and beauty than it would arrive at in the natural way of blowing. The usual method is thus: about April, when the flower stems begin to put forth, or *spindle*, as the gardeners call it, they place by each flower a strait stick four feet long, and tie the spindles to it as they shoot. As soon as the flower-buds appear, they leave only one of the largest on each flower-stem to blossom. About ten days before the flowers open themselves, the round-podded kinds will begin to crack their husks on one side, when the careful gardener, with a fine needle, splits or opens the husk on the side opposite to the natural fracture; and about three or four days before the complete opening of the flower, cuts off with a pair of scissars the points on the top of the flower-pod, and supplies the vacancies or openings on each side of the husk with two small pieces of vellum or oil-cloth, slipped in between the flower-leaves and the inside of the husk; by such means, the blossom will display its parts equally on all sides, and be of a regular figure. Besides this care, when the blossom begins to shew its colours, they use to shade it from the extreme heat of the sun with a trencher-like board, or other device of the like nature, fastened to the stick which supports it; for the flowers as well as fruits, grow larger in the shade, and ripen and decay soonest in the sun.

In *Heraldry*, a fleur de lys is said to be blown, *espanoui*, when its leaves are opened, so that buds appear among the fleurons. The arms of the city of Florence are *argent, a fleur de lys blown, gules*.

BLOWING-snake, in *Zoology*, a name given by the people of Virginia to a species of serpent much resembling the European viper, but considerably larger, and very remarkable for its inflating and extending the surface of its head before it bites. Its wound is very fatal.

BLOWN RED, in the manufacture of porcelain. See **RED**.

BLUBBER, in *Physiology* and *Trade*, the fat which invests the bodies of all large cetaceous fish, serving to furnish an oil.

The blubber is properly the *adeps* of the animal: it lies immediately under the skin, and over the muscular flesh. In the porpoise, it is firm and full of fibres, and invests the body about an inch thick. In the whale, its thickness is ordinarily six inches; but about the under lip, it is found two or three feet thick. The whole quantity yielded by one of these animals ordinarily amounts to forty or fifty, sometimes to eighty or more hundred weight. *Phil. Trans.* N^o 77. p. 2275.

The use of the blubber to the animal seems to be partly to poise the body, and render it equiponderant to the water; partly to keep off the water at some distance from the blood, the immediate contact whereof would be apt to chill it; and partly also for the same use that cloaths serve us, to keep the fish warm, by reflecting or reverberating the hot steams of the body, and so redoubling the heat; since all fat bodies are, by experience, found less sensible of the impression of cold than lean ones.

Its use in trade and manufactures is to furnish train-oil, which it does by boiling down. Formerly this was performed ashore in the countries where the whales were caught; but of late the fishers do not go ashore, they bring the blubber home, stowed in casks, and boil it down there.

BLUBBER-livers. The livers of cod, which having been barrelled, yield spontaneously a considerable quantity of oil, which being skimmed off, the residue are called blubber-livers, to be boiled down for more oil.

BLUBBER, *sea*, a denomination given by our navigators to the *urtica marina*, or sea-nettle. *Phil. Trans.* N^o 349.

BLUDENTZ, in *Geography*. See **PLUDENTZ**.

BLUE, one of the seven primitive colours of the rays of light, into which they are divided, when refracted through a glass prism. See **COLOURS**, and **REFRACTION**.

Anciently blue was the symbol of the sea; for which reason, in the Circensian games, the combatants who represented the sea were clad in blue; and those who had distinguished themselves by any notable exploit at sea, were rewarded with a blue ensign.

Mr. Boyle has given us the following method of making transparent blue, nearly equal to ultramarine. The principal ingredient of this beautiful colour is the *cyonus*, or blue corn-bottle flower, which abounds almost in every corn-field, and may easily be had during four of the summer months. It may be gathered by children about the verges of corn-fields, without doing any damage to the corn. This flower has two blues in it, one of a pale colour in the large outer leaves; and the other of a deeper blue, that lies in the middle of the flower. Both these will do, being separated from the buttons or cases in which they grow; but the deep blue leaves in the middle produce much the best colour; this may be observed by rubbing the leaves while they are fresh upon a piece of writing-paper, so hard as to express the juice which will yield an excellent colour, that by the experience of two or three years has not been found to fade. A sufficient quantity of these middle leaves being procured, let the juice be pressed from them; to which a little alum being added, will give a lasting transparent blue, scarcely inferior in brightness to ultramarine. It is very probable, that if the chives of these flowers were cured in the same manner with saffron, they would produce a much greater body of colour, from which a tincture might be drawn with more ease than when pressed fresh from the field.

Mr. Boyle also recommends another fine blue, produced from the blue leaves of rue beaten in a stone mortar with a wooden pestle, and then put in water for fourteen days or more, washing them every day until they are rotten. These beaten up at last, water and all, until they become a pulp, and then dried in the sun, will make a fine blue for shading.

BLUE Ashes, *Cendres bleues*. See **VERDITER**.

BLUE Lice, is a colour of good brightness, next to Prussian blue; it is also a colour of a body, and flows well from the pencil. See **BLUE**.

BLUE, in *Dyeing*. See **DYEING**, **INDIGO**, and **WOAD**.

BLUE black. See **BLACK**.

BLUE enamel. See **Azure ENAMEL**.

BLUE, *Flanders*, is a colour seldom used but in landscapes as being apt to turn green. The French call it *cendre verte*, or green ashes.

BLUE for painting or joining glass. See **GLASS**.

BLUE Japan. See **JAPANING**.

BLUE Indigo. See **INDIGO**.

BLUE Livers, or *Laemus*. See **LITMUS**.

BLUE, *Painter's*, is made differently according to the different kinds of paintings. In limning, fresco, and miniature, they use indifferently ultramarine, blue ashes, and smalt; these are the natural blues, excepting the last, which is partly natural, partly artificial. See each under its proper head. In oil and miniature they use indigo, blue lice, blue verditer, lapis armenus, smalt, and litmus, also a counterfeit ultramarine. Enamellers and painters of glass have blues peculiar to themselves; each preparing them after his own manner. See **ENAMELLING**, *Painting on GLASS*, and **Neumann's Chem. Works**, by Dr. Lewis.

BLUE, *Prussian*. See PRUSSIC ACID.

BLUE, *Saxon*, a solution of indigo in sulphuric acid. See INDIGO.

For an account of the processes for obtaining blue liquors from oak duct and vitriol, from log wood and verdigrise, from log-wood and blue vitriol, from an essential oil and volatile spirit; see Dr. Lewis's *Commercium Philosophico-Technicum*, ed. 4to, ann. 1773, p. 382. 407. 436.

BLUE, *Stone*, or *Powder*, used in washing of linen, is the same with smalt, either in the lump or powdered.

When the smalt is taken from the pot, it is thrown into a large vessel of cold water: this makes it more tractable and easily powdered. Afterwards, when examined after cooling, it is found to be mixed with a greyish matter resembling ashes, which they call *schel*. This grey matter is separated by washing, and then the blue substance is powdered and sifted through fine sieves, to bring it to what we call *powder-blue*. Phil. Trans. N° 396. See COBALT.

BLUE, *turnsol*, is a blue used in painting on wood, made of the seed of that plant. It is prepared by boiling four ounces of turnsol in a pint and a half of water wherein lime has been slacked. See TURN SOL.

BLUE, *ultramarine*. See LAZULITE.

There is a blue substance, something like what Kentman mentions under the name of *caruleum patavinum*. It was discovered in a peat-moss in Scotland. This earth is at first of a white colour, and only grows blue by being exposed to the air. It has also some resemblance to what Mr. de Costa in his Nat. Hist. of Foss. p. 103, calls *ochria friabilis carulea*. It is described very minutely by Mr. Douglas, who gives an account of his various experiments upon it, and recommends it as a cheap paint in gum water, particularly as it is levigated and prepared by nature. See Phil. Trans. vol. lviii. N° 27. an. 1768.

Many similar specimens of blue earth have been discovered in England and Ireland, and several parts of the continent.

BLUE-ball, a name given in some countries to the *Conewheat*.

BLUE-bottle, in Botany. See CENTAURIA.

BLUE-Cap, in Ichthyology. See BLEW-CAP.

BLUE *John*, the common appellation, among the Derbyshire miners, of FLUOR-SPAR.

BLUE *Mantle Pursuivant of Arms*. This officer is by patent a member of the corporation of heralds. Sir Henry Spelman conjectures, that the title was taken from the colour of the mantle of the French kings. This office is said to have been instituted by Henry V., and probably might be coeval with that of Garter, and erected with reference to that order; but although the catalogues place John Wrexworth and others by this title under the reign of Henry V.; Anthony Wood ascribes the creation of this office to Henry VI, in whose 26th year *Bluemantle Pursuivant* waited on Bruges, Garter king of arms, into France, and also on the bishop of Chichester and others, ambassadors thither. Previous to that date there are not any entries on record relating to this Officer; but from thence to the present time the succession hath been carried on without any interruption.

BLUE Nuns, *filles blues*, those of the order of the Annunciation.

BLUEFIELD'S BAY, in Geography, a bay in the island of Jamaica, lying S.E. of Savannah-la-Mar, and having good anchorage for large vessels. N. lat. 18° 10' 30". W. long. 78°.

BLUEFIELD'S, or *Blewfield's Bay*, a bay on the western

coast of Nicaragua, in New Spain, into which a river of the same name is discharged N. lat. 11° 40'. W. long. 83°.

BLUEHILL, a township of America, in Hancock county and district of Maine, on the west side of Union river, 344 miles N.E. of Bolton, and 13 E. of Penobscot; having 274 inhabitants.

BLUEHILL Bay, a bay of America, formed by Naskeag point on the west, and Mount Desert island on the east and extending northerly to a mountain on the east of Penobscot river, which, from its appearance at sea, is called "Blue-hill." Union river discharges itself into this bay.

BLUE Hills, a range of mountains in New England, the first ridge of which in New Hampshire passes through Rochester, Barrington, and Nottingham.

BLUE Mountains, are mountains of America, in Northampton county, and state of Pennsylvania, extending from S.W. to N.E. and through a small interval across the Delaware. — Also, a range of mountains, which run from S.E. to N.W. through Surry county, in the island of Jamaica. Blue mountain peak is said to rise 7431 feet above the level of the sea; and the precipices are interspersed with beautiful savannahs. — Also a mountain in Russia, part of the Altay mountains. See SINNAI SOPKA.

BLUE Ridge, or *South Mountain*, is the first ridge of the Alleghany mountains in Pennsylvania, Virginia, and North Carolina, distant from 150 to 200 miles from the sea, and, measured from its base, about 400 feet high. Between this and the north mountain is a large fertile vale. The Passage of the Potomack river through this ridge is one of the most stupendous scenes in nature. See ALLEGHANY Mountains, and POTOMACK RIVER.

BLUE Lick, lie on the main branch of the Licking river in Kentucky, and are situated about 8 miles westerly from the Upper Blue Licks. Both of them are on the N.E. side of the river; and the latter is about 5 miles N.E. of Millers.

BLUE Spring, lies between Big Barren and Little Barren river, southern branches of Green river, in Mercer's county, Kentucky, about 22 miles south-westerly from Sulphur spring, and 13 south of Craig's fort, on the north side of Green river.

BLUE Stone Creek, a small western branch of the Great Kanaway.

BLUE-water river, a river of America, that rises among the southern branches of Duck river, and empties into the Tennessee. It is scended by boats.

BLUENESS, that quality which denominates a body blue, depending on such a size and texture of the parts that compose the surface of a body, as dispose them to reflect the blue or azure rays of light, and those only, to the eye.

With respect to the blueness of the sky, M. de la Hire, after Leonardo da Vinci, observes, that any black body viewed through a thin white one, gives the sensation of blue; and this he assigns as the reason of the blueness of the sky, the immense depth of which being wholly devoid of light, is viewed through the air illuminated and watered by the sun. For the same reason, he adds, it is that foot mixed with white makes a blue; for white bodies, being always a little transparent, and mixing themselves with a black behind, give the perception of blue. From the same principle he accounts for the blueness of the veins on the surface of the skin, though the blood they are filled with be a deep red; for red he observes, unless viewed in a clear, strong light, appears a dark brown, bordering on black: being then in a kind of obscurity in the veins, it must have the effect of a black; and this, viewed through the membrane of the vein and the white skin, will produce the perception of blueness.

In the same way did many of the early writers account for the phenomenon of a blue sky; such as Fromondus, Funceius, Otto Guericke, and many others: their opinion long prevailed, and has been adopted by some in more modern times, especially by Wolffius and Muschenbroek. But in the explanation of this phenomenon, sir Isaac Newton observes that all the vapours, when they begin to condense and coalesce into natural particles, become first of such a bigness as to reflect the azure rays, before they can constitute clouds of any other colour. This, therefore, being the first colour which they begin to reflect, must be that of the finest and most transparent skies, in which the vapours are not arrived to a grossness sufficient to reflect other colours.

M. Bouguer, without having recourse to the vapours diffused through the atmosphere, in order to account for the reflection of the blue-making rays, ascribes it to the constitution of the air itself, whereby these fainter-coloured rays are capable of making their way through any considerable tract of it. And he accounts for those blue shadows, which were first observed by M. Buffon in the year 1742, by the aerial colour of the atmosphere, which enlightens these shadows, and in which the blue rays prevail; whilst the red rays are not reflected so soon, but pass on to the remoter regions of the atmosphere. The abbé Mazeas, in a Memoir of the society of Berlin, for the year 1752, accounts for the phenomenon of blue shadows by the diminution of light; having observed that, of two shadows which were cast upon a white wall from an opaque body illuminated by the moon, and by a candle at the same time, that which was enlightened by the candle was reddish, and that which was enlightened by the moon was blue. However, the true cause of this appearance seems to be that assigned by M. Bouguer, which agrees with the solution given of it about the same time by Mr. Melville. But instead of attributing the different colours of the clouds, as sir Isaac Newton does, to the different size of those globules into which the vapours are condensed; Mr. Melville supposes, that the clouds only reflect and transmit the sun's light; and that according to their different altitudes, they may assume all the variety of colours at sun rising and setting, by barely reflecting the sun's incident light, as they receive it through a shorter or longer tract of air: and the change produced in the sun's rays by the quantity of air through which they pass, from white to yellow, from yellow to orange, and lastly to red, may be understood agreeably to this hypothesis, by applying to the atmosphere what sir Isaac Newton says concerning the colour of transparent liquors in general, and that of the infusion of *lignum nephriticum* in particular. Edinb. Ess. vol. ii. p. 77. Bouguer *Traité d'Optique*, p. 366. Newton's *Optics*, p. 228; or Priestley's *Hist. of Vision*, &c. p. 435-445.

BLUFF-HEAD, or *Bluff-headed*, in the *Sea-Language*, is, when a ship has but a broad rake forward on, being built with her stem too straight up.

Bluff-headed ships are opposed to those that are sharp-headed. They are shorter, less masted, and sail cheaper.

BLUING OF IRON, a method of beautifying that metal sometimes practised; as for mourning buckles, swords, or the like. The manner is thus: take a piece of grind-stone, and whet-stone, and rub hard on the work to take off the black scurf from it; then heat it in the fire, and as it grows hot, the colour changes by degrees, coming first to a light, then to a dark gold colour, and lastly to a blue. Sometimes they grind also indigo and salad-oil together, and rub the mixture on the work with a woollen rag, while it is heating, leaving it to cool of itself.

Among sculptors we also find mention of bluing, a figure of bronze, by which is meant the heating of it, to prepare it for the application of gold leaf, because of the bluish cast it acquires in the operation.

BLUM, JOACHIM CHRISTIAN, in *Biography*, an esteemed German poet, was born at Rathenau, in 1739, and received the early part of his education in his father's house, from a lady, who was the governess of his sisters. At the age of eleven years he lost his father, and became master of a library, of which he availed himself to great advantage. During his residence with his mother and sisters, he amused himself with playing hymns on the harpsichord, and with reading moral authors, and reciting orations, which he did in a manner so affecting as to cause his hearers to shed tears. His mother concluded, that he had an inclination to become a clergyman, and with this view placed him, in 1754, at a school in Brandenburg, where he manifested by his course of reading, and also by his performances, a strong turn for poetry. In 1757, he removed to the gymnasium at Berlin; and giving up all thoughts of the ministerial office, he devoted himself to the study of philosophy and the belles lettres, indulging himself occasionally in his favourite pursuit. From Berlin he proceeded, in 1759, to Frankfort on the Oder, where he studied for some time under Baumgarten, for whom he professed the highest respect; but when this city fell into the hands of the Russians, he retired to the house of his mother; and as his health was in an infirm and declining state, in consequence of an accident which had almost proved fatal to him in his youth, he determined to continue with his mother, and to devote the remainder of his days to the muses in his native place. Here he closed his life, August 28, 1790. His poetical works were "Lyric Poems," and "Idylls," published at various periods after the year 1765. A dramatic piece, in praise of his native town, entitled "Rattenau delivered," was often represented at Berlin with applause, but forbidden in compliance with the request of the Swedish ambassador. Blum's poetry is said to be characterized by softness, simplicity, and correctness, and he ranks among the best poets of Germany. He also published some volumes under the title of "Walks;" two volumes of "Orations;" and a collection of "German Proverbs." His works in general were much read, and approved by persons of the first distinction. The late king of Prussia, Frederick William, honoured him with a very particular token of favour. As Blum's health required his residence in the country, he purchased, in 1787, a small estate, upon which was a mansion in a very ruinous condition; but having in the purchase exhausted almost the whole of his property, he could not repair his house without assistance; and, therefore he addressed a poetical epistle to the king, in which he introduced the following lines:

"O aid thy poet, gracious prince,
And free his breast from care;
All that he asks is competence
His mansion to repair.
Those mould'ring walls, which long have stood
Offensive to the eyes,
A temple then to gratitude,
Shall renovated rise.
His groves, near yonder wand'ring stream,
Whose banks with reeds are crown'd,
Thus consecrated groves shall seem,
And shade the hallow'd ground."

With this address his majesty was so much pleased, that he ordered for him 2000 rix dollars. Blum expressed his gratitude in a second epistle, to which the king returned his best

wishes. Besides the Greek and Latin, he well understood the French, Italian, and English languages; and he had studied with great attention the history of the Christian church. Gen Biog.

BLUMBERG, in *Geography*, a small town of Germany, in the landgravate of Baar.

BLUMENAU, a bailiwick of Germany, in the principality of Calenberg, seated on the Leine.

BLUMENFELD, a town of Germany, in the circle of Swabia, and commandery of Minau, seated on the river Ach; 8 miles N.N.E. of Schaffhausen.

BLUMENSTRAS, J. DEODATUS, in *Biography*, took his degree of doctor in Medicine in Leyden. Returning thence to Russia, his native country, he was soon distinguished by the emperor, who made him archiater, or principal physician to his court. He had also the honour of being appointed the first president of the Royal Academy of Sciences at Petersburg, which had been instituted, Haller says, by his exertions. He died at Moscow at an advanced age, in April 1755, leaving only one publication, which was first printed in the year 1700, 4to. "Medicus Castrensis Exercitui Moscovitarum." Haller Bib. Med. Pract. Eloy. Dict. Hist.

BLUMENTHAL, in *Geography*, a bailiwick of Germany, in the duchy of Bremen.

BLUMLIS ALP, a majestic eminence of the Alps, in the canton of Bern, in Switzerland, terminating the valley of Lauterbrunnen, and having at its feet a large glacier, which stretches towards the valley of Gaster. The Blumlis Alp, and also the feet of the Alpschelenhorn, are covered with black schistus; but the granite is not apparent, except at a considerable height. The sides of the Blumlis Alp, bordering the glacier, are black slate, in which have been found several blemmites, and a fragment of a Cornu Ammonis, a foot in diameter.

BLUNDERBUSS, in the *Military Art*, a short sort of fire arm, with a large bore contrived to carry a number of musket or pistol bullets at once. The blunderbuss is proper to do execution in a crowd, or to make good a narrow passage, as the door of a house, stair case, or the like.

BLUNT, in *Fencing*. To fight with blunts, is to exercise or parade with weapons without points or edges.

BLUNTING the angles of a *battalion*, in the *Military Art*, signifies to retrench the four corners, and turn the square into an octagon. This is done in order to give an opportunity for presenting the pikes, or firing on all sides, and was a military evolution formerly much in use, but now disused.

BLUSHING, a suffusion or redness of the cheeks, excited by a sense of shame, on account of consciousness of some failure or imperfection. See ENCHYMOA.

Blushing is supposed to be produced from a kind of consent or sympathy between several parts of the body, occasioned by the same nerve being extended to them all. Thus the fifth pair of nerves being branched from the brain to the eye, ear, muscles of the lips, cheeks, palate, tongue, and nose; a thing seen or heard, that is shameful, affects the cheeks with blushes, driving the blood into the minute vessels thereof; at the same time that it affects the eye and ear. For the same reason it is, as Dr. Derham observes, that a savoury thing seen or smelt, affects the glands and parts of the mouth; if a thing heard be pleasing, it affects the muscles of the face with laughter; if melancholy, it exerts itself on the glands of the eyes, and occasions weeping, &c. And to the same cause Dr. Willis ascribes the pleasure of kissing.

BLUSTERING *weather* is that where the wind blows

with various degrees of strength, attended with a dark sky, rain, snow, &c.

BLUTEAU, DON RAPHAEL, in *Biography*, a religious theatine, was born of French parents in London in 1638. After having distinguished himself in sacred and profane literature, he visited Portugal and acquired such knowledge of the language as to be able to preach in it with applause. From Portugal he returned to Paris, and was for some time preacher to Henrietta-Maria, queen of England. Upon revisiting Portugal, he obtained an office in the inquisition, and became member of the Royal Academy of History. Of his works, the most esteemed is "A Portuguese and Latin Dictionary," in 8 vols fol. Coimbra 1712—1721, to which he added a Supplement in 2 vols. fol. Lisbon. 1727, 1728. He died at Lisbon in 1734, at the advanced age of 96. Moreri.

BLUTFINK, in *Ornithology*, one of the synonymous names of *loxia pyrrhula*, the common bulfinch. Frisch. Av.

BLYSOOG, in *Geography*, a river of South Wales, which runs into the Tivy, about 3 miles S.S.E. of Cardigan.

BLYTH, in *Geography*, a small market town of Nottinghamshire, in England, has been the seat of a castle and a priory; but these buildings with their endowments and privileges, being entirely demolished at the dissolution, the town also sunk in the general wreck, and has never since been renovated. The whole parish consists now only of 157 houses, with 589 inhabitants. Here are a small market on Wednesdays, and two annual fairs. The church is a large handsome structure, and contains several ancient monuments. Some of the Cressy family built an hospital here, which bears the name of Blyth-spittle.

BLYTH, or *South Blyth*, a small sea-port town of Northumberland, in England, is a place that has obtained its sole consequence since the restoration; for, previous to that period, here were scarcely any houses. In the year 1728, its trade had so much increased that above 200 vessels were entered in the custom house books as sailing from this port. It is considered as a creek to the port of Newcastle, and its principal trade is in coals. Blyth is 14 miles N.E. of Newcastle, and 288 miles N. of London. The township contains 183 houses, and 1170 inhabitants, of whom 234 are employed in trade. Here is a small market on Saturdays. About three miles south of Blyth is Seaton Delaval, a seat belonging to lord Delaval, whose grandfather, sir Francis Blake Delaval, was an able admiral in the beginning of the last century. He was often projecting some improvements in the ports near his seat, and after surmounting great difficulties, constructed one upon a new plan, which now bears his name.

BMI, in *Music*. See GAMUT.

BOA, in *Zoology*, a genus of the SERPENT race distinguished by having plates, or undivided scuta, both on the belly and beneath the tail; the latter of which, unlike the crotali, does not terminate in a rattle.

Such is the Linnæan character of this genus, the species of which are not very numerous. Gmelin enumerates the following kinds in the Systema Naturæ: contortrix, canina, hipnale, constrictor, cenchris, ophryas, enydris, murina, scytale, and hortulana. But in addition to these we are to mention a few other species described by Dr. Patrick Russel in a recent publication on the serpents of India, with the observations of Dr. Shaw upon the newly discovered kinds, and several others lately spoken of by continental writers.

Dr. Russel in the work above cited, has four new species

of boa, called, in the Indian language, *bungarum pamah*, *padain cootoo*, *geedi paragoodo*, or in the young state *cobra monil*, and the *horatta p-m*. These are the species, fasciata, viperina, lineata, and horatta of Dr. Shaw's zoology. Dr. Shaw has likewise increased the number of the boæ by the addition of a fifth species, *crotalus mutus* of Linnæus, which he is induced to remove from the crotali to this genus, because it is not furnished with a genuine rattle like the rest of that tribe.

But the French writers of the present day have regarded the arrangement of the Swedish naturalist in the amphibious class of animals with much less indulgence, their alterations tending to little less than the subversion of his system. The boa genus, as established by Linnæus, is obviously defective, in one point at least, where nature had herself prescribed those characters which ought not to have escaped the discrimination of the naturalist. Nothing, we must admit, can be more improper, if it could have been avoided, than to include in the same natural family both the venomous and inoffensive kinds of serpents; or, in other words, to unite, under one head, those which, having fangs for the conveyance of poison into the wound inflicted with their bite, are highly dangerous, and such as have no fangs for this purpose, and are therefore comparatively harmless. The first innovation upon the Linnæan genera was made by Lacepede, whose method has been followed by others; and lastly, by Latreille, with some improvements, in his Natural History of Reptiles.

Latreille retains among his boæ those only of the Linnæan species which have no venomous fangs; for the reception of the remainder he establishes the new genus SCYTALE. This genus forms an intermediate link between the two Linnæan genera boa, and crotalus; having, in common with both, the abdominal plates, and either plates alone, or plates and scales beneath the tail; the poisonous fangs removing them from the boæ, and the naked tail from the crotali. or snakes that have a rattle at the extremity of that part. The boæ of Latreille contain the following species: *le boa devin* (constrictor, Linn.), *le boa géant* (a species hitherto confounded with the former,) *le boa bejubi* (boa canina, Linn. and Lacepede), *le boa bipnale* (hipnale, Linn.), *le boa cenchris* (cenchris, Linn.), *le boa enhydre* (enydris, Linn.), *le boa ophrie* (ophrias, Linn.), *le boa scytale* (scytale, Gmel. Scheucher), *le boa brodé* (hortulana, Linn.), *le boa ratiore* (Seba, v. 2. pl. 29. 1.), and *le boa turc*, a native of the Grecian islands, described by Olivier in his "Voyage dans l'Empire Ottoman."—Thus the Linnæan *boa constrictrix*, a poisonous species, *le scytale a groin* of this writer, is removed from among the boæ to the genus SCYTALE, together with another species not before described, *le scytale a tête plate*, and the four new species mentioned by Dr. Russel belong unquestionably to the same genus, being all of the venomous kind. We have, therefore, six species of the SCYTALES confounded with the natural family of boa.

The boæ, taken collectively, exceed in magnitude all the other tribe of serpents. The powers of certain species, like their stature, are prodigious. These enormous kinds are principally the inhabitants of the burning regions of Africa, whose fame, in this respect, was celebrated in ages of remote antiquity. History speaks of these tremendous serpents in terms that stagger credibility; but travellers of our own times, who have had the opportunity of observing these creatures in their native haunt, and whose relations deserve every rational degree of credit, afford so much collateral evidence, that we are not allowed to reject the authority of the ancients in many of the most material points. When Valerius Maximus relates, upon the authority of Livy, the contest between an army of Romans under Attilius

Regulus, and an enormous snake, that disputed with them, for a considerable time, the passage across the river Bagdara in Africa, and was at last only overcome, after killing many of the soldiers, by means of the battering machines employed in attacking fortresses, we are inclined to suspect the whole as fabulous. If, however, we reflect at the same time upon the size and power of this monster, the skin of which, when taken off, was 120 feet in length, we need not be astonished at the resistance it was capable of making. Something must be allowed on this occasion for the luxuriance of fancy, or the fictions of the battle between the Phœnicians, and the sacred snake of Mars, would almost shrink from comparison with this surprising adventure.

Ille volubilibus squamos nexibus orbes
Torquet, et immanes saltu sinuatur in arcus:
Ac media plus parte leves erectus in auras
Despicit omne nemus:—

Nec mora: Phœnicas (sive illi tela parabant,
Sive fugam; sive ipse timor prohibebat utrumque).
Occupat; hos morsu, longis complexibus illos;
Hos necat afflatus functi tabe veneni. Ovid.

The serpent mentioned by Livy is believed to have been an overgrown creature of the boa genus, the *constrictor* of Linnæus; a kind which, from the superiority of its size, is emphatically denominated the "King of Serpents." This species, of which we shall speak more largely in another place (vide CONSTRICTOR), is found occasionally in Africa, India, and South America, from 20 to 30 feet in length, and even more; and of a strength so great, as to be able to destroy most of the larger animals by the violence of its pressure only. We have seen the skins of this particular species almost 20 feet in length, and of a bulk proportionate. Among the articles of Natural History, collected in South America for the National Museum at Paris, but intercepted, and sold in this country, there were several specimens; dried skins of this kind are also preserved in the British and Leverian museums, and in most of the public museums on the continent, which at once remove every unreasonable degree of suspicion as to the actual existence of such a monstrous kind of serpent.

If, therefore, according to the ideas of latter writers, the true boæ are destitute of poisonous fangs, nature has more than amply supplied the deficiency by the powers they are endowed with for the destruction of their prey. The elephant, the rhinoceros, the hippopotamus, and the lion, are the only animals that can resist them with success. The stag, the leopard, and even the buffalo, entangled once within the coils of the body of the boa, must fall an easy victim to its voracity. The boæ are, among serpents, what the elephant and the lion are among quadrupeds: like the elephant, they surpass the rest of the serpent race by their size; and, like the lion, excel them in their address, their courage, and their force. They seldom attack their prey by artifice, decoying their unwary adversary, and, by a wound as sudden as insensible, paralyzing its efforts with the deadly torpor of their poison. Confident in their powers, they attack them openly; oppose their strength to the resistance of their enemy with ardent intrepidity; and when they conquer, it is by the manifest superiority of bodily vigour over that of their opponent.—It should be observed, that these traits of character relate only to the largest of the boa genus, of which no more than two species are correctly ascertained, although there is reason to believe the number must be greater. Much confusion prevails among travellers who have described these serpents: they have entered largely into the prodigies of their history, without paying any due regard to the descrip-

tion of the animals themselves, a circumstance that has hitherto involved this matter in obscurity, and leaves us in considerable doubt as to the real number of distinct species already discovered, and mentioned by those travellers. See *CONSTRICTO*, &c.

BOACRÆ, in *Ancient Geography*, a place of Italy, on the Aemilian way, in the route from Rome to Arlito, through Etruria and the Maritime Alps. Anton. Itin.

BOAD, in *Geography*, a town and fort of Hindoostan, in the country of Orissa, near the Mahanuddy river; 55 miles S. E. of Sumpulpour, and 100 west of Cattack. N. lat. 20° 40'. E. long. 84° 16'.

BOADICEA, *BOUDICRA* (Tacitus), or *BUNDUICA* (as she is called by Dion), in *Ancient British History*, a queen of the Iceni, celebrated for her misfortunes, and for her formidable, though unsuccessful, resistance to the Roman power in Britain.

At the time when the revolt, of which Boadicea was the principal mover, took place, the southern part of the island had tranquilly submitted to the government of the Cæsars. Although scarcely 13 years had elapsed since the invasion of Claudius, Britain was already considered an important acquisition. Several flourishing colonies were founded; numerous settlers flocked from the more distant provinces of the empire, and the only expedition which employed the legions, was that undertaken against the sequestered island of Mona, the principal remaining seat of Druidical superstition. But amidst this seeming security, the oppression exercised by individuals excited indignation among the natives. The procurator, Catus Decianus, who, in the absence of the proprætor, possessed the exclusive administration of government, behaved with the most insufferable tyranny; and, according to the confession of Tacitus himself, the great men of the nation were treated as slaves, and deprived injuriously of their estates by this upstart governor. The fear, however, of incurring the imperial resentment, restrained them from expressing their dissatisfaction otherwise than by murmurs, till the decease of Prasutagus, king of the Iceni, brought matters to a crisis. This monarch, by his attachment to the party of the invaders, had merited the title of friend and ally of the Roman people, and by his last will, had bequeathed his estates as a joint inheritance between the emperor Nero and his two daughters. His policy, if intended as such, failed of the desired effect. The procurator, under pretence of carrying the testament into execution, seized on all the possessions of Prasutagus without exception; and as Boadicea dared to murmur against such flagrant injustice, he actually caused herself to be publicly scourged as a slave, and the chastity of her daughters to be violated by his officers.

Such outrages were beyond sufferance. The Iceni to a man rose up in arms, headed by Boadicea in person, who to a masculine spirit joined a gift of natural eloquence calculated to inflame the passions of a barbarous multitude. The Trinobantes, and other neighbouring nations, alike incensed at the extortions of the procurator, followed the example, and an army of 120,000 islanders being rapidly formed, marched directly against Camalodunum, (supposed to have been Maldon,) the nearest Roman colony. As Decianus could only spare a few soldiers to assist the inhabitants in its defence, the place was almost instantly stormed, and, with a temple lately erected to the divinity of Claudius Cæsar, reduced to ashes, all within it being previously massacred. The ninth legion, which had ventured to take the field against the insurgents was next attacked and defeated. The infantry were almost totally destroyed. The commander, Petilius Cerealis, at the head of his cavalry, with

difficulty regained his camp, where he carefully intrenched himself; while Catus Decianus, terrified at the consequences of his infamous conduct, made his escape into Gaul, covered with universal odium.

After such a series of ill-fortune, the only hope of the Romans remained vested in the proprætor Suetonius Paulinus, at this time occupied in exterminating the Druids of Mona. On receiving news of the progress made by Boadicea, he immediately marched, though by a dangerous route, and through the midst of an hostile country, to Augusta (London), already a considerable place, though not yet dignified with the name of a colony. As he judged this post untenable, he retired to unite his scattered forces, accompanied by such of the inhabitants as chose to follow his fortunes; but the women and children, the old and infirm, who were left behind, without any other protection than their sex, their age, or their situation afforded, were indiscriminately sacrificed to the fury of the Britons. Verulamium, another colony, shared the same fate. All foreigners were every where put to the sword, and the cruelties, said by Dion to have been exercised upon some of the sufferers, are shocking beyond description.

The rebellion had now attained its utmost height. Three Roman stations laid in ashes, and the blood profusely poured of 70,000 of her persecutors, had amply revenged the wrongs of Boadicea. The whole eastern part of the island was in possession of her partizans, and her forces in arms had increased to the amazing number of 230,000, when Suetonius, having taken every measure prudence could suggest in his circumstances, prepared to check this torrent in its course. The proprætor, although accused, and perhaps with justice, of pride and excessive cruelty, yet possessed the most splendid military talents. During the last reign he had signalised himself, when commander in Africa, by a complete victory over the rebellious Mauritanians. Nero rewarded his bravery by naming him to the government of Britain. The late reduction of Mona had increased his celebrity; and he appears to have been the only general then in the empire, Corbulo probably excepted, equal to the task of reducing the insurrection raised by Boadicea. His situation was, however, extremely critical. It was in vain that he dispatched instructions to Pænius Posthumus, who commanded the second legion, to march to his assistance. Pænius, in consequence of some difference with his general, or actuated by a secret jealousy, refused to move, in direct disobedience to orders. Thus Suetonius saw his whole force reduced to the fourteenth legion, Gemina, and the Vexillarii of the twentieth, which, added to a few auxiliary cohorts, only amounted to about 10,000 men. With his army, so small as it was, he determined on hazarding a battle, and therefore waited the approach of the Britons on a narrow spot of ground, opening in his front into an extensive plain, while his rear was protected by a thick wood. According to the usual disposition observed by the Roman armies, the legionaries were stationed in the centre, flanked by the light armed and auxiliary cohorts; the wings being composed of cavalry. Suetonius did not tarry long in expectation of the enemy. The Britons soon appeared, covering the plain in immense numbers. Their wives and children, who had accompanied them to become spectators of a victory already considered as certain, were mounded in heaps on waggons, encircling the field in their rear, like an amphitheatre. Boadicea, with her two daughters, drove in a chariot along the ranks, encouraging her troops in animated language. She renewed the detail of Roman injustice: besought vengeance for the wrongs sustained by herself and her family; magnified the importance of the victory she had already gained, and assured her fol-

lowers that their enemies, forsaken by all the gods, would never be able to endure even their shouts of rage. She finished by exhorting them to conquer or die; which, she added, was her own resolution. Suetonius on his side did not neglect to animate his men by a faithful oration, and the acclamation and cheerful countenance with which it was received convinced him that he had every thing to hope from the bravery and discipline of his soldiers.

The Britons came on, uttering loud shouts, menaces, and songs of victory, while the Romans, closely drawn up, awaited the onset in perfect silence and at the requisite distance, made a first discharge of the pila with terrible effect. Preserving the advantage of the ground, they received the attack of the Britons with such firmness, as checked its impetuosity; till, having expended all their javelins, without the dreadful carnage of the enemy, they rushed forward from all parts at once, observing the form of a wedge, the more easily to penetrate such an immense multitude. This charge was seconded by the alms with equal ardour. The first ranks of their opponents were instantly borne down, and heven in pieces; but the rest crowded to surround the Romans, a bloody conflict commenced. The British war-chariots, whenever they succeeded in breaking in among their enemies, occasioned the most sanguinary destruction, ordering his men to direct their blows at the naked bodies of the drivers, by degrees discombed himself of these troublesome invaders. The action was long maintained with fury on both sides, the Britons, though destitute of order or discipline, fighting with great obstinacy and desperation; but, finally, the superior skill, coolness, and bravery of the Romans, bore down every opposition. Prodigious numbers perished beneath the swords of the legions, or by the charges of the cavalry, who trampled all before them; while the crowds that endeavoured to save themselves by flight, met with an insurmountable impediment in their own waggons, which enclosed them in form of a fence. Here the slaughter was terrible, for mercy in the circumstances of Suetonius, would have been in the highest degree imprudent. The Romans, in the heat of their fury, spared neither age nor sex. Even the beasts of burden, struck through with darts, increased the horrors of the scene, and the heaps of dead, which covered the plain, the fields, and the surrounding forests. Upwards of 80,000 Britons are computed to have perished on this occasion; while of the Romans about 400 were killed, and scarcely so many wounded.

Few victories, even in the most flourishing ages of the republic, deserved to be compared with this of Suetonius. Never had any been more decisive. The remaining rebels, terrified at the dreadful chastisement they had received, dispersed into their respective districts, and Boadicea herself perished soon after the battle, either through distress, or, as is the prevailing opinion, she ended her days by poison. P. Posthumus, whose disobedience had prevented the second legion from sharing in the triumph of their countrymen, fell upon his own sword, thus avoiding the punishment and disgrace which awaited his conduct. The vigour with which, though accompanied by acts of the most terrible severity, Suetonius pursued the revolted, restored tranquillity to the whole island before the ensuing spring. The indignities of individuals, and the jealousy of his venerable sovereign, occasioned his subsequent recall from his government; yet the triumphs obtained under his auspices, conferred everlasting honour and renown both on his own name and that of the legion he commanded.

Boadicea is described by Dion Cassius as a woman of large stature, strong and well proportioned in her limbs, of a manly

and stern countenance, harsh, authoritative voice, and possessing beautiful golden hair, which reached down below her waist. That she was possessed of uncommon abilities, or at least had persons of extraordinary talents to assist her, is evident from the rapidity with which she cut off the Roman garrisons one after another; the disposition of her forces, so as entirely to interrupt the communication between the quarters of the legions; the victory she obtained over Cerealis, famous himself for his military knowledge, and the extremities to which she reduced Suetonius, the greatest general of the age. Dion is loud in praise of her eloquence, and puts into her mouth several elaborate orations. We have preferred the authority of Tacitus, reserving, however, such passages of Dion as are most necessary to elucidate the narration. The defeat and death of Boadicea are said to have happened A. D. 61. Tacit. Annal. xiv. c. 31—37. Dion Cassius, Hist. Rom. lib. lxxii. cap. 11—12.

BOADJOOS, in *Geography*, called also *Oron Jaut*, or men of the sea, are a sort of itinerant fishermen in the East Indies, said to come originally from Johore, at the east entrance of the straits of Malacca, though some are of opinion, that they must have come either from China or Japan. They live chiefly in small covered boats, on the coasts of Borneo, Celebes, and the adjacent islands. Others dwell near the sea, on these islands; their houses being raised on posts, at a little distance in the sea, and always at the mouths of rivers. They are Mahometans; and have a language of their own, but no written character. Many Boadjoos are settled on the north-west coast of Borneo, who not only fish but make salt, and trade in small boats along the coast. Some of their boats are from 12 to 15 and 20 tons burden, and carry from 10 to 20 men, and form, in some places, a fleet of a hundred sail. Others of them are about 5, or 6 tons burden, which are managed by women, even in heavy seas. Their method of making salt is as follows; they gather sea-weeds, burn them, make a ley of ashes, filter it, and form a better kind of salt in square pieces, by boiling it in pans made of the bark of the anechon, or cabbage-tree; these pieces of salt are carried to market, and pass as a currency for money. Those that are settled on the north-west coast of Borneo used to supply the market at Balambangan with rice, fowl, and other provisions. Many of them are settled at the mouth of the river of Palan, who employ themselves chiefly in catching small shrimps with hand-nets, which they push through the mud; the shrimps, after being well washed with water, are exposed to a hot sun. They are then beat in a mortar, and made into a kind of paste, called *blanchong*, which has a strong smell, and is much in request all over India. These last Boadjoos may be considered as stationary or fixed, compared with those who live always in their boats, and who, as the monsoon shifts on the islands Borneo and Celebes, shift their situation to leeward, so as to be always under the lee of the land, for the sake of fine weather. Most of those who rove round Celebes, though they change their situation with the monsoon, consider Macassar as their home. Whilst the Boadjoos lie at anchor, in boats managed by their women, they are dextrous in fishing for *tripngs*, i. e. swallows, or sea-slugs, which they take in seven or eight fathoms water. When they see the swallow in clear water, they strike it with an instrument, consisting of four-bearded iron prongs fixed along an almost cylindrical stone, rather smaller at one end than at the other, about 18 inches long; an iron sheet is fixed at the end of the stone, next the point of the prongs. The swallow is dried in the smoke, and sent to the China market. They also dive for it, the best being found in deep water. The black is reputed the best; but there is some of a lighter colour, found only in deep water, which is more valued

valued in China than the black, and sold even for 40 dollars a picol: some of the pieces weigh half a pound. The white, caught in shoal water and on the dry sand, among coral rocks, is the worst; its value being about four or five dollars a picol. The Boadjoos are very useful to the Dutch East India company, in carrying intelligence speedily from place to place. St. vorinus's *Voyages*, vol. ii. p. 240.

BOADODA *Bashaw*, in the *Turkish Military Orders*, an officer of the *janizaries*, whose business it is to walk every day about the principal parts of the city, with a number of janizaries to attend him, to keep order and see that all things are regular, even to the dress. This office is for three months, and from this the person is usually advanced to be a *serub*.

BOÆ, in *Ancient Geography*, a town of Peloponnesus in Laconia, at the extremity of the Bœotian gulf. Diana was particularly worshipped in this place; Apollo and Esculapius had their respective chapels here. At some stadia from this city was a temple of Serapis and Isis. Pausanias.

BOAGRIUS, a river, or rather torrent, of Greece, in the country of the Epicnemidian Locrians, according to Ptolemy. Strabo says, that it watered the town of Thronium.—Also, a town of the same country, situate to the west, on the confines of Phocis.

BOANERGES, i. e. *Sons of Thunder*, in *Scripture History*, a name given by our Lord to the two apostles James and John (Mark, iii. 17.) which some have erroneously supposed to be an appellation of reproach, intimating a fierceness and furiousness of temper; whereas it is much more reasonable to consider it, with others, as a title of honour, prophetically representing the resolution and courage with which they would openly and boldly declare the great truths of the gospel, when they were made fully acquainted with them. How well they deserved this title, sufficiently appears in the sequel of their history. See JAMES, and JOHN.

BOANS, in *Zoology*, a species of RANA, or frog, the body of which is smooth, marked with contiguous spots beneath; and the feet palmated. Gmelin. Two varieties of this kind are described; β , having the upper part of the body blackish lead colour, and γ , with the body inclining to orange. Laurent. Amph. &c.

This kind inhabits America, and differs from *rana arborea*, the tree-frog, to which it is nearly allied, according to Gmelin, in having all the feet webbed, and the body spotted with white. Much confusion prevails respecting the Linnæan species, boans. Dr. Shaw suspects it to be the same as the *rana maxima* of that author, probably in a younger state. He mentions likewise another supposed variety, the *rana virginiana altera* of Seba.

BOAR, the *wild boar* or hog from whence the common hog derives its origin. See SCROFA Sus. The male of the tame hog is also called the boar.

The wild boar is a native of almost all the temperate parts of Europe and Asia, and is also found in the upper parts of Africa. Formerly it was an inhabitant of this country, as appears from the laws of Howel Dda, who permitted his grand huntsman to chase that animal from the middle of November to the beginning of December. (*Leges Wallicæ*, 41.) There are also many places in Wales that retain the name Peanarth, or the Boar's Head, to this day. William the Conqueror punished with the loss of their eyes any that were convicted of killing the wild boar, the stag, or the roebuck. (*Leges Saxon.* 292.) And Fitz-Stephen tells us, that the vast forest, which in his time grew on the north side of London, was the retreat of stags, fallow deer, wild boars,

and lulls. Charles I. turned out wild boars in the New Forest, Hampshire; but these were destroyed in the civil wars. (Pennant.) In France, Germany, Poland, and other countries on the European continent, they are still common, and the hunting of them is a principal amusement among parties of the gentry. Boar-hunting is a favourite diversion also in other more distant parts of the world.

These animals are found in the steppes of the Samara and the Volga, in Russia, on the confines of the river Ural in Daouria, and about the Irtysh. Between the Ural and the Yamba they are very numerous, and are hunted in winter by the Cossacks, not without danger, with dogs, and sometimes killed with carabines, and sometimes with lances. Although they feed solely on the roots of sea-weed and sedge, they grow to such an extraordinary size, that they are frequently found weighing upwards of six hundred pounds; their bacon is nearly four inches thick in fat, though their flesh is in general dry and firm and well-flavoured.

Sonnin thinks it probable (see his *Travels in Upper and Lower Egypt*, p. 348.) that the wild boars of Egypt are not the same with those in Europe. The great difference of climate, and the still greater difference of situation, must have occasioned at least some varieties in the species of these animals. More multiplied in temperate or cold countries, which appear more suitable to their nature, they inhabit the thick recesses of the forests, where they can find abundance of food: They never leave the woods but to pass from one to another, or to ravage the growing crops, and these predatory excursions are undertaken only by night. In general, they retire to the darkest and closest places at the rising of the sun, the brightness and heat of which they seem to dread. The wild boar of Egypt, on the contrary, has no shelter. Continually exposed to the rays of a burning sun, he roams over the hottest sands, where he with difficulty finds a few scattered shrubs, which afford him a scanty subsistence, and scarcely any shade. He is also frequently seen in the deserts of Nitria, which is the resort of a greater number of animals than any other part of the deserts, on account of the sheets of water it contains, and of the plants that grow on their banks. These boars are solitary, though a general want of food sometimes drives them in herds to the environs of the lakes of Natron. As the Mahometans and Copts do not eat the flesh of the wild boar more than that of the hog, and hold both these animals in equal abhorrence, it was impossible, says this writer, to procure a wild boar in Egypt, at least without seeking it in the desert. Upon the whole he concludes, that they are not the same as those of Europe. It is perhaps, he adds, in this sense only that we must understand the passages of Aristotle (*Hist. Nat.* l. viii. c. 24.), and Pliny (*Hist. Nat.* l. viii. c. 33.), who have asserted that there are no wild boars in Africa. Wild boars, says Buffon, are as common in Asia and Africa as in Europe. But he has given an account and a drawing of an African wild boar, which is remarkable for several particular characters; and hence there is reason to believe, that the "hanzire" of Egypt is the same animal as the wild boar of Africa.

Among huntsmen, the wild boar has several names according to its different ages: the first year it is called a pig of the faunder; the second, a hog; the third, a hog-steer; and the fourth, a boar. When leaving the faunder, he is called a singler, or fangler. The wild boar inhabits woods, living on roots, masts, acorns, and other vegetable food. Though gluttons, they do not attack other animals to devour them; but they eat flesh when they meet with it. They have been seen to eat horse-flesh; and the skin of the deer,

deer, and the claws of birds have been found sticking in their stomach, but this may be from necessity. Yet they are fond of blood, since they will eat their own young, or even children in the cradle, according to Buffon. Wild boars (says this writer) do not separate from their mothers until the third year, and till that age are called by the hunters *stock beasts*, or *beasts of company*. They never wander alone till they have acquired sufficient strength to resist the attacks of the wolf. These animals when they have young, form a kind of flocks, and it is upon this alone their safety depends. When attacked, the largest and strongest front the enemy, and by pressing all round against the weaker, force them into the centre. Domestic hogs are also observed to defend themselves in a similar manner. The wild boar is hunted with dogs, or killed by surprise during the night when the moon shines. As he flies slowly, leaves a strong odour behind him, and defends himself against the dogs, and often wounds them dangerously, fine hunting dogs are unnecessary, and would have their nose spoiled, and acquire a habit of moving slowly by hunting him. Mastiffs, with very little training, are sufficient. The oldest boars, which are known by the track of their feet, should alone be hunted: a young boar of three years is difficult to be attacked, because he runs very far without stopping; but the old boars do not run far, allow the dogs to come near, and often stop to repel them. During the day, the boar commonly keeps in his foil, which is the most sequestered part of the woods, and comes out by night in quest of food; and in summer, when the grain is ripe, it is easy to surprise him among the cultivated fields, which he frequents every night.

The boar lives to twenty-five or thirty years, if he escapes accidents. The time of going to rut is in December, and lasts about three weeks. They feed on all sorts of fruits, and on the roots of many plants; the root of fern, in particular, seems a great favourite with them; and when they frequent places near the sea-coast, they will descend to the shores, and demolish shell-fish. Their general places of rest are among the thickest bushes that can be found, and they are not easily put out of them, but will stand the bay a long time. In April and May they sleep more soundly than at any other time of the year, and this is therefore the successful time for taking them in the toils. When a boar is roused out of the thicket, he always goes from it, if possible, the same way by which he came to it; and when he is once up, he will never stop till he comes to some place of greater security. If it happens that a *saunder* of them are found together, when any one breaks away, the rest will follow the same way. When the boar is hunted in the wood where he was bred, he will scarce ever be brought to quit it; he will sometimes make towards the sides, to listen to the noise of the dogs, but retires into the middle again, and usually dies or escapes there. When it happens that a boar runs a-head, he will not be stopped or put out of his way by man or beast, so long as he has strength left. He makes no doubles or crossings, when chased; and when killed, makes no noise, if an old boar; but the fows and pigs will squeak when wounded.

The season for hunting the boar begins in September, and ends in December when they go to rut. If it be a large boar, and one that has lain long at rest, he must be hunted with a great number of dogs, and those such as will keep close to him; and the huntsman, with his spear, should always be riding in among them and charging the boar as often as he can to discourage him. Such a boar as this, with five or six couple of dogs, will run to the first convenient place of shelter, and there stand at bay, and make at them as they attempt to come up with him. There ought

always to be relays also set for the best and staunchest hounds in the kennel; for if they are young eager dogs, they will be apt to seize him, and be killed or spoiled, before the rest come up. The putting of collars with bells about the dogs' neck is a great security for them; for the boar will not so soon strike at them when they have these, but will rather run before them. The huntsmen generally kill the boar with their swords or spears; but great caution is necessary in making the blows, for he is very apt to catch them upon his snout, or tusk, and, if wounded and not killed, he will attack the huntsman in the most furious manner. The places in which the wound is to be given with the spear, are either between the eyes in the middle of the forehead, or in the shoulders; both these places make the wound mortal. When this creature makes at the hunter, his safety consists merely in courage and address; if he flies for it, he is surely overtaken and killed; if the boar comes straight up he is to be received at the point of the spear; but if he makes doubles and windings, he is to be watched very cautiously, for he will attempt getting hold of the spear in his mouth, and if he does so, nothing can save the huntsman but another person's attacking him behind. He will, on this, attack the second person, and the first must then attack him again. Two people will thus have enough to do with him; and were it not for the forks of the boar-spears that make it impossible to press forward upon them, the huntsman, who gives the creature his death's wound, would seldom escape falling a sacrifice to his revenge for it.

The modern way of boar-hunting is generally to dispatch the creature by all the huntsmen striking him at once; but the ancient Roman way was for a person on foot, armed with a spear to keep the creature at bay; and in this case the boar would run of himself upon the spear to come at the huntsman, and push forward till the spear pierced him through.

The hinder claws of a boar are called *guards*. In the corn he is said to *feed*; in the meadows or fallow-fields, to *root*, *worm*, or *fern*; and in a close to *graze*. The boar is farrowed with as many teeth as he will ever have; his teeth increasing only in bigness, not in number. Among these there are four called tusks, the two biggest of which are of no use to him when he strikes, serving only to whet the two lowest, which are his most formidable weapons of defence. As the boar advances in age, he becomes less dangerous, on account of the growth of those tusks, which turn up or take such a curvature, as rather to impede than assist him in wounding his adversary. The Ethiopian boar, or hog, is a still more fierce and dangerous animal than the kind found in Europe. In habits and manners they are pretty much the same, although specifically different; and, like the common boar, is capable of inflicting the most tremendous wounds with its tusks.

The flesh of the boar was esteemed a delicacy among the ancient Romans; a boar served up whole was a dish of state. The boar was sometimes also the military ensign borne by the Roman armies in lieu of the eagle. Certain writers of modern date speak of the flesh being unwholesome, except to those with athletic constitutions.

A remarkable circumstance concerning the wild boar is related by Sommius. In the year 1787, an animal of this kind, of a most extraordinary size, was killed in the neighbourhood of Cognac, in Angoumois, which had many times escaped from the hunters, had received many gunshot wounds, and had cost the lives of several dogs and men each time of attacking him. When this animal was at length slain, several bullets are said to have been found be-

tween his skin and flesh. Had not the above account been given by hunters of distinguished order, and too well acquainted with these animals to have made any mistake, it might have been imagined, that this formidable creature, which had long continued its ravages in the park of Cognac, belonged to a different species. It was of an enormous size, with a very long head, a very sharp or pointed snout, and its mouth was armed with teeth of a very singular form. The hairs of the body were white; those of the head yellowish; the neck marked with a black band in form of a cravat; and the ears large and straight; and what appears surprising, considering its size, it was of uncommon swiftness. For a further history of this animal, see SCROFA.

BOAR, in the *Manege*. A horse is said to *boar* when he shoots out his nose as high as his ears, and tosses in the wind.

BOARD, a piece of timber sawed thin, for the purposes of building. See **TIMBER**.

We say, a deal-board, an oak-board, &c. Boards thicker than ordinary are called *planks*. Boards formed ready for the coopers' use are called *clap-boards*. We have also mill-board, and scale-board, shaved very thin, for cases, hand-boxes, &c. Deal-boards are generally imported into England ready sawed, because they are prepared cheaper abroad, by means of saw mills. Clap-boards are imported from Sweden and Dantzick. Oak-boards chiefly from Sweden and Holland; some from Dantzick. Pipe-boards are brought from Dantzick. We also import white boards for shoe-makers; mill and scale-boards, paste-boards, &c. for divers artificers. Scale-board is a thinner sort, used for the covers of primers, thin boxes, and the like. It is sawed with mills, and imported from Hamburg.

BOARD, *feather-edged, graining, log, post, sound, trail, waste, weather*. See the several adjectives.

BOARD, is also used for a kind of table or bench, whereon several artificers perform their work.

In this sense, we say a work-board, a shop-board, a tailor's-board, &c.

BOARD, is also used for a flat machine, or frame, used in certain games, and the like.

In this sense, we say a draught-board, a chefs-board, a shovel-board, and the like.

BOARDS, in *Book-binding*. See **BOOK-BINDING**.

BOARD, *bureau*, is also used for an office where accounts are taken, payments ordered, and the like.

In this sense, we say the board of works, board of ordnance, board of treasury, and the like.

BOARD of green cloth. See **GREEN-CLOTH**.

BOARD of Controll, was first instituted in 1784, by stat. 24 Geo. III. sess. 2. c. 25. with a view of directing and aiding the East India company, in the executive government of India, and establishing a power of controul in this kingdom. This board was further established and regulated by the stat. 33 Geo. III. c. 52. the operation of which commenced in India on the 1st of February 1794. By the former act six persons were to be nominated by the king, as commissioners for the affairs of India; but by the latter, the number, instead of being limited to six privy-counsellors, is indefinite, depending upon the king's pleasure; of which number the two principal secretaries of state, and the chancellor of the exchequer are to be three; and his majesty, if he pleases, may add to the list two commissioners, not of the privy-council; and the person first named in the king's commission is to be president. The king may give 5000l. a year among such of the commissioners as he pleases; which, together with the salary of the secretary and officers, and other ex-

pences of the board, are to be paid by the India company; the whole not to exceed 16,000l. per annum. The members of this board and their officers are sworn to execute the several powers and trusts reposed in them, without favour or affection, prejudice or malice. The office of a commissioner, or chief secretary, is not to be deemed a new office, to disable them from sitting in parliament; nor is the appointment of a commissioner, not having a salary, or of a chief secretary, to vacate a seat. Three commissioners must be present to form a board. The powers of the board are to superintend, direct, and control all acts, operations, and concerns, which relate to the civil and military government and revenues of the British territorial possessions in India, subject to certain restrictions. They and their officers are to have access to the papers and records of the company, and to be furnished with copies or extracts of such of them as shall be required. They are also to be furnished with copies of all proceedings of general courts, and courts of directors, within eight days, and with copies of all dispatches from abroad, relating to matters of government or revenue, immediately after their arrival. No orders on those subjects are to be sent by the company to India, until approved by the board; and when the commissioners vary or expunge any part of the dispatches proposed by the directors, they are to give their reasons; and all dispatches are to be returned to the court of directors in 14 days. The directors may state their objections to any alterations, and the commissioners are to re-consider them; and if they interfere with what the directors deem matter of commerce, the directors may apply to the king in council to determine betwixt them. But the board is restricted from the appointment of any of the company's servants. If the directors, on being called upon to propose dispatches on any subject relating to government or revenue, shall fail to do so within 14 days, the board may originate their own dispatches on that subject. The board is not to authorize any increase of salaries, or any allowance or gratuity to be granted to persons employed in the company's service, except the same shall be first proposed by the company; and their intention and reasons for such grant are to be certified to both houses of parliament, 30 days before the salary can commence. The directors are to appoint three of their members to be a committee of secrecy, through whom dispatches, relating to government, war, peace, or treaties, may be sent to or received from India. This committee, and their clerks, are to be sworn to secrecy. Orders of directors, concerning the government or revenues of India, once approved by the board, are not subject to revocation by the general court of proprietors. For the further provisions of the acts, appointing the board of controul, see *East India COMPANY*.

BOARD of Ordnance. See **ORDNANCE**.

BOARD of trade and plantation, was established by king William, in the year 1696. Commercial matters had before this time been generally referred to a fluctuating committee of the privy-council; the obvious inconveniences attending this mode of management, induced king Charles II. to erect a special council of trade in the year 1668, which was soon after laid aside; it was renewed again in 1672, but soon discontinued, and the former method of reference to committees of the privy-council revived. In 1696, a regular and permanent board was established, for settling all disputes and regulations relating to commerce and colonies. This board, beside such of our ministers of state, who only attended on extraordinary occasions, consisted of a first lord commissioner, and of seven other commissioners, with an annual salary of one thousand pounds each. This board was abolished in 1780.

BOARD of trade, bureau de commerce, an office in the French polity,

polity, established in 1723, composed of eight persons of experience in commerce and navigation, where all papers and proposals relating to the improvement of trade are examined, and all difficulties which occur in affairs of navigation and commerce, either within or without the realm, are discussed.

BOARD-WAGES, denote a certain annual sum allowed to household servants for maintenance. Board-wages, granted to the menial officers and servants of the crown, commenced in 1629, when the necessities of king Charles obliged him to retrench the expence of his household, by abolishing the greatest part of the daily tables in his palace, which were eighty in number, and substituting this annual allowance in their room.

BOARD, or ABOARD, in the *Sea Language*, is used in speaking of things within a ship or other vessel.

Hence, to go *aboard* signifies to go into the ship; to heave *over-board*, is to throw a thing out of the vessel into the sea; to slip by the *board*, is to slip down by the ship's side; to fall *a-board* of, is to strike or encounter another ship, when one or both are in motion; to keep the land *a-board*, or to keep hold of the land, is to steer near to, or in sight of the land; *board and board*, is when two ships come so near as to touch one another, or when they lie side by side. *Weather-board*, is that side of a ship which is to windward. To *board a ship*, is to enter an enemy's ship in an engagement. See **BOARDING, infra**.

Board denotes the distance run by a ship at one tack; and hence to *make a board*, or as it is otherwise expressed, to *board it up* to a place, is to turn to windward; and to beat sometimes upon one tack, and sometimes upon another; in which it is to be noted, that the farther you stand off to one point of the compass, the better board you will make; and that it is better making *long boards* than short ones, if you have sea-room. A *long board* is when you stand a great way off before you tack or turn; a *short board* is when you stand off a little; a *good board* is when a ship does not go to leeward of her course, or advances much at one tack, and sails upon a straight line. To leave a land on *back-board*, is to leave it a-stern, or behind; the *back-board*, being that which in boats or ships, we lean our backs against. *A-board* main-tack, the order to draw the main-tack; i.e. the lower corner of the main-sail, down to the chees-tree. See **CHESS-tree**.

BOARD, Lar, and Starboard. See **LARBOARD** and **STARBOARD**.

BOARDED Floor. See **FLOOR**.

BOARDING, in *Naval Tactics*, denotes the art of approaching the ship of an enemy so near as to admit of the grapnels, which are fixed on the lower yard-arms, at the forecastle, gang-ways, &c. being thrown into it, for the purpose of securing the vessels together, and of entering her decks, with a detachment of armed men. The method of conducting or of avoiding this kind of attack depends upon the relative situation of the contending ships; and varies, as it is to be performed to windward, to leeward, with the wind at large, or when the ship proposed to be boarded is at anchor.

In the first case, when the enemy's ship keeps her wind under an easy sail, and is overtaken in a chase by those who intend to board her, the vessel of the latter must get on the weather-quarter of the former, within half a pistol shot. She should then begin and continue a brisk action, so that the smoke of the cannon and musquetry of both ships may conceal her manœuvres; and, under the cover of this cloud, she should increase her sail, if she has not way enough, in order to augment her velocity and the rapidity of her move-

ments, that she may more readily lay on board the enemy, on the weather-side, either exactly abreast or a little abaft. This may be easily done, by edging down suddenly upon her, but avoiding being raked by the enemy's fire. By this manœuvre the grapnels will be on board of the adverse ship, before or very soon after she suspects the design of the boarders. In this situation, the vessel proposed to be boarded can recur only to one precarious expedient, which, duly observed by the boarder, will be of little or no avail. For when she braces sharp a-back her head sails, to cause the ship's falling off, and squares those aft, to give her stern-way, the boarder, by performing briskly the same manœuvre, will be as well situated for boarding as before; provided the boarding ship feels the impulse of her sails and helm, which ought to be put a-weather, and kept so till the ship's head-way ceases, when it is to be put a-lee, to assist her in falling off, in order to board the enemy to lee-ward; for the boarder ought to be on the quarter of the other, since at the moment the two ships were right before the wind, she who was directly to windward and wished to board, had only to continue her movement of rotation, and render her velocity equal to that of her adversary, by shortening sail in order not to pass her. If, therefore, the circular motion is kept up by the boarder, which at first caused him to fall off, and now brings him to the wind on the other tack, he will join the enemy to lee-ward; for it is evident that, if this motion of turning be more rapid than that of the ship which wishes to avoid boarding, the boarder will close with her before she can range to the wind on the other tack, since the boarder comes round with greater celerity. However, if the ship which fears boarding was pressed thus closely, she could make no other attempt than to throw once more all her sails to the mast, by bracing them only perpendicular to the keel to give her stern-way, and putting the helm a-weather, to keep her to the wind, as soon as her head-way ceases; observing that, as she is to windward, she may be thus driven on the boarder, who watches for her under her lee. But necessity obliges her to adopt this only expedient; because, if she could go a-stern with sufficient velocity, she might let the boarder pass a-head, veer under his stern, and rake him, if he does not anticipate this manœuvre, and as quickly manœuvre in the same manner, the great velocity with which he comes to the wind, and goes a-head, his sails being still full, reducing him to this state, which may prevent his persisting in the design of boarding. Nevertheless the boarder may attain his purpose, if he throws all his sails a-back at the same time as the ship to windward; because, the attacked ship dropping to leeward, and having stern-way first, approaches the boarder, who has preserved his position on the quarter, and longer kept his luff, by having gone a-stern somewhat later than the weather ship. It should also be observed, that when the two ships are right before the wind, if the vessel which fears boarding moves more quickly to the wind than the one which attacks, she will avoid it, as the retreating ship will be close to the wind before the other, and able to get a-head of her, by making all sail to keep her wind, or to heave in stays, and get upon the other tack. This last movement, however, is disadvantageous; because it will present the stern to a ship, which will avail itself of that situation, and rake her, and this may be more destructive than a well opposed attack by boarding. After all, if the ship that is inclined to board sails better than the other, she will always have it in her power to execute her purpose, if she is as well manœuvred as the ship which endeavours to escape.

In the second case of boarding to leeward, when close to the wind, the boarder should arrive within pistol shot, close in

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the wake, or, at most, to the weather quarter of the ship against which the attack is meditated; taking care to continue steering, so as not to be raked by any of the guns that belong to the quarter on which he stands. In order to come up with his adversary, he must edge away a little, and range round aft, so close upon the enemy's lee-quarter, that his cat-head may almost touch her quarter-gallery. When the ship has shot sufficiently a-head, and is parallel to that of the adversary, the fore-castle being a-breast of the enemy's main-mast, the mizen and mizen stay-sail sheets are to be well hauled out, the helm put hard a-lee, and the head-sheets let fly; then the ship, coming rapidly to the wind, shivers her sails, and closes with the opposing vessel side to side. In executing this manœuvre, which cannot fail to succeed with the advantage of sailing, great attention is necessary; because, if at this moment the weather-ship, which wishes to avoid being boarded, either sets her courses, or lays all these flat a-back which she had set, she may chance to break the grapnels, if the sails of the boarding vessel have not been trimmed like those of the other; for, by making more full if the wind be a little fresh, she will shoot a-head through the water, and drag the boarder with such force as to break the chains or hawsers by which the two ships are confined together. By laying all flat to the mast the boarded vessel is still more likely to succeed, since the sails of one ship will be full, while those of the other are a-back.

This mode of boarding may be avoided, if the boarder does not pay strict attention to his own manœuvres, as well as to those of his adversary; and it may be more readily avoided, if the adversary's vessel braces her head-sails sharp a-back, setting only, if necessary, the fore-sail, at the same instant laying to the mast or shivering, according to the necessity for more or less stern-way, all those which are abaft, and putting the helm hard a-lee. This is to be executed, when the boarder is about a ship's length a stern of the other vessel. The quickness of this evolution, and the rapid veering of the weather-ship, may bring the boarding vessel, which is a little to leeward or a-stern of the other, into the most dangerous situation, if she does not manœuvre in the same manner, and with equal celerity; as the boarder's sails being full, keep up his velocity, and may, before he can veer, engage his bowsprit in the main shrouds of the enemy, who pays short round on her head. Those who wish to board a ship, and to engage the enemy's bowsprit in their main shrouds, need only to get a little to windward of her, and about one or two ship's lengths a-head, according to the estimated celerity of their movements; then brace sharp a-back the head sails, shiver the after-ones, or lay them flat to the mast, with the helm a-lee. This manœuvre, well performed, and covered by a brisk fire, will commonly succeed; but care must be taken not to come round too soon, but to range very close to the adversary; because if the boarding vessel be not sufficiently a-head of him, it might fail in boarding by paying too short round, and its bowsprit get foul of his fore shrouds, which would be very disadvantageous. The design will be frustrated, if the boarding ship being too far a-head, passes under the bowsprit of the enemy, who will thus, however, be exposed to be raked at his head, if he does not manœuvre in the same manner and equal quickness as the boarding vessel, which has the great advantage of priority. In order to engage the bowsprit of the enemy's ship in the rigging of the boarding vessel, this should be ranged very close to the other; because, if this were attempted at only a ship's length large, and to windward of the enemy, he need merely, upon perceiving the design, to put the helm hard a-lee, and heave in stays. If this last method be properly executed, the two ships can

only range very near each other, and exchange their broadsides, and the lee-ship will immediately gain the wind of her adversary. Consequently to execute this manœuvre well, the vessels must be nearly yard-arm and yard-arm.

If the boarder be at a certain distance aft on the weather-quarter, the ship wishing to avoid boarding must heave in stays, as soon as the other vessel is in the act of veering, in order to close with her to leeward. By this manœuvre they will come head to head, so that they may reciprocally fire their broadsides, in passing on opposite directions, and the lee-ship will get to windward.

In the third case, when two ships engage with the wind large, the boarding vessel should keep as close as possible on the lee-quarter of the ship she means to attack by boarding, that she may execute her purpose by coming rapidly to the wind, and being careful not to pass a-head of her opponent. The weather-ship, in order to avoid being boarded, must act according to circumstances, in the manner directed in the last case. A ship may be boarded on the weather-side, by conforming to the instructions relating to boarding to windward. When two vessels are engaged with the wind right aft, the boarder ought to drop a-stern of the enemy, in order to run up close along-side of him, if the boarder has the advantage of sailing; for, as she then advances towards her adversary, the adversary can only endeavour to range rapidly to the wind on the other tack, as soon as the bowsprit of the boarder is a-breast of her stern, and thus gain the wind, in order to be in a situation to extricate herself more easily by a good manœuvre. The boarding vessel should be allowed to come a-breast of the stern of her adversary, before she hauls her wind; because, if this were done sooner, the ship a-stern, at a small distance, would board her perfectly well, even if she sailed with equal celerity, since the boarder would be to windward, would run large longer than the other, would range more slowly to the wind, and continue to stem a-head of the flying ship. This will appear more evident by considering, that the boarder coming from windward preserves his velocity longer, trimming his sails only as the ship comes to the wind, and cuts the course of his adversary with a line less curved than that described by the retreating ship. If, by coming too soon or too fast to the wind, the boarder chose to abandon his design, he might do so by veering a few points on the other tack, and shortening sail; so that the retreating ship will shew her stern, and the boarder can then rake her by passing under her stern.

In attacking a ship closely to leeward, the boarder should keep away a little when abreast of her, and seem to yield under her fire. If the enemy's ship should thus be induced to veer, in order to bring the boarder more under her guns, the latter should heave rapidly to the wind, by putting the helm a-lee, trimming all sharp a-baft, and suppressing the effect of the head sails; which should be done at the instant when the enemy is perceived to be bearing down. The two ships will by the quickness of this manœuvre, and the priority of the movement thus gained on the enemy, soon close, and, with proper attention, the enemy's bowsprit may be entangled in the fore or main rigging of the boarding vessel, which would be a favourable circumstance in the attempt to board. However it may happen that no attempt can be made to board, if the weather-ship, instead of bearing away, plies more and more to leeward; for this faint manœuvre may take the boarder too far off to leeward of the adversary. If the boarder should chance to be a ship's length to leeward, and about the same distance a-head of the enemy's vessel, it may, under cover of a heavy fire, heave in stays; and thus come right athwart the enemy's hawse, rake him fore and aft, and board him, his bowsprit being
right

right over the enemy's gang-way; nor can he possibly avoid a broadside; for if he heave all a-back and make a-stern board, which is his only resource, he may avoid being boarded, but his situation will be very perilous.

In the last case of boarding a ship, which is at anchor, riding head to wind, it must be executed under sail; for if the boarder cannot approach the enemy except by towing a-head, he will never be able to board the latter against his will; because he will be always able to annoy the boats which are laying out the tow-lines. It should not therefore be attempted, unless the boarder be under way. In order to perform it with success, the boarder must be sufficiently to windward to approach the enemy by a little falling off, without exposing his stern to the fire of the latter, which in this situation might be played on with great advantage. If the boarder, then, should be thus to windward, so as to be able to approach the enemy at anchor, he ought to stop his head-way, by taking a-back his mizen top-sail and fore-day-sail; and when about a ship's length from the vessel proposed to be boarded, let go an anchor, and then work, so that, as soon as the mizen top-sail is taken a-back, the mizen close aft, the top-sails clued up, and the fore-topmast stay-sail hauled down, he may come head to wind, and veer away cable, till, by falling off, he comes board and board with his opponent, who is still riding at his moorings, and who at that instant ought to be also raked by the boarder. This is the only method of manœuvring to which the boarding ship can recur; because, as soon as the anchor is gone, the ship acquires stern-way, and when the cable is checked, she runs head to wind, in which she is much assisted by the mizen and mizen top-sail, which impel her stern to leeward, till the wind is right in the direction of the keel; and, as the cable is veered away, till exactly along-side the ship at anchor, her own anchor being right a-head of the vessel she means to board, it follows that, as soon as the boarding ship comes head to wind, she is in a proper situation to throw her grappels, and send her crew on board of the other, if they are the strongest.

The ship at anchor should never wait for the enemy in that situation, which is always disadvantageous, and as there is much greater probability of escape when under way. But if it be necessary for the enemy to continue at anchor, he should take advantage of the boarder's ship letting go her anchor, to cut the cable by which she rides; and by this manœuvre fall athwart, rake the boarder, avoid being boarded, and bring up with the lee anchor. If time allow, two springs should be cast out, one on each side of the cable by which the ship rides, if there have been no previous opportunity for laying out two anchors, and thus guard against surprise, in case the ship which attacks has it in her power to pass on either side of the other; and when the side for which she is determined is perceived, the assailed should heave on the spring which is on the same side she has let go her anchor, if she be a-head, and on the opposite, if she be a-stern, veering out at the same time the other spring and cable, till the assailant be brought right a-breast. Then he may be raked at pleasure, as he has no way of escape. His only course to prevent danger would be having also a spring; and under cover of a brisk fire, veering upon that spring and cable to lay his enemy handsomely on board. But if this precaution should have been neglected, he must cut his cable, and drop on board of the ship to leeward; who on the other hand, has no mode of avoiding being boarded, but by cutting, to get under way, or to run on shore.

It is always easy to board a ship at anchor, when the wind will allow approaching to her under sail; in which case it is most advisable to run her along side, or to bring-to to

windward of the ship intended to be attacked, keeping her exactly to leeward; then to drift on board of her, by trimming the sails in such a manner as to keep as nearly as possible the broadside of the attacking vessel opposite to that of the adverse ship. In this situation the boarder should annoy the enemy with his guns till he can close with him; and by constantly cannonading, his fire may not be so well served as it otherwise might be. If, whilst a vessel is under way, it be proposed to board a vessel that is moored, an anchor should be let go at the time of boarding; for if the attacked ship should at this moment cut her cables to drive on shore, this would prevent the assailant and the assailed running a-ground together. Elements and Practice of Rigging and Seamanship, vol. ii. Boarder's Manœuverer, or Skillful Seaman, &c. translated from the French by Saufeuil, 4to. 1788.

BOARDING-netting, in *Ship Rigging*. See NETTING.

BOARI, in *Geography*, a village of Africa, on the Gold Coast, situated between Sukonda and Sama, where the Dutch had formerly a small factory, which was afterwards removed to Sama.

BOARI LAPPA a name given by the antient Romans to the fruit or rough balls of the common sparine or cleavers. Pliny calls this plant sometimes *lappa*, sometimes *lappago*; and the fruit by the names of *lappe boaria*, or *lappe canina*, and sometimes *canaria*.

BOARINA, BOAROLA, in *Ornithology*, the name of a small bird, described by Aldrovandus and others. This is the fig-eater of Albin and Latham; and *Motacilla Nevois* of Gmelin.

BOARULA, a species of MOTACILLA, called in England the grey wagtail. The colour of this bird is cinereous above, beneath yellow; tail feathers dark, and pale at the edges. This is an European bird, about seven inches and a half in length, and, like the rest of the wagtail tribe, frequents watery places. They are lively, active birds, perpetually flirt the tail, and seldom perch, but rest upon the ground. They feed chiefly upon insects. The nest of this species is made on the ground, and is composed of dried fibres and moss, lined with wool or feather, and usually contains from six to eight eggs, which are of a dirty white, marked with yellow spots. They breed in the north of England, seldom approaching nearer to the southward than Cumberland, till after the month of October. Linn. Donov. Brit. Birds, pl. 40, &c. *Le Bergette*, of Belon; and *la Bergonette jaune*, of Brisson, is of this species.

Obs. A variety of *Motacilla Boarula* inhabits Java. The colour is an olive brown, beneath yellow; lower part of the neck grey; first tail-feather entirely white; inner side and tip of the second and third white.

BOAS, in *Entomology*, a species of SCARABÆUS, that inhabits Sierra Leona. The thorax is retuse, excavated, bidentated; horn of the head recurved and simple. Fabricius.

BOAT, a small vessel, generally without a deck, managed by sails or oars, or drawn by horses upon canals, rivers, or lakes, for the purpose of conveying passengers, goods &c. from one place to another. The form, equipment, and names of boats are different according to the purpose for which they are intended, or to the country where they are built. Hence, boats are made slight or strong, sharp or flat-bottomed, open or decked, plain or ornamented, as they may be designed for swiftness or burden, for deep or shallow water, for sailing in a harbour or at sea, and for convenience or pleasure.

As boats make always a necessary appendage to ships it

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will, therefore, be proper to give a brief account of those belonging to the different classes of shipping.

Ships of war, particularly of the line, have usually six boats, and the number decreases with the rate of the ship. The largest is called the *long-boat*, and sometimes the *launch*; and its principal employment is to convey heavy stores to the ship. This boat is generally furnished with a mast and sails, and is occasionally decked, armed, and equipped, for cruising short distances against merchant ships of the enemy, or smugglers, or for impressing seamen, &c. The *barge* is the next less boat, and is particularly appropriated to carry the principal sea officers, as the admiral, captain, &c. to or from the ship; and in consequence of its slender construction, combined with its small breadth, is very unfit for sea. This boat never rows less than ten oars. The *pinnace* is similar to the barge, but smaller, never rows above eight oars, and is used by lieutenants in going ashore, or coming off to the ship. *Cutters* are broader, deeper, and shorter than the former; they are employed on almost all occasions, as for going ashore, carrying stores, provisions, boarding ships at sea, &c. *Jolly-boat* is the smallest boat used in any of the ships in his majesty's service. In *Plate VI* of *Ships* are perspective views of a man of war's long-boat, of a barge, and flat-bottomed boat.

In an East Indianman there are four boats, the *long boat*, *cutter*, *jolly-boat*, and *yarwl*. The first of these is for conveying stores and goods to and from the ship; the second for going ashore; and the others are employed occasionally.

Ships in the West India trade use boats in number and size according to the islands at which they intend to take in their cargo. Four boats generally belong to a ship in the Jamaica trade. The largest, called a *shallop*, will carry from eighteen to twenty hogheads of sugar. The next less in size is usually called a *ten hoghead boat*, from the number of hogheads it carries; these two are left in the country. The next less boat called a *double moses*, or *pinnace*, carries two hogheads a short distance; and the smallest boat is called the *jolly-boat*, and is generally suspended from the taffrail.

Ships in the Windward Island trade, loading at Barbadoes, Martinico, Dominica, &c. generally use a flat launch with skeeds, each about thirty-six feet long, one end being upon the boat's stern, and the other upon the beach, upon which the sugar hogheads are rolled from the beach into the launch. At St. Vincent's, Grenada, and Tobago, a one hoghead moses is used. At Trinidad a launch as flat as can be built is used. At Demerara, Berbice, and Surinam, they generally use sailing craft that will carry from twelve to twenty hogheads.

Ships employed in the whale fishery have six or more boats. These are very narrow in respect to their length, for the purpose of pulling fast; they are strong built, and sharp at both ends.

Smaller vessels of one hundred tons and under, have in general one boat.

Bachot, a fishing boat on the rivers in France; it is provided with a mast, oars, fishing lines, a staff, a pole to fasten their boat on the river when they are fishing, &c.

Balza or *balsa*, a boat, or rather raft, composed of five, seven, or nine logs or trunks of trees, used in South America. This boat is so called from *balza* or *balsa*, the name of the wood of which it is constructed, but which is called *puero* by the Darien Indians. The *balza* is a whitish spongy wood, and so very light that a boy can easily carry a log four yards long and a foot in diameter. The following account of this boat is extracted from the *Relacion Historica del Viage a la America Meridional*, *necho de Orden*, de S. Mag, &c. *Impressa de Orden de Rey en Madrid*, 1748.

The *balzas* are not only adapted to this river (Guayaquil),

but venture to sea, and carry on the trade as far as Payta. Their dimensions are proportionate to their use, or the voyage for which they are intended; some being only for fishing, others for the river trade, bringing fruits, and all sorts of merchandize from Bodega to Guayaquil, and from thence exporting them to Puna, Salto de Tumbez, and Payta; others are yet more commodiously contrived for carrying families, with all their furniture and necessaries, to their plantations or country houses. The *puero* trees, of which they are built, are twelve or thirteen toises long, reckoning five feet to the toise, and two feet, or two and a half diameter, so that the whole breadth of nine logs, of which some of them consist, is between twenty and twenty-four feet; and those of seven or fewer logs are proportionate.

These logs are fastened to each other only by the *bejuco*s or withies, with which the cross logs are also lashed to them, yet so securely as never to give way, if not worn out by long use, though in their voyage to the coast of Tumbez and Payta the sea runs very high; but the negroes neglecting to examine if the *bejuco*s are not too much worn to sustain another voyage, before they put to sea, it too often happens that the lashing breaks, the logs separate, and both cargo and passengers perish: indeed the Indians, being more active, get upon a log and safely work it to the nearest harbour. One of these melancholy instances happened while we were in the jurisdiction of Quito, and are wholly to be imputed to the sordid negligence of the Indians, who seem to have no sensibility of danger.

The thickest log of the *balza* is placed so as to reach farther than the others; at the stern, another log is lashed to this, on each side, and others to these, till the intended number be completed, which is always odd; the large one in the middle being, as it were, the stay and foundation of the others. The larger sort of these vessels usually carry about twenty-five tons, without damaging the cargo in consequence of its being too near the water's edge, for the sea never breaks over them, nor does the water swell between the logs, or ever rise above them, because the whole body of the vehicle accommodates itself to the motion of the water in all weathers.

These rafts work and ply to windward like a keeled vessel, and keep their course before the wind almost as exactly, which is the effect of another contrivance besides the rudder; some large planks, three or four yards long, and half a yard broad called *guares*, are set up vertically at the stern, and also forward between the main logs. By pushing some of these under the water, and taking others a little up, the float sails large, bears up, tacks, or lies to, according as the machine is worked; an invention which has hitherto escaped the acuteness of the most ingenious Europeans; and though the Indians have indeed contrived the instrument, yet they are utter strangers to the principles of mechanics, and the causes of its operations.

Had it been known before in Europe, the loss of many lives in shipwreck might have been prevented, as appears by the following, among many other instances: in the year 1730, the Genouefa ship of war, being lost in the Vivora, the mariners made a *jangada*, or raft, to save their lives, but miscarried by committing themselves to the winds and currents, without any steering; and the frequency of such melancholy events induces me to give a minute explanation of this instrument, from a memoir of Don Jorge Juan, relating to it.

The direction in which a ship moves, when under sail, is in a line perpendicular to the sail, according to the demonstrations of Renau, in his *Theory of Manual Arts*, cap. ii. art. i. Bernouilli, cap. i. art. 4; and Pitot, sect. ii. art. 13. The

re-action being equal, and opposite to the action, the opposition of the water to the motion of the vessel will also be in a direction perpendicular to the sail, from leeward to windward, and the impulse of a longer body exceeding that of a smaller, supposing the motion of both to be equal, it follows that, upon one of the fore guares being thrust under water, the vessel will lie to, and bear up again, if it be taken out; and by a parity of reasoning, an after one being thrust under water will cause the ship to bear up and to lie to, on its being taken out. The way used by the Indians, in managing the balza, is to increase the number of guares to four, five, or six, to keep her to windward; for it is evident that the more there are under water the greater will be the lateral resistance, which is thus increased by the lee-boards used in smaller vessels, and for the same purpose. These guares so effectually answer the end for which they are intended, that, when once the balza is underway, only one need be worked; and by thrusting it down or raising it up a foot or two, the vessel is kept in a right course. *Plate I. of boats*, contains a perspective view of a Balza.

Barge, the second boat in a ship of war, as mentioned above; a vessel employed in carrying merchandize in the river Thames, with one mast. See also the article *BARGE*.

Bum boat, a small boat employed in felling vegetables, &c. to vessels lying at a distance from the shore.

Bunder boat, a boat at Bombay for carrying off pilots to a ship, and taking passengers ashore.

Chalaud, a boat navigated on the river Loire in France; these boats are narrow and low, for the purpose of more easily passing through the locks of canals: they are principally used in carrying wines and other productions, and merchandizes of the provinces, which lie near the Loire and Allier.

Coolie, a boat employed as a wherry at Bombay; it has one mast, with a considerable rake forward, and sails very fast.

Felucca, is a strong passage-boat used in the Mediterranean, having from 10 to 16 banks of oars. The natives of Barbary often employ boats of this sort as cruisers.

Ferry-boats, are used for conveying passengers, goods, horses, cattle, &c. across a river or branch of the sea; and, therefore, are of different dimensions and forms of construction accordingly.

Fishing boats, are of various kinds; those employed in the salmon fishing, which is generally in rivers, or at the sea shore, and commonly called *colles*, are narrow at one end, and broad at the other, for the purpose of making up the net upon it, and from which the net is let into the river or sea. Boats employed in the white fishery, that is, in taking ling, cod, haddocks, &c. are pretty large; some carrying ten tons and upwards, with two masts, with a square or lug-sails, and strong built so as to endure a rough sea; they are usually and unequally sharp at both ends, the sharpest end being the bow. Decked vessels called *snacks* having one mast, or *luggers* with three masts, are employed in this fishery.

Flat-bottomed boat, is so constructed for taking the beach easily, for the greater convenience of landing troops with their baggage, accoutrements, &c.

Flotts, boats of the master ferryman at Paris. The ordinance of that city, made in the year 1672, enjoins them to keep their boats always provided with daves and oars; and to have a sufficient number of boats ready at the places and services appointed by the provost of the merchants and echevins.

Foncts, boats which navigate on the river Seine; they are large, long, and strong; they come from Roan, and from the river Oise, and are commonly used to carry great loads of wood for fuel, also goods, &c.

Gig, a small light boat, usually suspended from the taffrail of a ship.

Holland, Boats of. In almost all the Seven United Provinces there are boats which serve for public carriages, which set out from every city at all hours of the day, and carry passengers very conveniently from one place to another, at a very small expence. They are long, narrow, and covered, and contain about sixty persons; each boat is drawn by one horse, and has only two men to manage it, the one attends the helm, and the other takes care of the rope; the horse is generally rode by a boy. In these boats there is a room which can easily contain six persons; this room, which is called a *roof*, has glass windows, whereas the other openings in the boat are shut with oil cloth in bad weather. A passenger may take a place in this room, or the whole room. Those boats which carry goods from Amsterdam to the Hague, and which leave Amsterdam at eight at night, arrive at the Hague next morning. In those boats, however, designed for passengers only, a person is obliged to change boat several times. From Amsterdam to Haerlem he must change boats half way, because the canal there is cut by a dyke. At Haerlem, the passengers must cross the town to get to the boat that is to carry them to Leyden. At Leyden, he must again cross the town to meet the boat in which he is to go to the Hague. All this can be performed in ten hours and a half; for, at eight o'clock precisely, a boat sets out from Amsterdam to Haerlem, where it arrives about half an hour after ten; at eleven a boat sets out from Haerlem for Leyden, and arrives there at three in the morning; half an hour after three a boat sets out from Leyden, and arrives at the Hague half an hour after six. There is such good order kept, that at the ringing of a bell the boat must set out immediately, without waiting for any passenger. There are few countries where people can travel so conveniently as in Holland.

Ivahab, a boat or canoe of the Society Islands, of which captain Cook gives the following description. The ivahah is used for short excursions at sea. These boats are all of the same figure, but of different sizes, and used for different purposes; their length is from ten to seventy-two feet, but the breadth is by no means in proportion; for those of ten feet are about a foot wide, and those of more than seventy are scarcely two feet. They have the fighting ivahah, the fishing ivahah, and the travelling ivahah, for some of these go from one island to another. The fighting ivahah is by far the longest; and the head and stern are considerably raised above the body, in a semicircular form, particularly the stern, which is sometimes seventeen or eighteen feet high, though the boat itself is scarcely three feet. These never go to sea singly, but are fastened together side by side at the distance of about three feet, by strong poles of wood, which are laid across them, and lashed to the gunwales. Upon these in the fore part, a stage or platform is raised about ten or twelve feet high, and somewhat wider than the boats, which is supported by pillars about six feet long; upon this stage stand the fighting men, whose missile weapons are slings and spears; for, among other singularities in the manners of these people, their bows and arrows are used only for diversion as we throw quoits; below these stages sit the rowers, who receive from them those that are wounded, and furnish fresh men to ascend in their room. Some of these have a platform of bamboos, or other light wood, through their whole length, and considerably broader, by means of which they can carry a great number of men. The fishing ivahahs vary in length from about forty feet to the smallest size, which is about ten feet; all that are of the length of twenty-five feet and upwards, of whatever sort, occasionally carry sail. The travelling ivahah is always double, and furnished with a small neat house, about five or

six feet broad, and six or seven feet long, which is fastened upon the fore part, for the convenience of the principal people, who sit in them by day, and sleep in them at night. The fishing ivahals are sometimes joined together, and have a house on board, but this is not common. Those which are shorter than twenty-five feet, seldom or never carry sail; and though the stern rises about four or five feet, they have a flat head and a board that projects forward about four feet. The ivahals are the only boats used by the inhabitants of Otaheite.

Life-boat, a boat invented by Mr. Henry Greathead of South Shields, for the purpose of preserving the lives of shipwrecked persons. The following circumstance gave rise to this invention:

In September 1789, the ship *Adventure* of Newcastle, was stranded on the *Herd* sand, on the fourth side of Tyremouth haven, in the midst of tremendous breakers; and all the crew dropped from the rigging one by one, in the presence of thousands of spectators, not one of whom could be prevailed upon, by any reward, to venture out to her assistance, in any boat or coble of the common construction.

On this occasion, the gentlemen of South Shields called a meeting of the Inhabitants, at which a committee was appointed, and premiums were offered for plans of a boat which should be the best calculated to brave the dangers of the sea, particularly of broken water.

Many proposals were offered; but the preference was unanimously given to that of Mr. Greathead, who was immediately directed to build a boat at the expence of the committee.

This boat went off on the 30th of January 1790; and so well has it answered, and indeed exceeded, every expectation, in the most tremendous broken sea, that since that time, not fewer than two hundred lives have been saved at the entrance of the Tyne alone, which otherwise must have been lost; and in no instance has it ever failed.

The principle of this boat appears to have been suggested to Mr. Greathead by the following simple fact.—Take a spheroid, and divide it into quarters; each quarter is elliptical, and nearly resembles the half of a wooden bowl, having a curvature with projecting ends; this, thrown into the sea or broken water, cannot be upset, or lie with the bottom upwards.

The length of the boat is thirty feet; the breadth, ten feet; the depth, from the top of the gunwale to the lower part of the keel in midships, three feet three inches; from the gunwale to the platform (within), two feet four inches; from the top of the stems (both ends being similar) to the horizontal line of the bottom of the keel, five feet nine inches. The keel is a plank of three inches thick, of a proportionate breadth in midships, narrowing gradually towards the ends, to the breadth of the stems at the bottom, and forming a great convexity downwards. The stems are segments of a circle, with considerable *rakes*. The bottom section, to the floor-heads, is a curve fore and aft, with the sweep of the keel. The floor timber has a small rise curving from the keel to the floor-heads. A bilge plank is wrought in on each side, next the floor-heads, with a double rabbit or groove, of a similar thickness with the keel; and, on the outside of this, are fixed two bilge-trees, corresponding nearly with the level of the keel. The ends of the bottom section form that fine kind of entrance observable in the lower part of the bow of the fishing boat, called a *coble*, much used in the north. From this part to the top of the stem it is more elliptical, forming a considerable projection. The sides, from the floor-heads to the top of the gunwale, flaunch off on each side, in proportion to

above half the breadth of the floor. The breadth is continued far forwards towards the ends, leaving a sufficient length of straight side at the top. The sheer is regular along the straight side, and more elevated towards the ends. The gunwale fixed to the outside is three inches thick. The sides, from the underpart of the gunwale, along the whole length of the regular sheer, extending twenty-one feet six inches, are cased with layers of cork, to the depth of sixteen inches downwards; and the thickness of this casing of cork being four inches, it projects at the top a little without the gunwale. The cork, on the outside, is secured with thin plates or slips of copper, and the boat is fastened with copper nails. The thwarts, or seats, are five in number, *double-banked*; consequently the boat may be rowed with ten oars. The thwarts are firmly stanchioned. The side oars are short, with iron tholes and rope grommets, so that the rower can pull either way. The boat is steered with an oar at each end; and the steering oar is one third longer than the rowing oar. The platform placed at the bottom, within the boat, is horizontal, the length of the midships, and elevated at the ends, for the convenience of the steerer, to give him a greater power with the oar. The internal part of the boat next the sides, from the under part of the thwarts down to the platform, is cased with cork; the whole quantity of which, affixed to the life-boat, is nearly seven hundred weight. The cork indisputably contributes much to the buoyancy of the boat, is a good defence in going along-side a vessel, and is of principal use in keeping the boat in an erect position in the sea, or rather for giving her a very lively and quick disposition to recover from any sudden *cant* or *lurch*, which she may receive from the stroke of a heavy wave. But, exclusively of the cork, the admirable construction of this boat gives it a decided pre-eminence. The ends being similar, the boat can be rowed either way; and this peculiarity of form alleviates her in rising over the waves. The curvature of the keel and bottom facilitates her movement in turning, and contributes to the ease of the steering, as a single stroke of the steering oar has an immediate effect, the boat moving as it were upon a centre. The fine entrance below is of use in dividing the waves, when rowing against them; and, combined with the convexity of the bottom, and the elliptical form of the stem, admits her to rise with wonderful buoyancy in a high sea, and to launch forward with rapidity, without shipping any water, when a common boat would be in danger of being filled. The flaunching or spreading form of the boat, from her floor-heads to the gunwale, gives her a considerable bearing; and the continuation of the breadth, well forward, is a great support to her in the sea; and it has been found by experience, that boats of this construction are the best sea boats for rowing against turbulent waves. The internal shallowness of the boat from the gunwale down to the platform, the convexity of the form, and the bulk of cork within, leave a very diminished space for the water to occupy; so that the life boat, when filled with water, contains a considerable less quantity than the common boat, and is in no danger either of sinking or overturning. It may be presumed by some, that in cases of high wind, agitated sea, and broken waves, a boat of such a bulk could not prevail against them by the force of oars; but the life-boat from her peculiar form, may be rowed a-head, when the attempt in other boats would fail. Boats of the common form, adapted for speed, are of course put in motion with a small power; but for want of buoyancy and bearing, are over-run by the waves, and sunk, when impelled against them; and boats constructed for burthen meet with too much resistance from the wind and sea, when opposed

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to them, and cannot in such cases be rowed from the shore to a ship in distress.

Mr. Greathead gives the following instructions for the management of the life-boat.

The boats, in general, of this description are painted white on the outside; this colour more immediately engaging the eye of the spectator when rising from the hollow of the sea than any other. The bottom of the boat is at first varnished (which will take paint afterwards) for the more minute inspection of purchasers. The oars she is equipped with are made of fir, of the best quality; having found by experience, that a rove ash oar, that will dress clean and light, is too pliant among the breakers; and when made strong and heavy, from rowing double-banked, the purchase being short, sooner exhausts the rower, which makes the fir oar, when made stiff, more preferable.

In the management of the boat she requires twelve men to work her; that is, five men on each side rowing double-banked, with an oar slung over an iron thole, with a grommet (as provided), so as to enable the rower to pull either way, and one man at each end to steer her, and to be ready at the opposite end to take the steer-oar, when wanted. As, from the construction of the boat, she is always in a position to be rowed either way, without turning the boat; when manned, the person who steers her should be well acquainted with the course of the tides, in order to take every possible advantage: the best method, if the direction will admit of it, is to head the sea. The steersman should keep his eye fixed upon the wave or breaker, and encourage the rowers to give way, as the boat rises to it; being then aided by the force of the oars, she launches over it with vast rapidity, without shipping any water. It is necessary to observe that there is often a strong reflux of sea occasioned by the stranded wrecks, which requires both dispatch and care in the people employed, that the boat be not damaged. When the wreck is reached, if the wind blows to the land, the boat will come in shore without any other effort than steering.

The following additional observations and instructions are given by Mr. Hinderswell of Scarborough.

The life-boat at Scarborough is under the direction of a committee. Twenty-four fishermen, composing two crews, are alternately employed to navigate her. A reward, in cases of shipwreck, is paid by the committee to each man actually engaged in the assistance; and it is expected the vessel receiving assistance should contribute to defray this expense. None have hitherto refused.

It is of importance that the command of the boat should be entrusted to some steady experienced person, who is acquainted with the direction of the tides or currents, as much skill may be required in rising them to the most advantage, in going to a ship in distress. It should also be recommended, to keep the head of the boat to the sea, as much as circumstances will admit; and to give her an accelerated velocity to meet the wave, much exertion is necessary in approaching a wreck, on account of the strong reflux of the waves, which is sometimes attended with great danger. In a general way, it is safest to go on the lee quarter; but this depends on the position of the vessel; and the master of the boat should exercise his skill in placing her in the most convenient situation. The boatmen should practise themselves in the use of the boat, that they may be the better acquainted with her movements; and they should at all times be strictly obedient to the directions of the person who is appointed to the command.

Plate II of *Boats* contains a perspective view of the life-boat rising over a heavy surge, and going out to the assistance of a ship, which appears in the horizon in distress. In

the life-boat are ten rowers pulling to get to the ship. At the lower end of the boat, a man is steering her with a long oar towards the ship; and another person is stationed with an oar at the higher end, to steer the boat on her return; both ends of the boat being formed alike, in order to use either at pleasure in going to or coming from the ship. The sheer, or curve of the boat, rising considerably from the middle to the stems, or ends, is clearly distinguished; also the coating of cork secured by slips of copper along the outside of the boat, near the part where the rowers are seated.

As every thing relating to this important invention must be interesting to the public, it is, therefore, presumed the following additional information will not be unacceptable, especially as it contains the strongest evidence of the great utility of this boat.

The life-boat having been submitted to a test of twelve years' experience, during which period Mr. Greathead sacrificed a very considerable portion of his time in furnishing plans, and otherwise rendering the invention as extensively useful as he could; on the 25th of February 1802, he presented a petition to the house of commons, the prayer of which was as follows:

"Your petitioner having been instrumental in saving the lives of so many persons; and the utility of the boat being now established; and your petitioner having derived little or no pecuniary advantage whatever from the invention, his models having been made public; humbly hopes, that this honourable house will take his case into their consideration, and grant your petitioner such reward as to this honourable house shall seem meet, &c."

The petition, having been recommended by his majesty, was referred to the consideration of a committee; from whose report the following is a brief abstract.

"It appeared to your committee to be necessary to direct their inquiries particularly to the three following subjects.

"1st. The utility of the life-boat.

"2dly. The originality of the invention claimed by Mr. Greathead.

"3dly. Whether he had received any and what remuneration.

"And in order to ascertain these facts, your committee proceeded to examine,

"Ralph Hillery, a seaman, who stated, that he had been forty-five years at sea, in the Greenland and coal trade, and has resided always at Shields. About three years ago, he was in the Northumberland life boat, which was presented to North Shields by the duke of Northumberland, the first time she went off, which was to the relief of the sloop Edinburgh. This vessel was seen to go upon the Herd sands, about a mile and a half from shore; she was brought to an anchor before the life-boat got to her, and she continued striking the ground so heavily, that she would not have held together ten minutes longer, had they not got to her; they made her cut her cable, and then took seven men out of her, and brought them on shore. The sea at that time was monstrously high, so high that no other boat whatever could have lived in it.

"He was then asked, whether he had been out in the life-boat on any other occasion? to which he replied, that he had been five times out in her to the relief of different ships; from one ship they saved fifteen men; and in every instance when he, the witness, was in the boat, they saved the whole of the crews of the wrecked ships. Besides the times he has been himself in the boat, he has seen her go off scores of times, and never saw her fail in bringing off such of the crews as stayed by the ships. But many times part of the crews of the vessel wrecked have taken to their own boats,

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and have been drowned by the boats' upsetting; whilst the remainder of the crews that continued on board have been saved by the life-boat. And the witness declared his conviction, that no other boat that ever he saw could have gone from the shore and saved the crews, at the times the life-boat went.

"He stated that in the event of the life-boat filling with water, she would continue still upright, and would not founder, as boats of a common construction do. That about two months ago, he saw her come on shore with a ship's crew, besides her own crew, so full of water that it ran over each side; the sea had broken several of her oars; and he believes, that no boat of any other construction could have brought the crew on shore so filled with water.

"Captain William Carter, of the ship Providence of Newcastle, stated, that he had resided at South Shields twenty-five years, and been fifteen years in the coal and Baltic trades; that on the 28th of November 1797, he commanded the Velocity of 59 tons, riding at anchor on Tynemouth bar, amongst the broken water, when the ship Planter was driven on shore by the violence of the gale, about one hundred yards from the Velocity; the life-boat came off and took fifteen persons out of the Planter; and they had scarcely quitted the ship when she went to pieces; they must all otherwise have inevitably perished, as the wreck came on shore almost as soon as the life-boat. He conceived that no boat of a common construction could have given relief at that time. There were several other vessels in the same situation with the Planter, namely, the Gateshead, the Mary, and the Beaver, besides a sloop, whose name the witness does not know. The crew of the Gateshead, being nine in number, took to their own boat, which sunk, and seven of them were lost; the other two saved themselves by ropes thrown from the Mary. After the life-boat had landed the crew of the Planter, she went off successively to the other vessels, and brought the whole of their crews safe on shore, together with the two persons who had escaped from the boat of the Gateshead. He has seen the life-boat go to the assistance of other vessels at different times, and she always succeeded in bringing the crews on shore.

"The witness has several times observed her to come on shore full of water and always safe.

"Captain Gilfred Lawson Reed, an elder brother of the Trinity-house, stated, that he had been bred to the sea, and had been a member of the Trinity-house seventeen years. He had the management of the life-boat at Lowestoffe, particularly last year, where he was requested by the subscribers to make any improvement he thought necessary. She was built exactly upon Mr. Greathead's plan, corresponding with the model before the committee. Having fitted her for service as far as he thought proper, he was requested by a number of the subscribers to launch this life-boat; he took an opportunity, when the sea fell very heavy on the beach, and launched her in the presence of at least two hundred spectators. Twenty-four men jumped into her; and when she first mounted the waves, the spectators with one voice expressed their astonishment. He had given the men orders to cross a shoal, that lay about a mile and a half from the shore upon which the sea broke very heavily; by some mistake one of the plugs was left out of the bottom, and she filled with water before she got to the shoal, which obliged the men to return immediately, and she brought the twenty-four men safe to shore, though when she gained the shore, she was full of water to the gun wale and midships; yet by her sheer one-third of her at each end was out of the water.

"Being asked, wherein he considered the superiority of the life-boat consists over any other boat that has hitherto

been invented? he answered, the curvature of the keel, and the flanking sides, which render it almost impossible to be upset. When this boat was afloat and full of water, the men all went to one side of the boat, in order to try the possibility of upsetting her, which they could not effect.

"Mr. Thomas Henderwell, of Scarborough, ship-owner, stated, that the peculiar nature of the curvature of the keel of this boat is the foundation and basis of its excellence. It regulates, in a great measure, the sheer with elevation towards the ends. This construction spreads and repels the water in every direction, and enables her to ascend and descend with great facility over the breakers. The ends being reduced regularly from the centre to less than one-third proportion of the midships, both ends are lighter than the body section. By means of the curved keel, and the centre of gravity being placed in the centre of the boat, she preserves equilibrium in the midst of the breakers. The internal shallowness of the boat in the body section, occasioned by the convexity of the keel and the sheer at the top, leaves to small a space for the water to occupy, that the boat, though filled with water, is in no danger of sinking or upsetting. The buoyancy of the boat, when filled with water, is also assisted by the cork being placed above the water-line.

"Mr. Samuel Plumb, of Lower Shadwell, described himself to have been bred to the sea, and to have acted in the capacity of master of a ship from 1777 until within these eighteen months; that he had been chiefly employed in the coal and Baltic trades, and had resided at Shields the whole of his life till within the last five years. He is acquainted with the Shields' life-boats; and from every information he had received, Mr. Greathead has been universally considered as the inventor of them.

"He went out in one of them to the relief of a ship, which was wrecked on the coast near the mouth of the Tyne. The first time they reached the wreck, the rope, which they threw from the wreck to the life-boat, broke, and the boat was drifted to the northward by the violence of the wind and strong current of the tide; they then landed, and by two horses dragged the boat along the sand to the southward, and then launched her again through the breakers to the vessel. In the second attempt they succeeded in bringing the crew on shore. The witness never saw any other boat in which he would have ventured to the relief of the crew, or which he thinks could have executed the purpose of saving them.

"Mr. William Masterman of South Shields, ship-owner, was one of the original committee that ordered the life-boat at South Shields in 1789. He corroborated the evidence given by captain William Carter; and stated, that from the situation of his residence, he has seen the performance of the life-boat more frequently than probably any other of the committee at South Shields, and has frequently seen and assisted in the launching of the life-boat from the beach into the sea during a storm. That this is done with the assistance of low wheels, or what may be called rollers, upon which she is dragged to the water's edge, and by means of hands proportioned to the weight of the boat, she can be launched with as much ease as any other boat. He remembers the instance stated by Mr. Samuel Plumb, in which the life boat, being drifted to the northward by a strong tide, was landed, and again launched to the southward opposite to the wreck, and in the face of a very heavy sea. When the Gateshead, Planter, and other ships were wrecked, it was first discovered that the life-boat could act with perfect safety *athwart the sea*; and since that time, the boat has been rowed *athwart sea*, or otherwise, indifferently,

as the object to be relieved required it; and that the goes with the same safety from one object to another, in a broken sea, as an ordinary boat would pass from one ship to another in a smooth sea. He is confident, since the establishment of the life-boat, that there have been at least 300 persons brought on shore from ships in distress, and wrecks off Shields, the greatest part of whom must otherwise have perished. And the witness added, that it was his opinion, founded upon experience and the observations he had been enabled to make, that no sea, however high, could upset or sink the life-boat."

The *originality* of Mr. Greathead's invention is there proved by proper certificates and attestations; and the remuneration that he had received over and above a profit of from ten to fifteen pounds each, upon building a few boats, is stated to be,

From the Literary and Philosophical Society of Newcastle, five guineas.

Royal Humane Society, a medallion.

Corporation of the Trinity House, 100 guineas.

Society of Arts, a gold medallion and 50 guineas.

The vote of parliament, on the 3d of June, in consequence of the foregoing report, was, "That a sum not exceeding 1200 pounds be granted to his majesty, to be paid to Henry Greathead, of South Shields, in the county of Durham, boat builder, as a reward for his invention of the life-boat, whereby many lives have already been saved, and great security is afforded to seamen and property in cases of shipwreck."

The subscribers at Lloyd's, on the 20th of May, voted to Mr. Greathead the sum of 100 guineas, "as an acknowledgement of his talents and exertions in inventing and building a life-boat," and 2000 pounds "for the purpose of encouraging the building of life-boats on different parts of the coasts of these kingdoms."

At the beginning of 1804, Mr. Greathead received a very valuable diamond ring from the emperor of Russia, whose munificence to ingenious men of all countries is well known.

The following extract from the Tyne Mercury of the 20th November 1803, is another proof of the great utility of the life-boat.

The Bee of Shields, John Houston master, having put to sea (21st Nov.) in an easterly wind, had not proceeded far, when it began to blow strong from the south-east, which obliged him a few hours after to put back. In taking Tynemouth bar at the last quarter ebb, in a very heavy sea, she struck the ground, and unshipped her rudder. Being now completely unmanageable, she drifted towards the north side of the bar, and at length drove on the Black Middens. They who have witnessed the tremendous sea which breaks on the north-east part of this harbour, in a south-easterly wind, may form a conception of the dreadful situation in which the crew of the vessel were situated. In the midst of rocks, where the sea runs mountains high, so as frequently to obscure the ship, and where any vessel might be expected immediately to go to pieces; their only refuge from being swept into the gulf, was to climb up into the shrouds, which the captain, with six men and boys, being the whole crew, instantly effected. The dangerous situation in which they were placed, immediately attracted an immense number of spectators from both North and South Shields. The shores in every direction were lined with people who expressed, by their anxious looks, the most sympathetic apprehensions for their safety. The making use of the life-boat was by most people thought impossible; and at all events, the attempt was attended with extreme dan-

ger, owing to the tremendous sea, and the immense rocks which lay where the vessel was stranded. So confident, however, was Mr. Greathead, the inventor, of the life-boat being able to live in any sea, if properly navigated, that he, without hesitation, and with the greatest alertness, volunteered his services to bring off the men from the brig. This intrepid offer operated like electricity among the sailors; and immediately the Northumberland life-boat was launched, and manned with Mr. Greathead and South Shields pilots. In the course of a few minutes they reached the vessel, without much difficulty, and picked off the men from the shrouds shivering with cold, and almost perished by fatigue. One man, in making too much haste to enter the boat, fell into the breakers, but was immediately recovered. When the whole crew was in the boat, they rowed towards the shore, and in less than an hour from the time the boat was launched, did they return in safety to South Shields, without a single accident!

Upon the 1st of August 1777, some trials were made on a boat, or sloop fit for inland navigation, coasting voyages, and short passages by sea, which is not, like ordinary vessels, liable to be upset or sunk by winds, waves, water-spouts, or too heavy a load, contrived and constructed by Monsieur Bernieres, director of the bridges and causeways in France, &c. at the gate of the invalids in Paris, in the presence of the provost of the merchants, of the body of the town, and of a numerous concourse of spectators of all conditions.

These experiments were made in the way of comparison with another common boat of the same place, and of equal size. Both boats had been built ten years, and their exterior forms appeared to be exactly similar. The common boat contained only eight men, who rocked it and made it incline so much to one side, that it presently filled with water, and sunk; so that the men were obliged to save themselves by swimming; a thing common in all vessels of the same kind, either from the imprudence of those who are in them, the strength of the waves or wind, a violent or unexpected shock, their being overloaded, or overpowered any other way.

The same men who had just escaped the boat which sunk, got into the boat of M. Bernieres; rocked and filled it, as they had done the other, with water. But, instead of sinking to the bottom, though brim-full, it bore being rowed about the river, loaded as it was with men and water, without any danger to the people in it.

M. Bernieres carried the trial still farther. He ordered a malt to be erected in this same boat, when filled with water; and to the top of the malt had a rope fastened, and drawn till the end of the malt touched the surface of the river, so that the boat was entirely on one side, a position into which neither winds nor waves could bring her; yet, as soon as the men, who had hauled her into this situation, let go the rope the boat and malt recovered themselves perfectly in less than the quarter of a second; a convincing proof that the boat could neither be sunk nor overturned, and that it afforded the greatest possible security in every way. These experiments appeared to give the greater pleasure to the public, as the advantages of the discovery are not only so sensible, but of the first importance to mankind.

Marnois boats, so called from being employed on the river Marne in France. They are flat, and carry wine, corn, timber, &c. from the province of Champagne.

Norway boat, or yawl, is sharp at both ends, and of various dimensions. This boat, from its construction, is admirably adapted for enduring a high sea, and will often ven-

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ture out to a great distance from the land, when some ships can scarcely carry any sail.

Pabie, a boat of the Society islands; it is bow-sided, and sharp-bottomed. The *pabie*, according to captain Cook, is of different sizes, from thirty to sixty feet long, but like the *ivahah*, is very narrow. One that was measured was fifty-one feet long, and only one foot and an half wide at the top; in the widest part it was about three-feet, and this is the general proportion. It does not, however, widen by a gradual swell, but the sides being straight and parallel for a little way below the gunwale, it swells abruptly, and draws to a ridge in the bottom; so that a transverse section of it has somewhat the appearance of the mark upon cards, called a spade, the whole being much wider in proportion to its length. These, like the largest *ivahahs*, are used for fighting, but principally for long voyages. The fighting *pabie*, which is the largest, is fitted with the stage or platform, which is proportionably larger than those of the *ivahah*, as their form enables them to sustain a much greater weight. Those that are used for sailing are double, and those of the middle size are said to be the best sea-boats. They are sometimes out a month together, going from island to island, and sometimes as is credibly reported, they are not unfrequently a fortnight or twenty days at sea, and could keep it longer, if they had more stowage for provisions, and conveniencies to hold fresh water.

When any of these boats carry sail single, they make use of a log of wood which is fastened to the end of two poles that lie across the vessel, and project from six to ten feet, according to the size of the vessel, beyond its side; somewhat like what is used by the flying proa of the Ladrone islands, and called, in the account of lord Anson's voyage, an *Outrigger*; to which the shrouds are fastened.

Some of them have one mast, and others two; they are made of a single stick; and when the length of the canoe is 30 feet, that of the mast is somewhat less than 25 feet; it is fixed to the frame that is above the canoe, and receives a sail of matting about one-third longer than itself; the sail is pointed at the top, square at the bottom, and curved at the side, somewhat resembling what is called a shoulder of mutton sail, and used for boats belonging to men of war; it is placed in a frame of wood, which surrounds it on every side, and has no contrivance either for reefing or furling, so that if either should become necessary, it must be cut away, which, however, in these climates, can seldom happen. To the top of the mast are fastened ornaments of feathers, which are placed inclining obliquely forwards, the shape and position of which will be conceived at once from the figure in the *plate of Boats*.

The oars or paddles that are used with these boats, have a long handle and flat blade, not unlike a baker's peel. Of these, every person in the boat has one, except those that sit under the awning, and they push her forward with them at a good rate. These boats, however, admit so much water at the seams, that one person at least is continually employed in throwing it out. The only thing in which they excel is landing and putting off from the shore in a surf; by their great length, and high sterns, they could land every day, where the English boats could scarcely land at all; they have also the same advantages in putting off by the height of the head.

The exact dimensions of a *pabie*, given from a careful admeasurement, will so very materially contribute to the elucidation of the description subsequently given, as to the manner and particular form in which this class of canoes is built, that they might perhaps enable an European draughtsman, to construct one so nearly resembling them as to

create some difficulty in pointing out the true from that which was fictitious:

	Feet.	Inches.
Extreme length from stem to stern, not reckoning the beading up of either	51	0
Breadth in the clear of the top forward	1	2
Breadth in the midships	1	6
Breadth aft	1	2
—In the bilge forward	2	8
—In the midships	2	11
—Aft	2	9
Depth in the midships	3	4
Height from the ground on which she stood	3	6
Height of the head from the ground without, including that of the figure	4	4
Height of the figure	0	11
Height of the stern from the ground	8	9
Height of the figure	2	0

To illustrate the description of the manner in which these vessels are built, it will be necessary to refer to *fig. 2. Plate II*.

The first stage or keel under *aa*, is formed of a tree hollowed out like a trough, for which the longest trees are chosen that can be procured, so that there are never more than three in the whole length; the next stage under *bb*, is formed of straight planks, about four feet long, fifteen inches broad, and two inches thick; the third stage under *cc*, is like the bottom, made of the trunks hollowed into its bilging form; the last is also cut out of trunks, so that the moulding is of one piece with the upright. To form these parts separately without saw, plane, chissel, or any other iron tool, may well be thought no easy task; but the great difficulty is to join them together.

When all the parts are prepared, the keel is laid upon the blocks; and the planks, being supported by stanchions, are sewed or clamped together with strong thongs of plaiting. These are passed several times through holes that are bored with a gauge or auger of bone, which performs its office with tolerable exactness; and the nicety with which this is done, may be inferred from their being sufficiently water-tight for use without caulking. As the plaiting soon rots in the water, it is renewed at least, once a year, in order to which the vessel is taken entirely to pieces; the head and stern are rude, with respect to the design, but very neatly finished, and polished to the highest degree.

These *pabies* are kept with great care in a kind of house, built on purpose for their reception; the houses are formed of poles set upright in the ground, the tops of which are drawn towards each other, and fastened together with their strongest cord, so as to form a kind of Gothic arch, which is completely thatched quite to the ground, being open only at the ends: they are sometimes fifty or sixty paces long.

Peter-boat, a boat employed in the river Thames in fishing. They in general sail well, and are good sea-boats.

Pleasure-boat, a vessel employed by gentlemen in excursions upon the water, for their amusement. Their size and manner of equipment are very various, being from a few tons burden, to upwards of two or three hundred tons, and having one or more masts.

Post-boats, are boats established on the river Loire in France, for the convenience of the public. They are long in respect to their breadth, and go very fast: There are also some on the Rhone, which go from Lyons to Avignon in 24 hours.

Proa; see that article.

Punt, a sort of flat-bottomed boat, whose floor resembles the platform of a floating stage. It is used by the naval artificers,

artificers, either in caulking, breaming, or repairing the bottom of a ship.

Sampan, a Chinese boat without a keel, appearing almost like a trough; they are made of different dimensions, but are mostly covered. There are passenger sampans, to carry people backward and forward, between the town and ships. These boats are as long as sloops, but broader, almost like a baking trough, and have, at the end, one or more decks, made of bamboo-sticks; the cover, or roof, is also made of bamboo sticks, arched over in the shape of a grater, and may be raised or lowered at pleasure; the sides are made of boards, with little holes, and shutters instead of windows; the boards are fastened on both sides to posts, which have notches like steps on the inside, that the roof may be let down, and rest on them; on both ends of the deck are commonly two little doors, at least there is one at the stern. A fine, white smooth carpet, spread up as far as the boards, makes the floor, which, in the middle, consists of loose boards; but this carpet is only made use of to sleep on. As these boats differ from those of Europeans in shape, they are likewise rowed in a different manner; for two rowers posting themselves at the back end of the sampan, work it forwards very readily by the motion of two oars, and can almost turn the vessel just as they please; the oars, which are covered with a little hollow quadrangular iron, are laid on iron swivels, which are fastened in the side of the sampan. At the iron the oars are pieced, which makes them look a little bent. In common, a rower sits before with a short oar, but this he is forced to lay aside when he comes near the city, on account of the great throng of sampans; and this inconvenience has continued the Chinese in their old way of rowing.

Sampans of *burden* are the largest boats, by which all porcelain, silks, and other commodities, are conveyed from Canton to the European ships. But these boats do not serve for the above-mentioned purposes only, but are used, besides, as houses for whole families, which are born, marry, and die in them. They commonly have, besides, hogs, some chickens and dogs, and some flower-pots, containing Guinea pepper, or some other plants, in these boats.

Duck sampans, are boats in which they feed four or five hundred ducks. They have on both sides a bridge, which may be let down. In the day-time the ducks feed in the river upon herbs and fish; at night their master calls them into his boat; they immediately obey him, and come on board as soon as he lets down his Bridge.

Fishing sampans, are the smallest of all, narrow, like some European fishing boats, and have either a very small deck of straw, or bamboo, or are even without that poor convenience. Bad as these boats are, yet parents, and their naked children, are seen to get their livelihood in them, both summer and winter, by fishing, and picking up what has been thrown overboard from other vessels. For this purpose they tie several hooks to a cord, and throw them out in different places; almost in the same manner as fishermen lay their eel-hooks. They have better or worse fortune, as it happens. There is nothing so filthy but what these people will use as food; and the hogs, which having died are thrown overboard, when they begin to putrefy, float in a few days, and often become the occasion of quarrels, which end in battles. The reason why the Europeans sink the hogs, which die on board their ships, is, that the inhabitants of this place may not fall upon them; for it is said that the Chinese, when they go on board any ships, will give pepper to the hogs, which they think is poison to them, that they may get them again if they should die. It is certain, that numbers of hogs die in possession of the Europeans whilst they stay in China.

Mandarin's sampans are greater or less red-painted boats, ornamented with dragons, and such like figures, or with little flags.

The *Stage-boats*, called in French, bateaux coches, and more commonly coches-d'eau, water coaches, are large covered vessels, which serve, particularly, on the river Seine, for the conveniency of travellers, and for carrying all sorts of merchandizes. The names of them are the passage boat, or water coach of Sens, of Auxerre, of Montereau, and of Fontainebleau, or Valvin.

Tilt-boat, one with a cover, to defend the passengers from rain, &c.

Trawl-boat, a boat employed in a canal in conveying passengers, &c. from one place to another. This mode of travelling, though not expeditious, is indeed very pleasant, and certainly much cheaper than by any land carriage. From Grangemouth to Port Dundas, a distance of nearly 30 miles, the fare is only one shilling, or eighteen pence.

Well-boat, a boat having a well in the bottom, to preserve fish alive.

A *Wherry* is a light sharp boat, used in a river or harbour, for carrying passengers from place to place.

The boats, or wherries, allowed to ply on the Thames about London, are either *skullers*, wrought by a single person with two oars; or *oars*, wrought by two or more persons, with each an oar.

The following are some of the terms used in the management of a boat.

Bale the boat, is to throw out the water which remains in her bottom, or the well-room. See BAILE.

Fend the boat, to save her from beating against the ship's sides.

Man the boat, an order to those appointed to manage her to go on board the boat immediately.

Moor the boat, the order to fasten a boat with two ropes, so as that the one shall counteract the other.

Trim the boat, the order to fit in the boat in such a manner as that she shall float upright in the water, without leaning to either side.

Wind the boat, the order to bring her head the other way.

The *boat's gang*, includes those who are employed for rowing in the boat; such as the cockswain and his gang, to whom the charge of the boat immediately belongs.

A *bold boat* is that which will endure a rough sea well.

To preserve boats from foundering at sea when ships founder. Take any mast, yard, boom, &c. that may be found floating from the ship; the longer the better; make fast to each end of the boom a rope about twice its length; and bend one end of another rope, about ten fathoms long, exactly in the middle of the span, and the other end is to be made fast to the forepart of the boat, so that she may drive stem on to the sea. When this misfortune happens far from land, and the storm ceases, in moderate weather the drift boom may be towed end on to the boat's stern, that they may either row or sail towards land.

Mr. Hutchinson, in his treatise on practical seamanship, gives an account of a boat being preserved by this method, as follows. The Basil, in her passage from the West Indies, took up ten men in a small boat, twelve feet long, which was preserved from foundering after the vessel had foundered, by having a rope fast to a log of wood, as they called it, and tied to the boat's bow, which kept her to drive end on with the head to the waves, and broke their violence so much as to preserve her from filling with water, when one half of them was obliged to lie down in the bottom of the boat, to prevent her being top-heavy. By particular inquiry of the maller

mafter and mate of the *Dasil*, Mr. Hutchinſon was informed, that thoſe people belonged to a ſchooner bound from *Bur-mudas* to the *West Indies*; that it was after a hard gale of wind when they met with the boat, which had two oars for masts, and two blankets ſet upon them for fails, and was ſteering for *Bermudas*, when they were fortunately taken up; and that the log of wood, as it was called, they drove by, was their fore ſquare ſail yard, ſpanned with a rope to each yard-arm, and a rope about ten or twelve fathoms long beat to the middle of the ſpan, and made faſt to the boat's bow, to drive by. The mate of the ſchooner told the maſter of the *Basil*, that they had been ſaved in this manner in a boat once before, by driving to leeward of a maſt, in a hurricane in the *West Indies*.

In order to account for this wonderful effect of the drift-boom, in preventing the broken water from ſwamping the boat, it may be obſerved, ſays Mr. Hutchinſon, that waves never break till their tops are forced forwards by their great velocity beyond the perpendicular of their baſe; then that water falls down forward, and incloſes and compreſſes a quantity of air, which, by the power of its elafiicity, blows this fore part of the waves to pieces, forwards and upwards, in an oblique direction, and makes it appear like froth. They then have no buoyant power to lift a boat; but when they are high, they fill and ſink her. And they break more in ſhoal water than in deep, in proportion as their bottoms or baſe are more obſtructed in their velocity by the ground than their tops; hence, in very ſhoal water, they are continually breaking, ſo that they make nothing but what is called broken water, by which ſhoals may be ſeen and known at a great diſtance in clear weather.

If we endeavour to account for the wonderful effect of ſo ſmall and ſimple a machine, to preſerve ſuch a ſmall boat, deeply laden as ſhe muſt be with ten men, from being filled with water in ſuch a ſtorm; in our opinion it is owing to the boat driving end on by the drift boom, that keeps it always ſwimming on the ſurface, broadſide to the wind; and the waves that are running towards it, within the length of the drift boom, muſt certainly obſtruct the velocity of the upper part of theſe waves, ſo as to leſſen their increaſe in height, and prevent the top from running beyond the perpendicular of the baſe, or bottom of theſe waves, that occaſions their breaking, as has been deſcribed, but ſpend themſelves without breaking. Theſe reaſons we hope will be thought ſufficient to recommend this method to be tried and brought into practice on ſuch dreadful occaſions: and we cannot help thinking, that the ſame method ſhould be tried, when under the dreadful neceſſity of ſaving lives by boats landing on a lee ſhore in a ſtorm, where broken waves run high. The only difference we would recommend in the management, is to proceed with the boat's ſtern to the drift boom, and her head to the ſhore, to be ready to row and ſteer for the beſt apparent landing-place; and if it is a long flat ſhore, as ſoon as the boat ſtrikes the ground, cut or ſlip the drift boom rope, that it may not haul the boat off the ſhore again by the back ſweep of the waves.

Upon landing a boat in a ſurf. Before the boat comes near the ſhore, pour a little oil on the water, which will prevent its breaking, and greatly allay the ſwell, ſo that the boat may approach the ſhore without the dread of being ſwallowed up in the breakers.

Mr. Danzel has lately invented an hydraulic machine for making a ſhip or boat advance during a calm, and even againſt a current.

The mechanism of this machine is very ſimple; it conſiſts of a long pole, to the anterior extremity of which an appa-

ratus, ſhaped like a drawer without back or front, is attached in ſuch a manner, that when puſhed forwards it folds itſelf back under the pole, to which it (as it were) adheres, and preſents to the water the thin cutting ſurface of its three edges, viz. of the bottom and two ſides, which can neither oppoſe to the water a reſiſtance capable of preventing the pole from penetrating farther, or of making the ſhip recede. When the pole, which is puſhed forwards from the veſſel, has attained to its full reach, the drawer, as ſoon as the pole is puſhed back, aſſumes a vertical poſition, and preſents to the water its whole cavity. By theſe means it embraces a column of water, which, without finding means to eſcape, preſſes on a ſurface much larger than that of a common oar, and keeps the drawer immoveable; ſo that thoſe who draw the pole towards them, inſtead of making the veſſel to recede, cauſe it to advance. This machine, which may be multiplied more conveniently than oars, has this viſible advantage over the latter, that it oppoſes to the water a reſiſtance infinitely ſuperior, while the paſſive re-acti-
on of this reſiſtance renders the labour of the mariners leſs labori-
ous and more effectual.

De Chales propoſes the conſtruction of a boat, which, what burden ſoever it bear, ſhall not only move againſt the current, without either fails or oars, but alſo advance ſo much the faſter, as the rapidity of the water is greater. Its make is the ſame with that of the others, excepting only a wheel added to its ſide, with a cord, which winds round a roller as faſt as the wheel turns.

Something of the like kind has alſo been ſince done by M. Pitot. Vide Mem. Acad. R. Scienc. an. 1729. p. 359. and p. 540.

M. de la Hire has given us an examination of the force neceſſary to move boats, both in ſtagnant and running water, either with ropes faſtened to them, or with oars, or with any other machine; wherein he ſhews, that the larger the ſurface of the oars plunged in the water, and the ſmaller that of the boat preſented to the water, is; and again, the longer that part of the oar between the hand and the places where the oar reſts on the boat, and the ſhorter that between this laſt point and the water; the freer will the boat move, and the greater effect will the oar have. See OAR.

Hence it is eaſy to calculate the force of any machine that ſhall be applied to rowing; v. gr. if we know the abſolute force of all the men who row, it muſt be changed into a relative force, according to the proportion of the two parts of the oar; i. e. if the part out of the veſſel be double the other, and all the men together can act with the force of 900 pounds, we compute firſt, that they will exert 300; which 300, multiplied by the ſurface which the veſſel preſents to the water, gives a ſolid water of a certain weight; which weight may be found, and of conſequence the velocity impreſſed on the veſſel by the oars. Or, the velocity of the oars may be found in the ſame manner, by multiplying the 300 pounds by the ſurface of all the parts of the oars plunged in the water. Nor would there be any difficulty in finding firſt the relative forces, then the abſolute ones; the velocities either of the oars, or of the veſſel being given, or the proportion of the two parts of the oar.

Boats ſail more ſlowly and heavily over ſhallow than over deep waters. See an account of experiments for explaining this, in Dr. Franklin's Letter to Sir John Pringle. Experiments, &c. 4to. 5th ed. p. 510.

BOATS, Conſtruction of. In order to illuſtrate this by an example, let it be required to lay down the ſeveral plans of a long boat, the extreme length being 31 feet, and breadth moulded 9 feet.

Draw the straight line PO, *fig. 1. Plat. I. (Slip-building)* equal to 31 feet, the extreme length of the boat, and also to represent the upper edge of the keel. Let \oplus be the station of the midship frame. From the points P, \oplus , and O, draw the lines PT, \oplus M, and OS, perpendicular to PO. Make \oplus M, \oplus N, equal to the upper and lower heights of breadth respectively at the main frame, PT, the height of breadth at the transom, and OS, the height at the stern. Describe the curve TMS, to represent the sheer, or extreme height of the side, which, in a ship, would be called either the upper height of breadth line, or the upper edge of the wale. Through the point N draw a curve parallel to TMS, to represent the breadth of the upper strake of a boat, or lower edge of the wale if in a ship. The dotted line TNS may also be drawn to represent the lower height of breadth.

Set off the rake of the post from P to p , and draw the line p , to represent the aft side of the post; then T p will represent the round up of the transom. Set off the breadth of the post from p to r , and from T to s , and draw the line rs to represent the fore-side of the post, which may either be a curve or a straight line at pleasure. Set up the height of the tuck from p to k . Let kx be the thickness of the transom, and draw the line Z x to represent the fore-side of the transom.

There is given the point S the height of the sheer on the fore-side of the stem; now that side of the stem is to be formed either by sweeps, or some other contrivance. Set off the breadth of the stem, and form the aft side of it.

Set up the dead-rising from \oplus to d , and form the rising line *ris*. Draw the line KL parallel to PO, to represent the lower edge of the keel, and another to represent the thickness of the plank or the rabbet. The rabbet on the post and stem may also be represented; and the stations of the timbers assigned, as \oplus , (1), 1, 2, 3, 4, 5, 6, 7, 8, 9; and \oplus , (A), A, B, C, D, E, F, G, H; and the sheer plan will be completed.

The half-breadth plan is to be formed next; for this purpose the perpendiculars TP, 9, 8, &c. must be produced. Upon M \oplus produced set off the half-breadth from the line KL to R (*fig. 2.*); set off also the half-breadth at the transom from K to b , and describe the extreme half-breadth line bRX , making the fore part of the curve agreeable to the proposed round of the harpin.

We may next proceed to form the timbers in the body plan. Let AB (*fig. 3.*) be the breadth moulded at \oplus . Erect the perpendicular CD in the middle of the line AB, draw the line mn distant therefrom the half thickness of the post, and xy the half thickness of the stem. Then take off the several portions of the perpendiculars \oplus , 1, 2, &c. intercepted between the upper edge of the keel and the rising line in the sheer plan, and set them up from C upon the line CD; through these points draw lines parallel to AC; take off also the several lower heights of the breadth at \oplus , 1, 2, &c. from the sheer plan, and set them up from C upon the middle line in the body plan; and draw lines parallel to AC through these points; then take off the several half-breadths corresponding to each from the floor plan; and set them off on their proper half-breadth lines, from the middle line in the body plan.

Construct the midship frame according to the directions mentioned in that article, the form of which will in some measure determine the form of the rest. For if a mould be made on any side of the middle line to fit the curve part of it, and the rising line, or that marked *bend mould*, (*fig. 4.*) and laid in such a manner that the lower part of it, which is

straight, may be upon the several rising lines, and the upper part just touch the point of the half-breadth in the breadth line corresponding to that rising upon which the mould is placed, a curve may then be drawn by the mould to the rising line. In this manner we may proceed so far as the rising line is parallel to the lower height of the breadth line. Then a hollow mould must be made, the upper end of which is left straight, as that marked *hollow mould* (*fig. 4.*). This is applied in such a manner, that some part of the hollow may touch the side of the keel, and the straight part touch the back of the curve before described by the bend mould; and beginning abaft, the straight part will always come lower on every timber, till we arrive at the midship timber, when it comes to the side of the keel. Having thus formed the timbers, as far as the whole mouldings will serve, the timbers abaft them are next formed. Their half-breadths are determined by the sheer and floor plans, which are the only fixed points through which the curves of these timbers must pass. Some form these after timbers before the whole is moulded, and then make the hollow mould, which will be straighter than the hollow of either of these timbers. It is indifferent which are first formed, or what methods are used: for after the timbers are all formed, though every timber may appear very fair when considered by itself, it is uncertain what the form of the side will be. In order to find which, we must form several ribband and water lines; and if these do not make fair curves, they must be rectified, and the timbers formed from these ribband and water lines. In using the hollow mould when it is applied to the curve of each timber, if the straight part is produced to the middle line, we shall have as many points of intersection as there are timbers; and if the heights above the base be transferred to the corresponding timbers in the sheer plan, a curve passing through these points is called a *rising strait*. This may be formed by fixing a point for the aftermost timber that is whole moulded, and transferring that height to the sheer plan. The curve must pass through this point, and fall in with the rising line somewhere abaft dead-flat; and if the several heights of this line be transferred from the sheer to the middle line in the body plan, these points will regulate what is called the *hauling down* of the hollow mould.

The timbers in the after-body being all formed, those in the fore-body are formed in the same manner, by transferring the several heights of the rising and breadth lines from the sheer to the body plan; the half-breadth corresponding to each height must also be transferred from the floor to the body plan. The same hollow mould will serve both for the fore and after-body; and the level lines, by which the water lines to prove the after-body were formed, may be produced into the fore-body, and by these the water lines to prove the fore-body may be described.

Another method of proving the body is by ribband lines, which are formed by sections of planes inclined to the sheer plan, and intersecting the body plan diagonally, as before observed, of which there may be as many as may be judged necessary. In this, four ribband lines are laid down, marked *diag.* which are drawn in such a manner as to be perpendicular to as many timbers as conveniently may be. After they are drawn in the body plan, the several portions of the diagonal, intercepted between the middle line and each timber, must be transferred to the floor plan. Thus, fix one foot of the compass in the point where the diagonal intersects the middle line in the body plan, extend the other foot to the point where the diagonal intersects the timber, for example, timber 9. Set off the same extent upon the perpendicular representing the plane of timber 9, from the point where it intersects the line KL, on the floor plan; in like manner proceed

with all the other timbers, both in the fore and after-body, and we shall have the points through which the curve must pass. If this should not prove a fair curve, it must be altered, observing to conform to the points, as nearly as the nature of the curve will admit; and, therefore, it may be carried within one point and without another, according as the timbers will allow. For after all the ribband lines are formed, the timbers must, if necessary, be altered by the ribband lines; this is only the reverse of forming these lines; for taking the portions of the several perpendiculars intercepted between the line KL, and the curve of the ribband line in the floor plan, and setting them off upon the diagonal, from the point where it intersects the middle line, we shall have the points in the diagonal through which the curves of the timbers must pass. Thus, the distance between the line KL, and the ribband at timber 3, on the floor plan, when transferred to the body plan, will extend on the diagonal from the middle line to the point where the curve of timber 3 intersects that diagonal. The like may be said of all the other timbers; and if several ribband lines be formed, they may be so contrived that their diagonals in the body plan shall be at such distances, that a point for every timber being given in each diagonal, will be sufficient to determine the form of all the timbers.

In stationing the timbers upon the keel, for a boat, there must be room for two futtocks in the space before, or abaft \oplus ; for which reason the distance between these two timbers will be as much more than that between the other, as the timber is broad. Here it is between \oplus and (A), which contains the distances between \oplus and (1), and the breadth of the timber besides.

The timbers being now formed, and proved by ribband and water lines, proceed then to form the transom, fashion-pieces, &c.; see these articles.

This method of whole moulding will not answer for the long timbers afore and abaft. They are generally canted in the same manner as those for a ship. In order to render this method more complete, we shall here describe the manner of moulding the timbers after they are laid down in the mould loft, by a *rising square*, *bend*, and *hollow mould*.

It was shewn before how to form the timbers by the bend and hollow moulds in the draught. The same method must be used in the loft; but the moulds must be made to their proper scantlings in real feet and inches. Now, when they are set, as before directed, for moulding each timber, let the middle line in the body plan be drawn across the bend mould, and draw a line across the hollow mould at the point where it touches the upper edge of the keel; and let them be marked with the proper name of the timber, as in *fig. 4*. The graduations of the bend mould will therefore be exactly the same as the narrowing of the breadth: Thus, the distance between \oplus and 7 on the bend mould is equal to the difference between the half breadth of timber 7 and that of \oplus . The height of the head of each timber is likewise marked on the bend mould, and also the floor and breadth firmarks. The floor firmark is in that point where a straight edged batten touches the back of the bend mould, the batten being so placed as to touch the lower edge of the keel at the same time. The several risings of the floor, and heights of the cutting-down line are marked on the rising square; and the half-breadth of the keel set off from the side of it.

The moulds being thus prepared, we shall apply them to mould timber 7. The timber being first properly sided to its breadth, lay the bend mould upon it, so as may best answer the round according to the grain of the wood; then lay the rising square to the bottom of the bend mould, so that the line drawn across the bend mould at timber 7 may coincide

with the line representing the middle of the keel upon the rising square; and draw a line upon the timber by the side of the square; or let the line be scored or cut by a tool made for that purpose, called a *raising knife*; this line so raised will be the side of the keel. Then the square must be moved till the side of it comes to 7 on the bend mould, and another line must be raised in by the side of it, to represent the middle of the keel. The other side of the keel must likewise be raised after the same manner, and the point 7 on the rising square be worked on each side of the keel, and a line raised across at these points to represent the upper edge of the keel. From this line the height of the cutting down line at 7 must be set up, and then the rising square may be taken away, and the timber may be raised by the bend mould, both inside and outside, from the head to the floor firmark; or it may be carried lower if necessary. After the firmarks and heads of the timbers are marked, the bend mould may likewise be taken away; and then the hollow mould applied to the back of the sweep in such a manner, that the point 7 upon it may intersect the upper side of the keel, before set off by the rising square; and, when in this position, the timber may be raised by it, which will complete the outside of the timbers. The inside of the timbers may likewise be formed by the hollow mould. The scantling at the keel is given by the cutting down before set off. The mould must be so placed as to touch the sweep of the inside of the timber formed before by the bend mould, and pass through the cutting down point.

The use of the firmarks is to find the true places of the futtocks; for, as they are cut off three or four inches short of the keel, they must be so placed that the futtock and floor firmarks may be compared and coincide. Notwithstanding which, if the timbers are not very carefully trimmed, the head of the futtock may be either within or without its proper half breadth, to prevent which a half breadth staff is made use of.

The half breadth staff may be one inch square, and of any convenient length. Upon one side of it are set off, from one-end, the several half breadths of all the timbers in the after-body; and those of the fore-body, upon the opposite side. On the other two sides are set off the several heights of the sheer; the after-body on one side, and the fore-body on its opposite. Two sides of the staff are marked *half-breadths*, and the other two sides *heights of the sheer*.

The staff being thus prepared, and the floor timbers fastened on the keel and levelled across, the futtocks must next be fastened to the floor timbers; but they must be set first to their proper half breadth and height. The half breadth staff, with the assistance of the ram-line, serves to set them to the half breadth; for as the keel of a boat is generally perpendicular to the horizon, therefore the line, at which the plummet is suspended, and which is moveable on the ram-line, will be perpendicular to the keel, whence we may by it set the timbers perpendicular to the keel, and then set them to their proper half breadths by the staff; and when the two firmarks coincide, the futtock will be at its proper height, and may be nailed to the floor timbers, and also to the breadth ribband; which may be set to the height of the sheer, by a level laid across, taking the height of the sheer by the staff, from the upper side of the keel; by which means we shall discover if the ribband is exactly the height of the sheer; and if not, the true height may be set off by a pair of compasses from the level, and marked on the timbers.

Juvenal (*fat. xv. v. 126—128*,) describes the boats of the ancient Egyptians, as if they were earthen-ware; and it is alleged, that such earthen-ware ships were used on the Nile, and that they were called "*picæ*," painted, because these boats

boats of baked earth were marked with various colours. However, it is much more probable, that the Egyptians formerly, as they have done in more modern times, made use of rafts, which were made to float by empty vessels of earthen-ware fastened under them. The word 'pictæ,' it is suggested, does not denote their being beautified with a variety of colours, but means their being rubbed with some substance that might fill up the pores, so as to prevent the water's penetrating into the cavity of the pitchers, and causing them to sink, for the Egyptian earthen-ware is said to be very porous. These floats, however, were not constructed to pass up and down the Nile like boats, or properly designed for carrying goods upon them, but it is an easy mode of conveying their earthen-ware from Upper Egypt, where it is manufactured, to the lower parts of that country, where, when they reach the destined place, the float is taken to pieces, and sold to the inhabitants. Harmer's Observations, vol. iii. p. 56.

BOAT-hook an iron hook with a sharp point, having a socket in which a long pole is stuck. This is a very necessary appendage to a boat, as by means of it, any thing floating past may be hooked; the boat may be held on to the ship, or pushed along, &c.

BOAT-keeper. In the whole fishery a person is appointed to each boat, whose express duty is to steer the boat towards the fish, &c.

BOATS, bridge of. See the article BRIDGE.

BOAT, removed with steam. An experiment was lately tried on the canal between Grangemouth and Glasgow, to make a large boat or lighter move by the power of steam. As, it is presumed, the series of experiments is not yet completed, the reader is, therefore, referred to the article STEAM.

BOAT-swain, the officer who has the care of the boats, sails, rigging, colours, and anchors, committed to him, which he receives by indenture from the surveyor of the navy, and is enjoined to use great care in the disposition of them.

It is the duty of the boatswain particularly to direct whatever relates to the rigging of a ship, after she is equipped from a royal dock-yard. Thus, he is to observe that the masts are properly supported by their shrouds, stays, and back-stays, so that each of those ropes may sustain a proportional effort when the mast is strained by the violence of the wind, or the agitation of the ship. He ought also to take care that the blocks and running-ropes are regularly placed, so as to answer the purposes for which they are intended; and that the sails are properly fitted to their yards and luffs, and well furled or reefed when occasion requires. It is likewise his office to summon the crew to their duty, to assist with his mates in the necessary business of the ship; and to relieve the watch when it expires. He ought frequently to examine the condition of the masts, sails, and rigging, and remove whatever may be judged unfit for service, or supply what is deficient; and he is ordered by his instructions to perform this duty with as little noise as possible.

The boatswain is not to cut up any cordage or canvas without an order in writing from the captain, and under the inspection of the master; and always to have by him a sufficient quantity of small plats for security of the cables.

He is not to sign any accounts, books, lists, or tickets, before he has thoroughly informed himself of the truth of every particular therein contained. His accounts are to be audited and vouched by the captain and water, and presented to the surveyor of the navy; and until such accounts are passed, he is not to receive any wages. If he has cause of complaint against any of the officers of the ship, with relation to the disposition of the stores under his charge, he is

to represent the same to the Navy-board before they pay off the ship. Fifteen years servitude intitles a boatswain to superannuation.

The *Boatswain's Mate* has the charge of the long boat, anchors, cables, &c.: he must give an account of his store; and he is appointed to execute the sentence of a captain or court martial.

BOATS, train of, a number of small vessels fastened to each other, ascending up the Loir in France, by sails when the wind serves, otherwise towed by men, sometimes to the number of seventy or eighty to a single rope.

BOAT-bill, in *Ornithology*, the English name of a species of **CANCROMA, cochlearia.** Brown's Illustrations. Or, more properly, at this time the English name of the *Cancroma* genus, *C. Cochlearia* being called by the modern writers the *crested boat-bill*, and *C. Canoeborga*, the *white bellied boat-bill*. There are the two only species known. See **CANCROMA.**

BOAT, scapha, in *Surgery*, a species of bandage, used when the crown of the head and the part between that and the forehead are to be bound. It is likewise called *thelus diocleus*.

BOAT-fly, in *Entomology.* See **NOTONECTA.**

BOAT-island, in *Geography*, a small island in the gulf of St. Lawrence, near the south coast of Labrador. N. lat. 50° 2'. W. long. 60° 55'.

BOAT Passage, a channel into Facile harbour, in *Duffy* bay, New Zealand.

BOATING, a kind of punishment in use among the ancient Persians for capital offenders.

The manner of boating was thus: the person condemned to it being laid on his back in a boat, and having his hands stretched out, and tied fast on each side of it, had another boat put over him, his head being let out through a place fit for it. In this posture they fed him, forcing him to eat by thrusting sharp iron instruments into his eyes, till the worms, which were bred in the excrements he voided as he thus lay, eat out his bowels, and so caused his death, which was usually twenty days in effecting; the criminal lying all this while in most exquisite torments. On his face, placed full in the sun, they poured honey, enticing the flies and wasps to torment him. Plutarch tells us, that Mithridates, whom Artaxerxes condemned to this kind of punishment, for pretending to have killed his brother Cyrus, lived seventeen days in the utmost agony; and that, when the uppermost boat was taken off at his death, they found his flesh wholly consumed, and swarms of worms gnawing his bowels. Herodot. l. i. c. 133, 140. Plut. in vit. Artaxerxes.

BOATIUM CIVITAS, in *Antient Geography*, a town of Gaul, and one of the twelve cities of Novempopulania.

BOATSKIDS, in *Naval Architecture*, are long square pieces of fir, extending across the ship from the gang-boards, on which the boats, spare masts, &c. are stowed.

BOB, or **BALL,** in *Horology*, is the metallic weight which is attached to the lower extremity of a pendulum rod, by means of a tapped adjusting nut, at such a distance from the point of suspension as the time of a given vibration requires. (See the articles **CENTRE OF OSCILLATION** and **PENDULUM.**) In fixing upon a proper bob for any pendulum, two things are particularly to be attended to: the shape which is best calculated for meeting with the least resistance from the air; and the weight which is best adapted for preserving the isochronism of the vibrations with a given maintaining power. Each of these considerations has been the subject of much investigation. A sphere is a solid, the surface of which bears the least proportion to its solidity of any other, and a cube is one with great extent of surface compared to its solid contents; consequently, the former shape

has obtained in cannon balls, intended to pass through the air with as little obstruction as possible, and has sometimes, for the same reason, been applied as a bob for a pendulum. Such a shape is better adapted for a large bob than a small one; for the increase of the surface is in proportion to the square of the diameter, whereas the increase of weight or quantity of matter is as the cube. Mr. B. Martin (*Mathematical Institutions*, vol. ii. p. 417.) proposed two equal frustra of similar cones, to be joined together at the bases, as a figure approximating nearly to a solid of least resistance, and recommended it as that out of which the middle one of three segments, cut longitudinally, will constitute the best shape for an appended weight, to answer the purpose of avoiding resistance. Such a section, he conceived, would displace but a small quantity of air in one vibration, and the impulses of that quantity, being made obliquely on the sloping surfaces of the ends, would produce but a small effect. The lenticular shape, however, composed of two segments of a large globe joined to the line of section, has been generally adopted by clock-makers, probably because two plates of brass of that shape can be easily folded together, and left hollow, so as to be filled with lead, or other heavy metal, in order to obtain a due degree of weight without adding to the thickness, which is an advantage that brass or copper cannot have of itself in any shape. M. Ferdinand Berthoud (*Essai sur l'Horlogerie*, tome ii. chap. xiii.) made some experiments with bobs of both a spherical and lenticular shape, of equal weight, attached successively to the same free pendulum, from which it appeared, that, in the same temperature, the latter continued to vibrate seconds much longer than the former before they arrived at the quiescent state, which experiment was considered as a proof that the lenticular shape has the advantage in escaping the effect of resistance; it was discovered, however, on a repetition of the experiment, with seconds and half-seconds pendulums, that the friction at the point of suspension occasioned by heavy weights, particularly when vibrating in long arcs, made considerable alterations in the results, and proved itself a second source of resistance to the free motion of the pendulum.

The second consideration to be attended to in making the bob, as has been said, is the weight which a given pendulum requires, with a given maintaining power. No theory is adequate to determine this desideratum of itself, because the diminution of the maintaining power by the friction of the pivots and the state of the oil, the duration of the impulse on the pallets, the nature of the escapements in other respects, the resistance of the air, and at the point of suspension, and particularly the nature and quantity of momentum of the pendulum, must all enter into the calculation; and these are data, many of which are constantly varying. The momentum, or whole quantity of motion of any pendulum, is the weight multiplied into the square of its velocity, so that a large arc with a small weight, and a small arc with a corresponding large weight, *ceteris paribus*, ought to have an equal effect upon the isochronism of the same pendulum; but the theory is not perfect; for first, large circular arcs deviate considerably from cycloidal ones, which, it has been demonstrated by Huygens and others since, are those which have the isochronal property in an uniformly dense medium; and secondly, they require a greater maintaining power than calculation gives: for instance, where the arc is 10 from the point of rest, the addition to be made to the maintaining power beyond calculation is 57 parts in 100, according to Berthoud's experiments, which consideration induces him to conclude, that irregularities in the maintaining power will affect the momentum principally composed of velocity, more than the momentum principally composed of weight; each kind of momentum, however, has its peculiar disadvantage; for

great velocity is subject to great resistance from the air, and great weight to much friction at the point of suspension. Mr. Alexander Cummings was an advocate for a large arc with a small bob; but modern practice is in favour of a large ball or bob with a short arc of vibration. It seems to be generally allowed, that the momentum of a pendulum ought to be as great as possible for a given maintaining power, provided the latter be sufficient to overcome all obstacles to constant motion; but as the momentum is obtained in two different ways, it may be proper to subjoin here an illustration of them.

If a pendulum, moving in an arc of one degree from the quiescent point, with a bob or ball of six pounds, have its momentum denominated by unity, then the square of any given momentum will give its corresponding weight for another bob, moving in the same arc; or the square root of the given momentum will give the arc of semivibration with the same weight; for instance, a momentum 4 will require $6 \times 4 = 24$ for the weight where the arc remains unaltered; but the root of $4 = 2$ will be the arc from the point of rest with the same weight; again, if the momentum be required to be 9 for a given maintaining power, the weight must be 54, or the arc 3° from the point of rest, and in the same proportion for any other momentum; but, in fact, both the weight and arc may be varied according to circumstances, which latitude affords great variety in the adjustment of the bob, and matter for multiplied experiments to determine what weight and arc shall be most desirable, taken conjointly under different circumstances.

The most practicable method of adjustment of the momentum of a pendulum, where a weight is used as a maintaining power, seems to be, to vary this power instead of the weight of the bob or ball, which, when once finished of the requisite shape, is not so easily altered. In pendulum clocks, actuated by a spring as a maintaining power, such adjustment cannot indeed be made in the power properly without changing the spring, or altering the fusee after they are adjusted to each other; but as these instruments are not intended to measure time with great nicety, the adjustment of the bob to the maintaining power is exactly done by guess. In Huygens's best clock, the maintaining power was equal to three pounds, falling about 90 inches in 24 hours, and the ball of its seconds pendulum, together with the pendulum itself, was also three pounds; but the nature of his escapement required the vibrations to be performed in long arcs. Cummings tried different weights for his pendulums from 6 to 16 pounds, and various arcs from 3° to 6° from the point of rest; but it does not appear that any other standard has been adopted by clock-makers than what accords with the individual opinion of each. See MAINTAINING POWER.

BOB, in *Ringing*, denotes a peal consisting of several courses, or sets of changes.

BOB-STAY, in *Sea-Language*, a rope used to confine the bowsprit of a ship downward to the stem, or cut-water, and to counteract the force of the stays of the fore-mast, which draw it upwards.

It is fixed by thrusting one of its ends through a hole bored in the fore-part of the cut-water and then splicing both ends together, so as to make it two-fold, or like the link of a chain; a dead-eye is then seized into it, and a lead passing through this, and communicating with another dead-eye upon the bowsprit, is drawn extremely tight by help of mechanical powers. The bob-stay is the first part of a ship's rigging, which is drawn tight to support the masts. With this view, it is usual to suspend a boat anchor, or other weighty body, at the bowsprit end, to press it downwards during the operation.

BOB-STAY-HOLERS, are those holes in the stem, or fore-part of the knee of the head, to which the bob-stay is fastened.

BOBAC, in *Zoology*. The bobac of the French and English writers is a sort of MARMOT with small, and somewhat oval ears; tail hairy; a claw upon the fore thumb; and the body grey above, and yellowish beneath. Gmelin calls this animal *arctomys bobac*.

There appear to be two varieties of this species, if not more. The bobac of Rzaczinski (Nat. Hist. Pol. p. 235.) described by Brisson, in his History of Quadrupeds, under the name of *marmotta polonica*, is of yellowish colour, inclining to reddish upon the head; but the bobac described by Pallas is of a greyish brown colour, with only the under parts yellow. In every respect, except the colour of the hair, these two varieties agree.

This creature is rather larger than the rabbit, measuring about sixteen inches from the nose to the base of the tail, the latter of which is four inches and an half in length; so that the whole animal measures above twenty inches. Dr. Pallas, to whom we are chiefly indebted for an account of the bobac, tells us, that it is a native of the high, but milder and sunny sides of mountainous countries, which abound with fissile, or free-stone rocks, where it is found in dry situations, and such as are full of springs, woods, or sand. It abounds in Poland and Russia, among the Carpathian hills: it swarms in the Ukraine, about the Boristhenes, especially between the Sula and Supoy; and then again between the Boristhenes and the Don, and along the range of hills which extend to the Volga. It is found about the Yaik and the neighbouring rivers; and inhabits the southern desert in Great Tartary, and the Altaic mountains, east of the Irtis. It ceases to appear in Siberia, on account of its northern situation, but is found again beyond the lake Baikal, and about the river Argun and the lake Dalay, in the sunny mountains about the Lena, and very frequently in Kamtschatka, but rarely reaches as high as latitude 55°.

The bobac is not considered as an article of food by the Mahometan Tartars. The Cossacks and the Calmucks, on the contrary, hunt and kill them for eating; the flesh, however, is very fat, and not in much esteem for the goodness of its flavour. In its manners of life the bobac resembles those of the Alpine marmot, with which it has been apparently sometimes confounded. It inhabits deep burrows, in societies of from twenty to twenty-four in each receptacle. Their habitation is lined with the finest hay; and it is said, the quantity found in every such receptacle is sufficient for a night's provender for a horse. In the morning, or the middle of the day, when the sun shines, they go abroad in search of food, always taking the precaution to station one of the party at the entrance of their cell as a centinel, who announces the least approach of danger with a whistle; and all, if within hearing, are thus enabled to provide for themselves in the best manner circumstances may require, either by returning for shelter to their cell, or remaining at a distance till the danger is over. The marmot, when attacked, rears itself upon the haunches, and defends itself with the fore paws. It eats with the fore paws, in the same posture. The bobac is an animal of a mild and gentle disposition, and may be easily domesticated. They are torpid throughout the winter, unless kept in a warm room. They breed early in the spring, and are said to produce six or eight young. The fat of this creature is used for dressing furs and leather.

BOBAN, in *Geography*, a town of Arabia, 32 miles S of Saade.

BOBART, ROBERT, in *Biography*, curator of the botanical garden at Oxford, which had been lately instituted by lord Danby, published, in 1648, "Catalogus plantarum horti medici Oxoniensis," 8vo. The catalogue gives the names of about 1600 plants, many of them from Canada,

first the Latin, then the English names, in alphabetical order. This was re-published in 1658, considerably improved and enlarged to more than double its bulk; Bobart being assisted in the work, as he acknowledges, by Dr. Philip Stevens and Wm. Brown, M. A. Besides the trivial names of the plants, there were now added those from Gerard, Parkinson, and Bauhine, which were not in the first edition. Bobart died in 1679, at the age of 81 years.

BOBART, JACOB, who succeeded his father, as curator of the garden, published, in 1699, the third volume of Morrison's "Plantarum historia universalis Oxoniensis, seu herbarum distributio nova, per tabulas cognitionis, ex naturæ libro detecta," fol.; making up by his own industry and sagacity what was deficient in the loose and imperfect sketches left by the author at his decease. There is an ingenious paper by this writer in the Philosophical Transactions for the year 1683, on the effects of the great frost, which happened the preceding winter, on trees and other plants. Many oak, elm, ash, walnut, and other trees, were found, he says, with large rents or clefts in different parts of their trunks, in the large branches, and in such parts of their roots as were not sunk deep into the earth. Parts, he adds, that were so knotted, that they could not have been split but with great difficulty with beetles and wedges, were rent asunder by the force of the ice contained within them, making, at the time of bursting, a noise like the explosion of gunpowder. It was supposed, that the trees which suffered were diseased, that some of the vessels were distended or burst, and that the effect was produced by the freezing of the sap or other juices contained in these cavities. Philoſ. Trans. abr. vol. iii. p. 89. Haller. Bib. Botan.

BOBARTIA, in *Botany*, (named in honour of James Bobart, formerly professor of botany at Oxford), a genus formed by Linnæus for a plant said to grow in the East Indies, with the following essential character:—*Glumes of the calyx* numerous; the exterior one short, univalved; the interior longer, bivalved; *glume of the corol.* single, shorter than those of the calyx, sitting on the germ, shrivelling. This generic character was first published in the *Amœnitates Academicæ*, vol. i. p. 113. (Lugd. Bat. Ed.); and in the *Species Plantarum* a reference is given to Scheucher, Gram. 369. Reichard added another supposed synonym from Plukenet tab. 30. fig. 7. Schreber, Jullieu, La Mark, and Bosc, have all taken it up from Linnæus; and La Mark, in his *Illustrations*, has copied Plukenet's figure. Willdenow, in his new edition of the *Species Plantarum*, has abolished the genus; asserting on the authority of Schumacher (Act. Soc. Nat. Hafn), that Linnæus drew up the character of his bobartia from a mutilated specimen of *moræa spathacea*, first completely described by Thunberg, and adopted by Linnæus the younger in the *Supplementum Plantarum*, p. 99.

The mistaken synonyms of Scheucher and Plukenet are referred by Willdenow to *cyperus arenaria* of Retz, of which Plukenet's figure, copied by La Mark, is said to be a good representation. A figure of *moræa spathacea* is also given by La Mark under its proper genus.

BOBARTIA. See also *RUDBECKIA Purpurea*.

BOBBIN, in *Commerce*, a term denoting about $\frac{3}{4}$ of a hundred of undressed flax.

BOBBING, or **BOBBIN**, a little piece of wood turned into a cylindrical form, wherein thread is wound, to be used in the weaving of bone-lace.

The French also give the denomination *bobine* to what among us is more properly called a *spool* or *quill*. In which they are also followed by several English.

In this general sense, bobbins are used to wind thread-worsted, hair, cotton, silk, gold, and silver; and they are

of different lengths and sizes, according to the materials which are spun or wound.

BOBBING for Eels, among *Fishermen*, is an amusing method of catching eels, generally practised from the side of a boat, the piers of bridges, wharfs, or other situations where deep water can be at once reached. The bait made use of may be either scoured lob-worms, or garbage of any kind; which bait of whatever kind is strung lengthways on worsted, so as to completely cover it: some yards are prepared in this way, which are then tied up in links, making something like a bundle of fringe. So prepared, the bait is suspended from a strong rod or pole by two or three yards of pack-thread, leaved within a foot of the worms with more or less weight according to the strength of the current. The bait and lead must be sunk to the bottom, and suffered to remain, when the fish will soon be felt to nibble; but time must be allowed for them to make their hold secure, after which they may be gently pulled up to within a small distance, when a slight jerk will secure them. The mouths of rivers, muddy and deep places, where the tide reaches, are particularly favourable for this sport.

BOBBIO, or **BOBIO**, *Bobium*, in *Geography*, a small town of Italy, and capital of a district of the same name, formerly belonging to the duchy of Milan, seated on the river Trebia, the see of a bishop, suffragan of Genoa, 30 miles N.E. of Genoa. It is now a canton of the district of Alexandria, in the department of Marengo.

BOBBIO. See **BOBIO**.

BOBENHAUSEN, a town of Germany, in the circle of the Upper Rhine, and principality of Upper Hesse; 17 miles east of Giefen.

BOBENNEUKIRCHEN, a town of Germany, in the circle of Upper Saxony, and the Vogtland; 6 miles S.W. of Oelsnitz.

BOBER, a river which runs into the Oder, at a small distance to the west of Crossen in Silesia.—Also, a town of Lithuania. N. lat. $55^{\circ} 46'$. E. long. $25^{\circ} 46'$.

BOBERG, a high promontory in the prefecture of Boffing, and diocese of Ripen, in Denmark, near which the coast is very dangerous, and has proved fatal to many ships.

BOBERSBERG, a town of Silesia, 9 miles S. S.W. of Crossen, and 28 S. of Franckfort on the Oder.—Also, a town of Germany, in the circle of Upper Saxony, and duchy of Crossen, 6 miles S. of Crossen.

BOBI, in *Conchology*. Adanson gives this name to the variety ϵ of *voluta persicula*.

BOBISATIO, or **BOCENISATIO**, in *Music*, denotes the using of the seven syllables, *bo, ce, di, ga, lo, ma, ni*, to express the seven musical notes in lieu of the six usual ones introduced by Aretine, *ut, re, mi, fa, sol, la*, as has been sometimes done by the Netherland and German musicians since the beginning of the seventeenth century, to avoid the mutation necessary in the use of these latter.

BOBLINGEN, in *Geography*, a small town and district of the same name, of Germany, in the duchy of Wurtemberg, situate in a fertile country, and in the forest of Schonbuch, which abounds with game, having a castle seated on an eminence lying above the town. The district contains 12 parishes; and the vicinity produces some wine.

BOBR, a river of Lithuania, which runs into the Dnieper; 5 miles S. S. E. of Rohaczow.

BOBR, in *Zoology*, a kind of marine otter, so called by the Russians, who reside at Kamtschatka, the precise species of which is doubtful. Some have imagined it to be allied to the castor.

BOBRITZSCH, in *Geography*, a town of Germany, in the circle of Upper Saxony, and country of Erzgebirg, 4 miles S. E. of Freyberg.

BOBROF, a district of the government of Voronetz, in Russia, seated on the Biliuk, falling into the Don.

BOBROWNIK, a town of Poland, in the palatinate of Lublin, 24 miles W. N. W. of Lublin.

BOBRYSLÉ, a town of Lithuania, in the palatinate of Minsk, seated near the river Berezyzna. N. lat. 53° . E. long. $29^{\circ} 12'$.

BOBRI, a town of Lithuania, in the palatinate of Troki. N. lat. 55° . E. long. $24^{\circ} 15'$.

BOCA. See **BOCCA**.

Boca Escondida, in *Geography*, a bay of North America, in the bay of Campechy, on the coast of Yucatan. N. lat. $18^{\circ} 50'$. W. long. $91^{\circ} 46'$.

Boca Grand, a bay of North America, at the mouth of the river Zucar, on the S. E. coast of Costa Rica. N. lat. $10^{\circ} 50'$. W. long. $83^{\circ} 26'$.

Boca Tora, a bay of North America, in the Caribbean sea, on the coast of Veragua. N. lat. $8^{\circ} 58'$. W. long. $82^{\circ} 1'$.

BOCABRITO, a town of North America, in the country of New Navarre, 65 miles east of Cinaloa.

BOCA-CHICA, the strait or entrance into the harbour of Carthagena, in South America; which was filled up since the attack of the English in 1741, who, having made themselves masters of the forts which defended it, entered the bay with an intent of taking the city; but their attempt miscarried, and they were obliged to retire with considerable loss. This event produced orders for opening the old entrance, by which all ships now enter the bay.

BOCA-DEL-DRAGO, a strait between the island of Trinidad and Andalusia, in the province of Terra Firma, South America.

BOCAGE, a small territory of France, in Normandy, of which the principal place was Vire.

BOCALIEAU, a small island, near the east coast of Newfoundland. N. lat. $48^{\circ} 15'$. W. long. $52^{\circ} 26'$.

BOCAMELE, in *Zoology*, the provincial name of an animal of the *MUSTELLA* tribe found in the island of Sardinia. This is believed to be the creature described by Aristotle by the name of *Isis*.

BOCANÁ, in *Ancient Geography*, a town situate in the eastern part of the isle of Taprobana. Ptolemy.

BOCARDÓ, in *Logic*, the fifth mode of the first figure of syllogisms, wherein the first proposition is particular and negative; the second, universal and affirmative; and the third, or conclusion, particular and negative. Thus:

BOC Some animal is not man.

AR Every animal has a principle of sensation.

DO Therefore something has a principle of sensation, that is not man.

BOCAS, LAS, in *Geography*, a town of North America, in New Biscay, 120 miles E. of Parmal.

BOCAT, the name of a valley in Syria, in which are the ruins of Balbec, of which Mr. Wood says, it might by a little care be made one of the richest and most beautiful spots in Syria; for it is more fertile, he adds, than the celebrated vale of Damascus, and better watered than the rich plains of Efdraelon and Rama. In its present neglected state, it produces corn, some good grapes, but very little wood. Here, it is supposed, was situated "Baal-hamon," which was the marriage portion of the bride of Solomon. Sol. Song. viii. 12. This estate was leased out to a variety of tenants, each of whom paid her a clear rental of a thousand shekels of silver, amounting to about 120 l. 16 s 8 d. sterling. Harmer's Outlines of a New Commentary on Solomon's Song, p. 35. Good's Song of Songs, Pref. p. 13. Bocat was also called "Bekaa," which see. See also **BALBEC**.

BOCAUD

BOCAUD, JOHN, in *Biography*, born at Montpellier, where he received his education. In 1540, he was made doctor; and in 1544, on the death of Denis Fontenon, professor of medicine in the university there; an office he is said to have filled with distinguished honour to the time of his death, which happened in 1558. We have only one work published by this writer; "Tabula curationum et indicationum ex prolixo Galeni methodo, in summa rerum capita contractæ." fol. Lyons. Haller. Bib. Med. Pract. Eloy. Dict. Hist. Med.

BOCCA, a term used both in the Levant and on the N.W. coast of South America, or the Spanish main, for a mouth or channel into any port or harbour, or the entrance into a found which has a passage out of it by a contrary way. See **BOCA**.

BOCCA, in *Geography*, a town of Italy in the duchy of Mantua, in the Comasenza, 5 miles N.N.E. of Sabione ta.

BOCCA Tigris, a name given by foreigners to the river Pe-kiang of China, near its discharge into the southern sea of China. See **PE-KIANG**.

BOCCA, in *Glass making*, the round hole in the working furnace, by which the metal is taken out of the great pots, and by which the pots are put into the furnace. This is to be stopped with a cover made of earth and brick, and removeable at pleasure, to preserve the eyes of the workmen from the violence of the heat.

BOCCACCI, or **BOCCACCINO, CAMILLO**, in *Biography*, a painter of history and portrait, was born at Cremona in 1511; and, having received instructions in the art of painting from his father, removed to Rome, and assumed the Roman taste. His application was indefatigable, and his improvement so observable, that he was immediately employed in several noble works for the churches and convents. He died young in 1546, when he was making rapid progress towards very high perfection. Pilkington

BOCCACCINI, ANTHONY, a surgeon of Comachio, a town in Ferrara, flourished in the early part of the last century. Reviving the practice of Magatus, in the cure of wounds and ulcers, which had fallen into disuse, he admitted no oily or greasy applications in the treatment of them, nor made use of tents or injections in the cure of abscesses, which, by irritating the parts, prevented, he said, their union, and frequently occasioned the orifices to become callous. His works, illustrating his practice, are "Cinque disinganni Chirurgicali, per la cura delle ferite," Venice 1713, 8vo. treating of the cure of gun-shot wounds; "Cinque disinganni Chirurgicali, per la cura delle ulcere," Ven. 1714, 8vo. with observations explaining and defending the doctrine of Magatus. Haller Bib. Chirurg. Eloy. Dict. Hist. Med.

BOCCACIO, or **BOCCACE, JOHN**, an eminent Italian writer, and one of the restorers of literature in Europe, was born of parents in low condition at Certaldo in Tuscany, in 1313. Declining that mercantile occupation for which he was originally designed, and in which he spent some of his earlier years, he devoted some time to the study of the canon law; but as soon as he had an opportunity of choosing for himself, he pursued a course of literature; and with this view sought instruction from the best masters, and at Florence put himself under the tuition of Leonzio Pilato for the Greek language. Besides the advantage he derived in furnishing his mind with stores of literature, and in cultivating a good taste, from conversation with the most learned men of his age, and from collecting and copying the most approved Greek and Latin writers of antiquity, he was particularly indebted for his progress in learning, and for his future reputation to the instruction and patronage of Petrarch, who was eminently useful to him both by his advice and by

supplying him with money for aiding the prosecution of his studies, when his own patrimony was exhausted. By a diligent improvement of these advantages, he acquired such reputation, that the republic of Florence conferred upon him the honour of citizenship, and employed him in a variety of public transactions. Among other important commissions with which he was entrusted, that of negotiating the return of his friend Petrarch to Florence was particularly agreeable to him. But though his message to this purpose did not succeed, it afforded him an opportunity of establishing a more intimate and confidential correspondence with this patron of his youth. In 1353, two years after his visit to Petrarch, he was sent to pope Innocent VI at Avignon. At this time he lived freely, and devoted himself chiefly to poetry and compositions of a lighter kind. During his rambles in Italy, he visited Naples, as some have said, in the year 1341, where he was favourably received by king Robert, and where he resided for some time. Here he fell in love with a young person whom he calls Fiametta, and who is commonly supposed to have been the natural daughter of Robert. In 1359, he had a conference with Petrarch at Milan, the result of which was his indulging more serious reflections than he had hitherto done; and having received an admonition in 1361, that his life would not be of long continuance, and that he would soon abandon poetry, his mind was so impressed that he immediately determined to relinquish his poetical lucubrations, and even the perusal of profane authors, and, against the counsel and remonstrance of Petrarch, to part with his library. About this time he assumed the clerical habit, and adopted a plan of conduct more guarded and regular than that of his past life. In 1362 or 1363 he again visited Naples; and without making any long stay there, went to Venice, and passed three months with his friend Petrarch. He was again deputed by his countrymen as ambassador to pope Urban V. at Avignon; and in 1367 he attended the pontiff under the same character at Rome. A public lecture on the "Comedia" of Dante, having been instituted at Florence, he commenced his expositions of that author in October, 1373; but, preferring the retirement of Certaldo, his native place, towards the close of his life, he died there in December, 1375. Boccaccio was a voluminous writer both in prose and verse. His works in Latin were, a mythological treatise in 15 books, "De Genealogia Deorum," Basil, 1532, fol. esteemed excellent at the time when it was written, but long since superseded by more valuable publications of a similar kind; to this was annexed a "Treatise on Mountains, Rivers, Seas, Lakes, &c.;" with respect to both these he has been charged with plagiarism; "An Abridgement of the Roman History," from Romulus to the year of Rome 724, with a parallel of the seven kings of Rome and of the emperors to Nero, inclusively, Cologne, 1534, 8vo.; an historical treatise, in nine books, entitled "De Casibus virorum et feminarum illustrium," beginning with Adam, and terminating with John king of France taken prisoner by the English at the battle of Poitiers, 1356, which work was translated into Italian, Spanish, French, and English, printed at Augsburgh, in 1544, and in French at Lyons, in 1483, and at Paris in 1578, by Claudius Vitart, under the title of "Traité des Malaventures des Personnes signalez," 8vo.; and another book "De claris mulieribus." He also wrote in Latin a number of eclogues. In Italian poetry, his compositions were the "Theleide," in 12 books; the "Filostrato;" the "Ninfale Fiesolano," &c. &c. But though he was reckoned one of the three princes of the poets of that age, he is ranked only as the third of the triumvirate, precedence being assigned to Dante and Petrarch. It is said

said, that he was duly sensible of his inferiority; and that, after having seen the sonnets and songs of Petrarch, he determined to throw his own into the fire. His prose works, which are more valuable, are his "Commentary on Dante," printed at Rome in 1544, 16to.; and at Florence, in 1576, 8vo. some romances of an amorous kind, intermixed with verse, as "Il Filocopo," "La Fiametta," "L'Ameto," "Il Laberinto d'Amore," &c. &c. But his most celebrated production of this kind is his "Decamerone," or collection of one hundred stories, or novels, feigned to have been recited in ten days by a company of ladies and gentlemen, who had retired into the country from the plague of Florence in 1348. These stories are partly founded on fact, and partly the productions of the author's own imagination; and they present a curious exhibition of characters and manners in all the ranks of society. They abound with satirical strokes levelled against the vices and frauds of the priests, and even the mysteries of religion; and the language, in some parts, is so free and licentious, that we may well wonder at their being recited before females of character and condition. However trite and vulgar many of the reflections may now appear, the style in which they are delivered is considered as a model of elegance and purity for the age in which they were written, and places the Italian language far beyond that of any modern nation at so early a period. No work was ever more popular, or more generally translated, than the Decamerone. The stories that occur in this work have furnished materials for some of the most popular pieces of La Fontaine and other similar writers. Boccace assumes the credit of having first brought the writings of Homer and of several other Greek authors from Greece to Tuscany; and he was, without doubt, a most industrious and indefatigable copyist of the remains of antiquity. His poetry is pronounced by his countrymen to be as feeble and languid in its character, as his prose is exquisite and admirable. His valuable library was bequeathed to a convent in Florence, where it was long preserved. For a further account of his life and writings, see Fabricius's *Bibl. Lat. medii ævi*. tom. 1. p. 248. &c.; and Tiraboschi, tom. v. p. 87. 439—451. Gen. Dict. Burney's *Gen. Hist. Music*, Vol. II. p. 338, &c.

BOCCALE, or **BOCAL**, a liquid measure used at Rome, answering to what among us is called a bottle, being equivalent to about an English quart. Seven *boccales* and an half make the *rubbia*.

BOCCALINI, **TRAJAN**, in *Biography*, a satirical writer of the 16th century, was the son of an architect at Carpi, and born at Loretto in 1556. At Rome, where he principally resided, he had access, by the vivacity of his genius, to several persons of rank, and among others to cardinal Bentivoglio, whom he instructed in geography. Protected from the danger to which his satirical turn exposed him, by the influence of the cardinals Borghese and Gaetani, he also, by their recommendation, obtained several offices of trust and honour in the ecclesiastical state, and was appointed to the government of Benevento. But his public conduct occasioned complaints, and he became obnoxious to the Spaniards, by exposing with freedom and severity their designs against the liberty of Italy, so that he was under a necessity of retiring to Venice in 1612. In the following year, it is said that he was assassinated by four ruffians, who broke into his chamber at an early hour in the morning, and beat him so severely with sand-bags as to occasion his death. Of his works, the most celebrated is his "Raggugli di Parnaso," or news from Parnassus, in which, under the fiction of a court in which Apollo presides, he takes occasion to satirize the actions and works of several persons who pass under review; but his reflections frequently betray the

want of critical judgement and of a regard to truth. A second part of this work written with the same views, is entitled "The Secretary of Apollo." His "Political Touchstone," levelled against the Spaniards, is of a similar kind. He also wrote the "Political Balance," "Commentaries on Tacitus," and some other works. Tiraboschi. *Gen. Dict.*

BOCCARELLA, in the *Glass-Manufacture*, a small hole or aperture of the furnace, one of which is placed on each side of the bocca, almost horizontally with it. Out of them the servitors take coloured or finer metal from the piling pot.

BOCCAS, in *Ichthyology*, the Arabian name of a fish belonging to the *SCOMBER* genus, observed by Forskal in the Red Sea. Vide *SCOMBER SANSUN*.

BOCCHERINI, **LUIGI**, in *Biography*, was born at Lucca in 1736, where he resided till 1768, when he went to Paris, and where he continued till 1780. He then removed to Madrid, where, if living, he still remains. His instrument is the violoncello, and though he writes but little at present, he has perhaps supplied the performers on bowed-instruments and lovers of music with more excellent compositions than any master of the present age, except Haydn. His style is at once bold, masterly, and elegant. There are movements in his works, of every style, and in the true genius of the instruments for which he writes, that place him high in rank among the greatest masters who have ever written for the violin or violoncello. There is perhaps no instrumental music more ingenious, elegant, and pleasing, than his quintets; in which invention, grace, modulation, and good taste, conspire to render them, when well executed, a treat for the most refined hearers and critical judges of musical composition. A complete list of the works of this excellent composer would be of use to judicious collectors, as his genius, taste, and judgment were too fertile and refined, to suffer him to commit to paper frivolous or indigested thoughts. His productions of 40 years ago have lost nothing of their worth, nor will 40 years more wholly deprive them of their bloom.

BOCCHETTA, in *Geography*, a chain of mountains, over which is the high road between Lombardy and Genoa; on the summit of the highest, which is very steep, is a way so narrow that three persons can hardly go a-breast, called "The Pass of Bocchetta," defended by forts, and considered as the key to the city of Genoa. In 1746 the imperialists, having made themselves masters of this pass, found little difficulty in proceeding to that capital. In 1778, a magnificent road was made from the Bocchetta to the north of Genoa, through the Polzevera, which, for the space of three years, employed from 5 to 800 men, by the patriotic munificence of one noble family, the Cambiasi. The Polzevera in the Bocchetta yields a beautiful stone which is serpentine, of various colours veined with marble.

BOCCHIANICO, a town of Italy, in the kingdom of Naples, and province of Abruzzo citra, 3 miles S.E. of Civita di Chieti.

BOCCIARDI, **CLEMENTI**, called *Clementone*, in *Biography*, a painter of history and portrait, was born at Genoa in 1020, and after having been the disciple of Bernardo Strozzi, went to Rome for improvement, by a judicious observation of the ancient sculptures, and the works of the celebrated modern artists. By the efforts of his own excellent genius, and a diligent application to design, he discovered the art of blending the antique and modern gusts in a style both of gracefulness and strength. Most of his works (his portraits excepted, which were lively, natural, and graceful,) are in the chapels of Genoa, Pisa, and other cities of Italy, where they are much esteemed. Pilkington.

BOCCOLD, **BOCKHOLDT**, or **BEUKELS**, **JOHN**, commonly called *John of Leyden*, a journeyman-taylor, of Leyden, who, in the earlier part of the 16th century, connected

connected himself with John Matthias, a baker of Haerlem, and with his assistance displayed the astonishing effects of fanaticism and enthusiasm. These two anabaptist prophets, for this was the appellation which they assumed, fixed their residence at Munster, in Westphalia, and at length gained such a number of proselytes, that they became masters of the city, and established in it a new form of government, directed by Matthias, who issued his commands, with the style, and with the authority of a prophet. Matthias, having pillaged the city, amassed large hoards of wealth, and reduced all ranks to an equality, provided for its defence, by repairing and extending its fortifications, by forming all his followers, who were capable of bearing arms, into regular bodies, and by endeavouring to add the vigour of discipline to the impetuosity of enthusiasm. After these preparations, he sent out emissaries to the anabaptists in the Low Countries, inviting them to assemble at Munster, which he dignified with the title of Mount Zion, and from thence he proposed that they should set out to reduce all the nations of the earth under their dominion. The bishop of Munster, justly alarmed by these hostile appearances, assembled an army, laid siege to the town, and slew Matthias, with 30 of his attendants, in their first frantic sally. Matthias in the same year 1534, was succeeded by Boccold, who, more cautious than his predecessor, satisfied himself with carrying on a defensive war, whilst he waited for the succours from the Low Countries, which he encouraged his deluded followers to expect. But though less daring in action than Matthias, he was a wilder enthusiast, and of more unbounded ambition. Accordingly he marched naked through the streets, and proclaimed with a loud voice, "That the kingdom of Zion was at hand; that whatever was highest on earth should be brought low, and whatever was lowest should be exalted." In order to verify his declaration, he commanded the churches, and the most lofty buildings in the city to be levelled with the ground; and depriving Cnipperdorling one of the most considerable of their proselytes of the consularship, the highest rank in the commonwealth, he degraded him to the humiliating office of common executioner. In place of the deposed senators, he named 12 judges, according to the number of tribes in Israel, and reserved to himself the authority possessed by Moses as legislator of the people. He further declared to the assembled multitude, that it was the will of God, that John Boccold should be king of Zion, and sit on the throne of David. Accepting this heavenly calling, which he pretended to have received by a special revelation, he was immediately acknowledged as monarch by the deluded multitude, and assumed all the state and pomp of royalty. He wore a crown of gold, and was clad in the most sumptuous garments. A Bible was carried by him in one hand, and a sword in the other; he appeared in public attended by a body of guards, coined money with his own image, and appointed the great officers of his household and kingdom, among whom Cnipperdorling was nominated governor of the city, as a recompence for his former submission. As the excesses of enthusiasm have usually led to sensual gratifications, Boccold instructed his prophets and teachers to inculcate the lawfulness of a plurality of wives, as one of the privileges granted by God to his saints; and he himself set the example of this Christian liberty, as he called it, by marrying at once three wives, one of whom was the beautiful widow of Matthias. He proceeded with augmenting the number of his wives to fourteen, restricting, however the title of queen to Matthias's widow, and allowing no other to share with him the splendour and ornaments of royalty. The multitude availing themselves of his example indulged their desires to the most licentious and extravagant excess; and polygamy and freedom of divorce universally prevailed. The bishop of Munster, in the mean while, aided by the German princes, pressed closer the blockade of the town into

which the siege had been converted; but its fortifications were so strong and so diligently guarded, that they durst not attempt an assault. But no succours arrived to the besieged; and after a close blockade of about fifteen months, they began to feel and lament the effects of scarcity. However, such was the fascinating influence of Boccold's promises and predictions, that no one seemed inclined, or at least possessed resolution enough to propose a surrender. One of his wives intimating a small doubt of his divine mission, was summoned before him as a blasphemer, and commanding her to kneel, he cut off her head with his own hands; his frantic followers at the same time dancing with joy round the bleeding body of their companion. Notwithstanding all the horrors of famine, the people of Munster still refused to capitulate. At length, however, a deserter made his escape to the enemy; and offered to head a party of the besiegers, under cover of the night, to a weak part of the fortifications, and less vigilantly guarded than any other. The proposal was accepted; and the party scaled the walls, seized one of the gates, and admitted the rest of the army. A dreadful carnage ensued; the king and Cnipperdorling were taken prisoners. The former, loaded with chains, was carried about from city to city, as a spectacle to the people; but notwithstanding all their insults, he maintained a firm and unbroken spirit; and adhered inflexibly to the tenets of his sect. He was afterwards brought back to Munster, and suffered the most exquisite as well as lingering tortures of death with astonishing fortitude; thus finishing an extraordinary course of delusion, at the age of 26 years. Bayle, Art. *Anabaptists*. Robertson's Hist. of Ch. V. vol. iii. p. 99. &c. Mosheim's Eccl. Hist. vol. iv. p. 452, &c.

BOCCONE, PAOLO, or PAUL, an ingenious naturalist, was born at Palermo, in Sicily, April 24th 1633. He was of a wealthy and respectable family, originally from Savona in Genoa. To improve himself in natural history, particularly in botany, to which he was early attached, he travelled over Sicily, Corsica, Malta, many parts of Germany, Holland, and England, conversing with the most eminent literary characters in the places he visited, with whom he afterwards kept up a correspondence. In the course of his travels, he was admitted doctor in medicine at Padua, was elected member of the Academ. Naturæ Curiosæ, and made botanist to the grand duke of Tuscany. In 1682, he entered among the Cistercian monks at Florence, and with the habit of the order took the name of Sylvio, which he affixed to his latter works, but he was still permitted to continue his researches in natural history. Returning at length to Sicily, he retired to one of the houses of the Cistercians near Palermo, where he died, Dec. 22, 1704. As he had been indefatigable in his researches, his collection of plants and other natural productions was very considerable. Sherrard, who saw his hortus siccus or specimens of dried plants, in 1697, was so struck with their number and beauty, that he engaged him to give a catalogue of them to the public, which he did in his "Musæo plante raræ," published at Venice in 4to. the same year. The catalogue was also published by itself. Several of his works appear to have been printed while he was on his travels. The first of them, "De abrotano mare monitum," in 1668; and in the same year, "Manifestum botanicum, de plantis Siculis," Catania, 4to. By an advertisement at the beginning of the work he offers to botanists the seeds of many of the curious and rare plants he had collected at moderate prices. Morrison published an edition of this work at Oxford in 1674, 4to. under the title of "Icones et descriptiones rariorum plantarum Sicilicæ, Melitæ, Gallicæ, et Italianæ." Many of the plants, Haller says, were new. The figures are small, and in general not well delineated or engraved. His next production was "Recherches et observations naturelles," published at Paris in

1671, 12mo. again at Amsterdam in 1674, and again in 1744, in 8vo. It consists of letters to his correspondents in France, Italy, England, &c. In 1684, in 16mo. "Operazioni naturali ove si contengono materie medico fisiche e di botanica," Bologna. The observations are 26 in number, and dedicated, or addressed to so many of the author's friends and patrons, among whom are many persons of high rank. He is very profuse in his elogia on the medical virtue of many of the plants, which he praises far beyond their real value. "Tenere oportet," Haller says, "credulum esse virum et in viribus medicis plantarum liberalem." "Musæo di fisica e di esperienze decorato di opervazioni naturali." Venet. 1697, 4to. The author here assumes the name of Sylvio. The observations are, as in the former work, dedicated to his noble patrons, and contain ample accounts of the medical virtues of various plants, much beyond what, from experience, they have been found to possess. Some smaller dissertations were printed in Miscel. Naturæ Curios. and in the Journal des Savans. On the whole, Boccone appears to have been an industrious and intelligent writer, and to be deservedly reckoned one of the promoters and improvers of botany. Haller Bib. Botan. Eloy. Dict. Hist. Méd.

BOCCONIA, in *Botany*, (named from Paolo Boccone, M.D.) a genus of the class *Dodecandria Monogynia*. Nat. Ord. *Rhœoifera*. *Papaveraceæ*, Jussieu. Lin. gen. 591 Reich. 643. Willden. 927. Schreb. 803. La Mark, p. 394. Gært. 44. Juss. 236.

Ess. Char. *Cal.* two-leaved. *Cor.* none. *Style* bifid. *Pericarp.* two-valved. *Seed* one.

Gen. Char. *Perianth* two-leaved, ovate, obtuse, concave, caducous. *Cor.* none. *Stamens*, before the opening of the flower, from 12 to 24, afterwards seldom more than 10; very short. *Anthers* linear, very large, as long as the calyx. *Pist.* germ roundish, contracted both ways, large, pedicelled. *Style* one, bifid. *Stigmas* simple, reflex. *Pericarp.* capsule subovate, attenuated to each end, compressed, one celled, two-valved. *Valves* coriaceous, opening at the base; the annular suture crowned with the permanent style. *Seed* one, globular, involved in pulp at its base, fixed to the bottom of the capsule. *Observ.* The capsule resembles a silicule in its general shape, and in the permanent suture terminated by the style.

Species, 1. *Bocconia frutescens*, shrubby bocconia tree, celandine, or parrot-weed. "Leaves oblong, sinuated. Willd." An ornamental shrub, 10 or 12 feet high, with a straight, hollow trunk filled with pith, covered with a smooth, white bark, and divided near its summit into several cylindrical branches. It abounds in all its parts with a thick, yellowish juice, similar to that of celandine. *Leaves* six or seven inches long, and about three broad; alternate, oblong, femipinnatifid; a little sinuated, with oval, unequally toothed segments; green and smooth above, glaucous, and a little tomentose beneath; on short petioles; flowers small, greenish, numerous, in large pyramidal, terminating panicles; bractes lanceolate.

It is a native of Mexico and the West Indies, where its acid juice is used to take off tetters and warts, and is also said to be employed in dyeing yellow. It has an evident affinity with the celandines in its sensible qualities and two-leaved caducous calyx, but differs remarkably from them in its incomplete flowers and monopermous fruit. La Mark conjectures that its want of a corolla is owing to the change of its natural petals into stamens: for, he observes, after the fall of the true stamens, four are constantly left, which continue as long as the calyx. See La Mark. Encyc.

The shrubby *bocconia* was first cultivated in England by Mr. Miller in 1739, and has flowered and ripened its seeds, in the physic garden at Chelsea. It is propagated by seeds,

which should be sown in a pot filled with light fresh earth, early in the spring, and then plunged into a bed of tanner's bark, and occasionally watered. When the plants are come up, they should be transplanted into separate pots filled with light sandy earth, plunged again in the hot bed, and shaded from the sun in the heat of the day, till they have taken root: at first they should be sparingly watered, but when their stems are become woody, they will require a larger supply. In about two months, they should be transplanted into larger pots, and plunged again into the bark. In warm weather they should have a good share of fresh air, but should never be taken out of the stove.

♁ *B. cordata*. "Leaves cordate, a little lobed." A native of China. *Panicle* elongated, with single, not divided, branches. *Calyx* white, as in the preceding species, but larger. *Stamens* about 24. *Style* none. *Stigma* bilamellated, sessile. Willdenow, by whom it was first described, as it should seem, from a dried specimen.

BOCCORE, in *Natural History*, בִּכְרִיָּה, q. d. first and early fruit, a name given in the kingdoms of Algiers and Tunis, and also in Palestine, to the early fig, which was produced in June, in Palestine, though the kermesz, or kermouse, the fig properly so called, which they preserved and made up into cakes, was rarely ripe before August, and sometimes hung upon the trees all the winter. The latter figs continued a long time upon the tree before they fell off; whereas the boccores dropped as soon as they were ripe, and, according to the appropriate and beautiful allusion of the prophet Nahum. (iii. 12.) fell into the mouth of the eater, upon being shaken. We learn from Jiny (N. H. l. xvi. c. 26.) that the fig-tree was bifera, or bore two crops of figs, viz. the boccore, as we may imagine, and kermouse: and it is well known that the fruit of these prolific trees always precedes the leaves; consequently, when our Saviour saw one of them, in full vigour, having leaves (Mark xi. 13) he might, according to the common course of nature, very justly look for fruit, and haply find some boccores, if not some winter-figs likewise upon it. The time of the year in which the event referred to in this passage occurred, was undoubtedly three or four days before the passover, at which our Saviour was crucified, and the passover in that year fell in the beginning of April. But it has been inquired, how Christ could expect to find ripe figs on the tree at the latter end of March? to which it is replied, because figs were ripe so soon in Judæa. It has been satisfactorily proved, that the harvest in Judæa began at the passover, and ended at pentecost; and as the barley in Judæa was ripe in March, and the wheat in April, we need not wonder, if there were ripe figs in the beginning of April too, or before the time of the passover. This, indeed, was the usual time for the first ripe figs; and therefore it was natural to expect that there should be figs at this season, more especially as the tree had leaves, before which the fruit came forth; and as the "time of figs" as bishop Kidder has shewn, the time of gathering in ripe figs, was not yet come. When St Mark says, "for the time of figs was not yet," he does not design to give a reason of what he said in the immediately foregoing clause, viz. "he found nothing but leaves," but he gives a reason of what he said in the clause before that, viz. "he came, if haply he might find any thing thereon." And it was a good reason for our Saviour's coming and seeking figs on the tree, because the time of gathering them was not yet come. The transposition above supposed, is not uncommon. See Mark, xvi. 3, 4. Gen. xiii. 10. Josh. xxii. 22. See Hallett's Notes on Texts of Scripture, vol. ii. p. 115, &c. Harmer's Observ. vol. i.

BOCH, JOHN, in *Biography*, a modern Latin poet and classical scholar, was born at Brussels in 1555; and having

entered into the service of cardinal Radzevil, accompanied him to Rome, and there studied theology under Bellarmine. He afterwards travelled into Poland, Livonia, and Russia, and was in danger of losing his feet by the frost in his journey to Moscow. Upon his return to the Low Countries, the duke of Parma appointed him secretary to the town-house of Antwerp. He died in 1609. His poetical works, consisting of epigrams, elegies, heroic poems, &c. were collected, and printed at Cologne in 1615. He has been highly esteemed as a Latin poet by the critics of his country, and called the "Belgic Virgil." Gen. Dict.

BOCH, in *Geography*, a river of the Netherlands which runs into the Meule, 5 miles below Dinant.

BOCHARIA. See BUCHARIA.

BOCHART, SAMUEL, in *Biography*, a learned orientalist, was the son of a minister of the reformed church at Rouen, where he was born in 1599. Having studied polite literature at Paris, philosophy at Sedan, and divinity, with the oriental languages, at Saumur, and made a surprising progress at a very early age, he completed his course of oriental literature under Erpenius and Ludolf at Leyden. On his return to France, he settled as minister at Caen. In 1646, he published his "Phaleg" and "Canaan," the two parts of his "Geographia Sacra," a work of very extraordinary erudition and research, in which he investigates the history of the human race as recorded in the Bible, the dispersion of mankind, and the origin of nations and languages, together with a variety of collateral subjects. Notwithstanding the charge of fanciful interpretations and chimerical conjectures, which has been alleged against some parts of this work, it has long maintained a high degree of reputation, and furnished an ample supply of materials for modern writers. In the progress of this work, the author was led to pursue a variety of inquiries concerning the animals, vegetables, and minerals mentioned in the sacred writings, on which he intended to have composed distinct treatises; but he only completed that relating to animals, which was printed at London in 1663, under the title of "Microzoicon." In this work the errors are such as must unavoidably occur at a period when the knowledge of natural history was very imperfect, compared with that of more modern times. In compliance with the invitation of queen Christina, Bochart visited Sweden in 1652, accompanied by the learned Huet, who wrote an humorous and elegant Latin poem on their journey. But finding that the capricious levity of the Swedish queen was not suited to his own grave character, he returned to France in 1653, and resumed his former studies. He was a member of the Academy at Caen, and, by his moderation and candour, maintained the distinguished reputation which he acquired by his profound erudition, together with the esteem and respect of persons of all parties, till the time of his death, which happened in consequence of an apoplectic stroke, during a disputation with Huet in the academy, May 16, 1667. Besides the learned works already mentioned, Bochart left several dissertations, particularly one, in which he attempts to prove that Æneas never was in Italy. His works were collected and printed by M. de Villemandy at Leyden in 1712, in 3 vols. folio. Gen. Dict.

BOCHO, in *Geography*, a town of Germany, in the circle of Upper Saxony, and principality of Querfurt, 3 miles S. E. of Juterbock.

BOCHOLNICZE, a town of Poland, in the palatinate of Sandomirz, 20 miles E. S. E. of Radom.

BOCHOLT, or BOCKOLT, a town of Germany, in a prefecture of the same name, in the bishopric of Munster, and circle of Westphalia; seated on the Aa, and

having iron mines in its vicinity; 36 miles W. S. W. of Munster.

BOCHOUULT, or BOCHOUT, a town of Flanders, situate on a canal cut from the Scheldt; 4 miles N. W. of Sas-de-Gent.

BOCK, BLAUER BOCK, in *Zoology*, a synonymous name of the *blue antelope*, *antilope leucophaea*. Kolbe.—Bock also signifies the male of the common goat. Gefn. Thierb.

BOCKA, or BUCKAU, in *Geography*, a mine town of Germany, in the circle of Upper Saxony, and country of Erzgebirg, 3 miles W. of Schwartzberg.

BOCKENBURG, a town of Germany, in the circle of Westphalia, and bishopric of Minden, one mile from Minden.

BOCKENHEIM, a town of Germany, in the circle of the Upper Rhine, and county of Hanau-Munzenberg; 2 miles W. N. W. of Frankfort on the Mayne.

BOCKHORD, or BOOK-HOARD, in *Antiquity*, a place where books, evidences, or writings were kept.

BOCKHORST, JOHN VAN, in *Biography*, a painter of history and portrait of the Flemish school, was born at Munster, about the year 1610; and removing to Flanders, acquired the art of design and colouring in the school of Jacques Jordaens. He designed well; the heads of his women are generally graceful, and those of his men distinguished by character: his tone of colouring sometimes resembled that of Rubens, but more frequently that of Vandyck. His pictures have great force and harmony, and his skillful management of the chiaro-scuro produces an agreeable effect. An altar piece at the church of St. James in Ghent, representing the martyrdom of this saint, and a picture of the Annunciation in another church, painted in 1664, are distinguished performances of this master. Descamps. Pilkington.

BOCKI, in *Geography*, a small town of Poland, in Podalachia, in the palatinate of Bielsk.

BOCKING. See BRAINTREE.

BOCKING herring, in the *Dutch Trade*, signifies the same with bloated herring among us.

BOCK-KOGO, in *Geography*, a vast peak of the Brenner mountains in the Tyrol, rising little inferior to Gesorn, and in the same latitude, but towards the west.

BOCK-LAND, or BOOK-LAND, formerly denoted that which we now call FREEHOLD-land, or CHARTER-land; and it was by that name distinguished from FOLK-land, which was COPYHOLD land. In *Ancient Law-Writers*, it denotes a possession or inheritance held by evidence in writing. The word was doubtless written *bock-land*, quasi *book-land*, answering to free-land, or land held by book or charter, which was regarded as free property, and descended to the heirs of the possessor. It stood opposed to FOLK-land, which was that held without writing.

BOCKUM, BOCHUM, or BOCHEIM, in *Geography*, a town and prefecture of Germany, in the circle of Westphalia, and county of Mark; seated in a very fertile district, 24 miles N. E. of Dusseldorp, and 35 N. of Cologne.

BOCNIA, a town of Poland, in the palatinate of Cracow, famous for its salt-mines, first discovered in 1251. The small river called Raab, that falls into the Vistula, runs near this town, which is surrounded with hills and eminences. The salt-mine of Boenia is in a narrow slip of land, about 750 feet in breadth from north to south, and about 10,000 feet in length from east to west, and its greatest depth below the surface is about 1200 feet. The salt lies in veins, and is somewhat finer, especially at a certain depth, than that of Wieliczka. It is cut in small pieces, and put up in casks. Large pieces of black wood have been found in this mine, which are incrustated with salt; and likewise al-

bafter. The mines, which are very dry, are under the direction of the magistrates of Wieliczka. The town is 20 miles E. of Cracow.

BOCZEYKOWO, a small town of Lithuanian Russia, in the palatine of Polock.

BODÆUS A. STAPEL, JOHN, in *Biography*, was born at Amsterdā the beginning of the 17th century, where, at a proper age, he was admitted doctor in medicine, but attached himself particularly to botany, in which he acquired considerable celebrity. He died in 1636, at an early age, leaving a work, on which he appeared to have bestowed much labour, prepared for the press, which was published some years after, viz. Joannes Bodæus, a Stapel, in Theophrasti Historiam Plantarum, fol. Amst. 1644. Eloy's Dict. Hist. Med.

BODAIKA, in *Geography*, a town of Hungary, 7 miles W. of Patak.

BODDAERTI, in *Ichthyology*, a name given to a species of CHÆTODON. This has the body variegated with brown and blue bands, and the ventral fins armed with two spines. Schr. der. berl. naturf. Gmel. The habitat of this fish is unknown.

BODDAERTI, a species of GOÆUS, found in the Indian ocean. Pallas describes it specifically as having the rays of the anterior dorsal fin cirriform, and the third ray very long. This fish is six inches in length; the body blueish brown, pale and yellowish beneath, of a convex shape, tapering in a slight degree towards the tail, and covered with small soft scales. The head is thick, blunt, somewhat convex, and spotted with brown and white. Jaws nearly equal. Lips thick and fleshy: eyes vertical. Lateral line with scarcely perceptible papillæ, and a few snowy white spots. Each side of the back marked with seven black spots, and on the sides below these as many dots of white. Vent nearer the head than the tail; surrounded by a black circle, with a conic peduncle behind. Dorsal fins, blueish black the anterior ones spotted with white, the other with fetaceous rays, and six transverse white lines between each ray. Pectoral fin rounded. Tail blueish white. In the first dorsal fin five rays, in the second twenty-five; pectoral twenty-one; ventral thirty-four; anal twenty-five; caudal eighteen. Pallas. Gmel. &c.

BODECKEN, in *Geography*, a town of Germany, in the circle of Westphalia, and bishoprick of Paderborn, 4 miles N. N. E. of Buren.

BODEGAS, a town of North America, in the province of Verapaz, on the north-east coast of Dolce-bay. N. lat. 15° 40'. W. long. 75° 35'.

BODEGNE'E, a town of France, the principal place of a canton, in the district of Huy, and department of Ourte; the place contains 320, and the canton 7422 persons; the territory comprehends 107½ kilometres, and 17 communes.

BODEGON, a town of Spain, in Andalusia, 4 leagues from Seville.

BODEKKER, in *Biography*, a painter of portraits, was born in the country of Cleves, in 1660, and abandoning the profession of music for which his father intended him, he was placed as a disciple, in the art of painting, under John De Baan at the Hague. He commenced the exercise of his profession at Pois-le-Duc and Breda with great reputation; and having resided some time at the Hague, he closed his life in 1727, at Amsterdam, where his performances were much esteemed. Pilkington.

BODENBURG, in *Geography*, a town of Germany, in the circle of Lower Saxony, and bishopric of Hildesheim; 8 miles N. E. of Alfeld.

BODENETZ, a town of Bohemia, in the circle of Chrudim; 10 miles N. of Chrudim.

BODENFELDE, a town of Germany, in the circle of Lower Saxony, and principality of Calenberg, seated on the Wefer in the quarter of Göttingen.

BODENHAUSEN, a town of Germany, in the circle of the Upper Rhine, and principality of Hesse, 18 miles E. N. E. of Cassel.

BODENI, in *Antient Geography*, a people of European Sarmatia, according to Ptolemy.

BODENLEICH, in *Geography*, a town of Germany in the circle of Lower Saxony, and principality of Luneburgh-Zell; 32 miles N. E. of Zell.

BODEN SEA, a name sometimes given to the gulph of Bothnia, which see.

BODENSTEIN, ADAM, in *Biography*, a celebrated German physician, son of a famous theologian, called from the place of his residence, Carlostadt, was born there in 1528. He was a pupil, and strenuous defender of the doctrines of Paracelsus, in which he appears to have placed an entire confidence. For a malignant fever raging at Basle, in 1577, he went there, armed with a Theriaca, composed on the principles of his master, with which he boasted he should be able to subdue the fever; but taking the infection, he fell a sacrifice to his credulity and temerity. Besides editing several of the works of Paracelsus, he left the following, which were collected and published in one volume folio, at Basle, in 1581.

"Epitola ad Fuggeros, in qua Argumenta Alchymiam infirmitiam, et confirmantia adducuntur; quibus et eam artem esse verissimam demonstratur; lapisque vere inventus ostenditur." "De Podagra preservatione, tractatus." "De herbis duodecim zodiaci signis, dicatis, &c." Adamus records his epitaph, placed on his monument, he says, at his own desire, in which he is said to have died, anno salutis, 1577, ætatis hebdomada septima, for seven times seven, or 49 years. Also the following lines, in which Bodenstein is supposed to say:

"Nec omnia, nec omnes mihi
Placere: quinam ego omnibus?
Non omnibus cous fenex,
Non eremita spagirus.
Nam tu viator omnibus?
Deo placere cura. Abi."

Adami Melch. Vitæ Germ. Med. Haller Bib. Med. Eloy Dict. Hist.

BODENWERDER, in *Geography*, a town of Germany, in the circle of Lower Saxony, and principality of Calenberg, seated on the Wefer; 16 miles S. of Hamelen. It has some trade with Bremen and Hamburg in coarse linen.

BODEN-ZEE a name given by the Germans to the superior lake of Constance, which see.

BODERIA, or BODOTRIA, in *Antient Geography*, an æstuary mentioned by Ptolemy in his description of Great Britain, which is the present Firth of Forth in Scotland.

BODET point, in *Geography*, lies on the north shore of Lake St. Francis, near the boundary line between Upper and Lower Canada. Bodet River runs into lake St. Francis, E. of Bodet point.

BODGURVA, a town of Asiatic Turkey, in the province of Natolia, 28 miles N. N. W. of Kastamon.

BODIANUS, or BOBIANUS, in *Antient Geography*, a borough of Italy, which was repeopled by a decree of Julius Cæsar.

BODIANUS, *Bodian*, in *Ichthyology*, a genus of *Thoracic* fishes, first established by Dr. Bloch, for the reception of such species of the two Linnæan genera SPARUS and PERCA, as have certain characters common to both, and are not therefore sufficiently distinct to be divided into two genera. The character of this new genus, as laid down in the first instance, consists in having the gill covers scaly, armed, and smooth,

smooth, or even at the edges. Under this head Dr. Bloch describes ten species only, namely, *Bodianus bodianus*, *bodianus guttatus*, *bodianus pentacanthus*, *bodianus bænac*, *bodianus aya*, *bodianus maculatus*, *bodianus apua*, *bodianus macrolepidotus*, *bodianus stellifer*, and *bodianus argenteus*. Lacepede, in adopting the genus *Bodianus*, considerably augments the number of its species by the addition of others not previously described under either of the Linnæan genera. In his "Histoire Naturelle des Poissons," there are altogether no less than four and twenty species. The generic character is modified, and two sections formed to admit them. Its essential character is thus expressed: one or more spines to the gill covers, the margins of which are neither denticulated, nor jagged; only a little beard, or sometimes none to the jaws; and a single dorsal fin.

The first section of the *Bodians* include those which have the caudal fin furcated in the form of a crescent, of which there are fourteen kinds; le bodian œilère (*bodianus palpebratus*), le bodian louti, le bodian jaguar (*bodianus pentacanthus*), le bodian macrolépidote, le bodian argenté, le bodian Bloch (*bodianus bodianus*), le bodian aya, le bodian tachté, le bodian vivanet, le bodian Fischer, le bodian décacanthe, le bodian lutjan, le bodian grosse tête, and le bodian cyclostome.

In the second division, the species of which have the tail fin entire, Lacepede describes only ten, le bodian rogaa, le bodian lunaire, le bodian mélanoleuque, le bodian Jacob Evertsen, le bodian bænac, le bodian biatule, le bodian apua, le bodian étoilé, le bodian tétracante, and le bodian six raies.

The genus *Bodianus* is recognised, and admitted by Dr. Shaw into the general zoology. He includes in this tribe precisely the same species as those described by Dr. Bloch, with five additional species described by Lacepede as *Bodians*, namely, *perca louti*, Gmel. *sparus palpebratus*, Gmel. *perca rogaa*, Gmel. *perca lunaria*, Gmel. and *bodianus melanoleucus* of Lacepede. But the generic definition of the *Bodians*, as given by this author, is evidently at variance with that assigned to it by others. The great object of the Ichthyologist, in establishing the new genus *bodianus*, must have been to separate from the two genera *perca* and *sparus*, such species as do not strictly belong to either; and unless this could be accomplished in a satisfactory manner, it were better to permit them to remain where Linnæus placed them. By some unusual oversight Dr. Shaw appears to have failed in this respect; his *bodians* are not sufficiently distinguished from the Linnæan *perca*, as the following generic character will shew: "*Habit* of the genus *perca*. Gill covers scaly, ferrated and aculeated. Scales (in most species) smooth. The gill-covers of the *perca*, according to this writer, are scaly and ferrated, and the scales of the body (in most species) hard and rough. According to this definition; a perch with smooth scales, and the denticulations of the gill covers conspicuously large, may be mistaken for a bodian; and a hard scaled bodian, on the contrary, for a perch. If we are to allow an innovation on the Linnæan arrangement by the insertion of the genus *bodianus*, its true character seems to be that the plates which constitute the gill-covers are smooth at the edges, and only armed with one or more distinct spines; while the ferrated edges of those plates as plainly point out the *perca*: and if the plates be both ferrated and aculeated, we conceive it highly proper to retain them under the old Linnæan genus *perca*.

BODIN, JOHN, in *Biography*, a famous lawyer of France, was born at Angers in 1530, he studied the law at Toulouse, and preferring the common to the civil law, quitted Toulouse and entered at the bar in Paris; but not succeeding in his expectations, he devoted himself to literature. He commenced his career as a writer, with a translation into elegant

Latin verse of "Oppian's Cynegeticon," or books of hunting, accompanied with learned notes, claimed as his own by Turnebus. His "Method of History," was published in 1566, and his "Discourse on Coins," with an answer to the paradoxes of Malestroit in 1568; but these were introductory to his great work in French, "Concerning a Republic," printed in 1576, in folio, and frequently reprinted in 8vo. To this work the president Thelusius bears very honourable testimony; it was also much commended by other persons of learning; and obtained for the author a high degree of reputation throughout Europe. It became the text-book of private lectures both at London and Cambridge. His tables of law, entitled "Juris Universi Distributio," were printed in 1578, and in the following year his "Demonomanie des Sorciers," to which was annexed "A Refutation of the book, de Lamiis," of John Wier, physician to the duke of Cleves, who had undertaken to prove that the stories of witchcraft and foreery have chiefly arisen from imposture or delusions of fancy. The literary character of Bodin, who defended this kind of superstition, incurred reproach, and he himself was suspected of being a magician. Before this time he had been invited by Henry III. to his court, who was much delighted with his conversation and treated him with attention and respect. But the royal favour was of no long continuance; for Bodin, who held an office in the presidial court of Laon, was sent, in 1576, as a deputy of the third estate of Vermandois, to the Assembly of the states-general at Blois; where he remonstrated against the project of alienating the royal demesnes belonging to that province; and this he did with such effect, that Thelusius principally ascribed the defeat of the injurious scheme of alienation to his conduct on this occasion. Bodin also resolutely opposed the party of the Guises, who were endeavouring to procure a decree for compelling all the king's subjects to profess the catholic religion. By such measures he became obnoxious at court; and he, therefore, accepted a proposal made to him by the king's brother, the duke of Alençon and Anjou, to accompany him to his government of the United Provinces. He afterwards attended him to England, and, it is said, that he advised the seizure of Antwerp, in consequence of which the duke lost both credit and influence. After the death of his patron, Bodin returned to Laon, and discharged the office of chief magistrate with great integrity. In this city he died of the plague in 1596. A work, written by him but never printed, and entitled "Heptaplomeron, five de abditis rerum sublimium arcanis," is said to have been an attack upon religion, and designed to invalidate the authority of revelation. By the seeming advantages which he gave in this work to the Jewish religion, he was suspected of being a convert to it; but it is more probable, that he was a sceptic with regard to religion, and alike indifferent to all modes of faith. A little while before his death he published a Latin treatise, entitled "Theatrum Universæ Naturæ," in which he pursues the causes and effects of things to their principles. Bodin was of an ardent and inquisitive temper; and his erudition was superior to his judgment. Gen. Diet.

BODLEY, SIR THOMAS, was born at Exeter in 1544, and at 12 years of age removed with his father to Geneva, who took his family thither to avoid the persecution of queen Mary's reign. In the university of that city he commenced his studies; and when his father returned to England, on the accession of queen Elizabeth, he was sent to Magdalen college, Oxford, where he remained for some years, and became fellow of Merton college. Here he read lectures in Greek and philosophy, and officiated as proctor and public orator. In 1576 he went abroad for improvement, and

spent four years in his travels. In 1583 he was made gentleman-usher to the queen; and having married, he entered into public life, and was employed in various foreign embassies. At the Hague, where he resided several years, his chief business was the negotiation of money-concerns between the States and queen Elizabeth. After his final return to England, in 1597, he found that his further advancement was obstructed by the intrigues and jealousies of persons in power, and he therefore formed a fixed purpose of retiring from all public affairs, devoting the remainder of his life to the laudable employment of refounding the university library at Oxford, furnishing it with books, and enlarging the building. See LIBRARY. At the accession of king James, Mr. Bodley received the honour of knighthood. He died in 1612, and was buried in Merton college choir. An annual oration is still spoken in his praise. *Biog. Brit.*

BODLEY, JOHN, who practised physic in London, in the beginning of the last century, published, in 1741, a critical essay on the works of various authors, particularly on those treating on medicine, with the view of shewing that neither those physicians who wrote the most correct and valuable treatises on medicine, nor those who were the most intelligent practitioners, were usually the most encouraged: fame and success being more commonly the appendages of craft and policy, than of skill and judgment. A similar opinion was held by the late Dr. Samuel Johnson, who thought a judicious history of the fate of physicians might prove both an entertaining and useful work. Something of this kind was done by Pierius, in his book "De Literatorum Infelicitate," but on a larger scale, embracing the whole community of letters. *Eloy. Dict. Hist.*

BODINCOMACUM, in *Ancient Geography*, the name of a borough of Italy in Liguria, where, according to Pliny, the river Eridanus was at its greatest depth; called in his time "Industria."

BODIONTICI, a people whom, according to Pliny, Galba annexed to Gallia Narbonensis; but before this time they formed a part of the Ligurians. M. D'Anville has placed them in the maritime Alps. Their capital was Dinia.

BODKIL, in *Geography*, one of the channels between Flanders and Walcheren island, in Zealand, by which great ships may sail in.

BODMER, in *Biography*, a celebrated professor and writer of Switzerland, was born at Zurich in 1698; and became professor of Helvetic history and politics in his native place. In this office he taught his pupils to think for themselves, and to make such observations on historical facts as might render them intimately acquainted with the human heart. He wrote the history of his own country in the form of dramatic dialogues. Although he became one of the most voluminous of the German poets, and contributed in a great degree to reform the taste of his contemporaries, and to familiarize them to the sublime beauties of Homer and Milton, he had scarcely written a verse in the German language before he was 50 years of age, when the first canto of Klopstock's Messiah fell into his hands, and excited his emulation. His first essays were in epic poetry, the subjects of which he took from the Scriptures, but he afterwards devoted his muse to other topics; and it is observable, that old age, which generally increases austerity of manners, had the contrary effect on Bodmer; inasmuch that his last pieces were the most gay, and that when he was 80 years old, he frequently amused himself with Tibullus and Petronius, and also with Boeace and la Fontaine. At the age of 77, he began a translation of Homer's Iliad and Odyssey, which he finished; he was 80, also, when he published his version of the Argonautics of Apollonius Rhodius. He died in 1783, at the

age of 85 years. Bodmer has been deservedly styled by the unanimous voice of his contemporaries, "the father of German literature;" whose just criticisms and correct judgment animated the poetical genius of Klopstock, Haller, and Geßner. *Bildnisse, &c. or Portraits of celebrated German Literati, &c. Rome, 1793.*

BODMIN, in *Geography*, an ancient borough and market town of Cornwall, England, is seated near the eastern borders of the county, on the confines of Devonshire. This town appears to have been formerly the principal seat of religion in the western district, and contained a priory, a collegiate church, and, according to Hals, thirteen other churches, or free chapels. The remains and foundations of some of their religious structures still exist; and the sites of others are remembered by the old inhabitants. Among these were the priory with its chapel, &c. St. Peter's church, St. Paul's church, on the northern side of the town, of which a solitary square tower remains; St. Nicholas, or the friary. The present town-hall and session house occupy the site, and are constructed with parts of the latter building. The first religious foundation of Bodmin was removed to it from Padstow, a town on the northern coast of the county, which being much infested by the Saxons and Danes, was the resort of the monks for greater protection and safety. Here they established the priory, and its various dependent buildings; all of which gradually decayed after the removal of the see. The town occupies the northern face of a hill, and consists principally of one long street stretching east and west. Near the eastern end of it is the parish church, a large ancient structure, consisting of three aisles, and a tower which is attached to the north side. The chancel part is certainly the most ancient, and was formerly connected with the priory-building. An old chapel, now appropriated to a school-room, still remains near the east end of the church, and a little farther east is a neat modern mansion, occupying the site of the domestic part of the priory. A monument richly and curiously sculptured, of one of the priors of this house, is carefully preserved in the chancel. This was made to commemorate the name and official character of Thomas Vivian, who was bishop of Megara, and died in 1533.

Bodmin is distinguished among the numerous boroughs of Cornwall, as being the only one free from the controul of a patron. It was first made a borough in the time of Henry II. and its privileges were afterwards confirmed by king James I. who incorporated it in the 15th year of his reign. In 1799, a new charter was obtained, which vested the government in a town clerk, twelve aldermen, and twenty-four common council-men, who hold the sole privilege of electing two members for parliament. About half a mile N. W. of the town is a regular, commodious county gaol, which was begun building in 1779, from designs by Sir John Call, who planned it according to the system recommended by the philanthropic Howard.

Bodmin gave birth to Dr. Richard Lower, an ingenious physician and anatomist, who made various experiments on the transfusion of blood from one animal into another. This town has a market on Saturday, is 235 miles south west from London, and contains 278 houses, and 1951 inhabitants.

BODOBRICA, in *Ancient Geography*. See BAUDUBRICUM.

BODODO, in *Geography*, a town of Africa, in the kingdom of Benin, containing about 50 houses, or little cabins, built of reeds and covered with leaves. Here a viceroy has his residence, attended by a council, whose jurisdiction extends over this canton in all civil affairs, levying taxes, and rating duties and imposts on merchandize. In criminal cases

of great importance, the viceroy and council are obliged to fend to Benin the capital, for the orders of the court.

BODOK, a district of Lower Hungary, in the province of Nitra, containing 101 large villages.

BODON. See **WIDIN**.

BODROG, a district of Hungary, near the Danube, 30 miles S. E. of Colocza, inhabited by Russians and a few Hungarians.—Also a River of Upper Hungary, which has its source in the Carpathian mountains, and discharges itself into the Theis near Tokay.

BODY, in *Zoology*, the name of a certain kind of American snake, supposed to be of the *amphibana* tribe, but of which this species is apparently doubtful. The same snake is likewise called *Ibijara*.

BODUNGEN, *Great*, in *Geography*, a market town in Germany in the circle of Upper Saxony, and county of Klettenberg, 5 miles north of Bleicherode. *Little Bodungen* lies in the bailiwick of Lora, 4 miles north of Bleicherode.

BODWELL'S FALLS, lie in Merrimack river, between Andover and Methuen, in North America, about 5 miles below Patucket falls.

BODY, in *Physics*, a solid, extended, palpable substance; of itself merely passive, and indifferent either to motion or rest; but capable of any sort of motion, and of all figures and forms.

The word alludes to the Saxon *bolige*, *stature*; and to the Belgic *boode*, *a cover*, q. d. *the tabernacle of the soul*. Body is composed, according to the Peripatetics, of *matter*, *form*, and *privation*; according to the Epicureans and Corpuscularians, of an assemblage of hooked, heavy *atoms*; according to the Cartesians, of a certain quantity of *extension*; according to the Newtonians, of a system or association of solid, massy, hard, impenetrable, moveable *particles*, ranged or disposed in this or that manner; whence result bodies of this or that form, distinguished by this or that name. These elementary or component particles of bodies must be infinitely hard; vastly harder than the bodies compounded of them; nay, so hard as never to wear, or break in pieces. "This" sir Isaac Newton observes, "is necessary in order to the world's persisting in the same state, and bodies continuing of the same nature and texture in several ages."

BODY, *affections of*. See **AFFECTION**.

BODY, *colours of*. See **COLOUR**.

BODY, *elements of*. See **ELEMENT**.

BODY, *essence of*. See **ESSENCE**.

BODY, *existence of*. See **EXISTENCE**.

BODY, *extension of*. See **EXTENSION**.

BODY, *modes of*. See **MODE**.

BODY, *motion of*. See **MOTION**.

BODY, *qualities of*. See **QUALITY**.

BODY, *solidity of*. See **SOLIDITY**.

BODY, *solid*, that whose particles cohere, or are some way connected with each other. See **SOLID**.

BODY, *fluid*, that whose particles easily slide over each other, and are of a fit size to be agitated by heat; or that whose particles do not cohere, but are easily put in motion by the smallest force. See **FLUID**.

BODY, *rough*, that whose surface is beset alternately with eminences and cavities, in contradistinction from a smooth body.

BODIES, *duãile*, those which being stretched do not break, but extend one way as much as they shrink another. Of these some are hard and malleable, as metals; others soft or viscid, as glues, gums, &c. Mem. Acad. Scien. an. 1713. p. 268.

BODIES, *flexible*, those which admit of being bent without breaking: such are thread, wire, fibres, and even glass, when

spun very fine. These are contradistinguished from brittle bodies.

BODIES, *specific gravity of*. See **GRAVITY**, and **WEIGHT**.

BODY, *dense*. See **DENSITY**.

BODY, *rare*. See **RARE**.

BODY, *luminous*, or *lucid*, that which emits its own rays, or shines by its own light.

BODY, *illuminated*, that which diffuses the light of another by reflection, or which shines by borrowed light.

BODY, *opaque*, that which intercepts the rays of light, or prevents their passage through it.

BODY, *transparent*, *diaphanous*, or *pellucid*, that which transmits the rays of light. See **TRANSPARENCY**.

BODY, *the inertia of*. See **VIS inertia**.

BODIES, *homogeneous*. See **HOMOGENEOUS**.

BODIES, *congruous*, those whose particles have the same magnitude and velocity, or at least harmonical proportions of magnitude and velocity.

BODIES, *incongruous*, those which have neither the same magnitude, nor the same degree of velocity, nor an harmonical proportion of magnitude and velocity.

BODY, *hard*. See **HARD**.

BODY, *volatile*, that which rises by the force of heat. See **VOLATILE**.

BODIES are divided into *animate* and *inanimate*; i. e. into those informed by a soul, and those which are not; or those that have life and those that have none.

Some consider bodies, either as *natural* and *sensible*; viz. as formed by physical causes, and clothed by physical qualities (in which sense, body makes the object of physics); or, as *intellectual* or *quantitative*, in the general or abstract; and according to three dimensions: in which sense, body makes the subject of geometry.

BODIES *alkaline*, *consistent*, *elastic*, *fixed*, *heterogeneous*, *atmosphere of*, *descent of*, *mercury of*. See the several articles.

BODY, with regard to animals, is used in opposition to *soul*; viz. for that part of an animal, composed of bones, muscles, canals, juices, nerves, &c. concerned in digestion, circulation, &c.

In which sense, body makes the subject of comparative anatomy. See **ANATOMY**.

BODY, *faculties of the*. See **FACULTY**.

BODY is also applied by anatomists to several particular parts of the animal fabric.—As the callous body of the brain, the cavernous or spongy bodies of the penis, &c.

BODY, *reticular*. See **RETICULAR**.

BODY, in speaking of a horse, denotes the chest, but chiefly the flanks.

A horse is said to have a good body, when he is full in the flank; a light body, when he is thin or slender in the flank. If the last of the short ribs be at a considerable distance from the haunch-bone, though such a horse may have a tolerable body for a time, if he be much laboured, he will lose it. It is a general rule never to buy a horse that is light bodied and fiery, because he will presently destroy himself.

BODY of a plant, in *Botany*. See **BOTANY**.

BODY of a piece of ordnance, in *Gunnery*, that part comprehended between the centre of the trunnions and the calcael. It ought always to be more fortified than the rest. See **CANNON**.

BODY of a pump, in *Hydraulics*, the thickest part of the barrel or pipe of a pump, within which the piston moves. See **PUMP**.

BODY, in *Geometry*, denotes the same with solid, which see.

BODIES, *regular*, or *Platonic*, are those which have all their sides, angles, and planes, similar and equal.

Of these there are only five; viz. the *tetrahedron*, consisting of four angles; the *octahedron*, of eight; the *icosahedron*, of twenty; the *dodecahedron*, of twelve pentagons; and the *cube* of six squares. See *REGULAR bodies*; see also *TETRAHEDRON*, &c.

BODY, in *Law*.—A man is said to be bound or held in *body and goods*; that is, he is liable to remain in prison in default of payment.

A woman, though in other respects she cannot engage her person but to her husband, may be *taken by the body*, when she carries on a separate trade.

BODY of the place, in *Fortification*, denotes either the buildings inclosed, or more generally the inclosure itself. Thus, to construct the body of the place, is to fortify or inclose the place with bastions and curtains.

BODY is also used for an assemblage of several different things collected into one; more particularly a number of persons united into a company or college.

A state or nation, under the administration, of one sovereign, is called a *body politic*. All large empires are unnatural, because the relation between the head and limbs is here too remote. No body, either natural or politic, can long remain sound without exercise. See *CORPORATION*.

BODY, corps, in *War*, is an aggregate or assemblage of forces, horse and foot, united and marching under some chief.

An army, ranged in form of battle, is divided into three bodies: the van-guard, the rear-guard, and the main body; which last is ordinarily the general's post.

BODY of reserve, in the *Military Art*, a draught or detachment of a number of forces out of an army, who are only to engage in case of necessity.

BODY, in matters of *Literature*, a name given to a collection of whatever relates to any particular science; thus we say, the body of the canon law; the body of the Saxon law. King James I. had a design to compile a body of the English law.

The body of the civil law consists chiefly of the Institutes, Pandects, Code, and Novels. A *glossated body*, is that to which glosses are added in the margin, composed by several lawyers.

BODY is also used figuratively, for consistence, solidity, and strength. In this sense, we say the body of a cloth, wine, &c.

Vintners have divers arts of increasing or diminishing the body of wine.

BODY, among *Painters*.—A colour is said to *bear a body*, when it is capable of being ground so fine, and mixing with the oil so entirely, as to seem only a thick oil of that colour; as white lead, lamp-black, vermilion, lake, indigo, &c. But verditers, minets, &c. will not embody with the oil, but are still apt to separate from it in working.

BODY *line*, or plane of projection, in *Ship-building*, is a section of the ship at the midship frame, or broadest place, perpendicular to the sheer and half-breadth plans. The several breadths, and the particular form of every frame of timbers, are described on this plane. As the two sides of a ship are similar to each other, it is therefore unnecessary to lay down both, hence the frames contained between the main frame and the stem are described on one side of the middle line, commonly on the right-hand side; and the after frames are described on the other side of that line.

BODZELIN, in *Geography*, a town of Poland, in the palatinate of Sandomierz, 24 miles south of Radom.

BOE, in *Ancient Geography*. See *ΒΟΕ*.

BOE, a small island of Norway, 25 leagues north of Bergen.—Also, a town of Norway, 18 miles north of Bergen.—Also, a town of Norway, 12 leagues north of Romfdale.

BOEBE, in *Ancient Geography*, the name of a lake or marsh in the island of Crete. Steph. Byz.

BOEBS, or **BOEBIAS**, a lake which some place in Bœotia, was situated near the confines of Magnesia, not far from mount Ossa. It has been since called the lake of Esero. North of this lake was a town called *Boebe*, whence the lake derived its name.

BOECE, or **BOEUS**, **HECTOR**, Lat. *Boethius*, in *Biography*, a celebrated Scottish historian, was born of an ancient family at Dundee, about the year 1470. After having studied in his native place, and also at Aberdeen, where he was professor in 1497, he went for further improvement to Paris, where he became a professor of philosophy, and where he had an opportunity of cultivating an acquaintance with several literary persons of eminence, and particularly with Erasmus. Upon the establishment of the king's college at Aberdeen, by Sir Elphinston, the bishop, about the year 1500, Boethius was sent for by the founder, and appointed principal of that university, and contributed, in concurrence with his colleague Mr Hay, to furnish the kingdom with several excellent scholars. After the death of Elphinston, his patron, in 1515, he wrote his life, together with an account of his predecessors, under the title of "*Vitæ Episcoporum Murthlæcenium et Aberdonensium*," Paris, 1522, 4to. He then engaged in his great undertaking of writing the history of Scotland, to which he prefixed a large geographical description of the country. This history was published under the title of "*Scotorum Historia ab illius gentis origine*," Paris, 1526, fol.; and he continued to improve it till his death, which happened about the year 1550. The first edition of this work consisted of 17 books, and ended with the death of king James I. The next edition printed at Laufanne and Paris, in 1574, fol. was much enlarged by the addition of the 18th and part of the 19th books. It was afterwards carried down to the end of the reign of James III. by J. Ferrerius, a native of Piedmont. The whole history was translated into the Scottish dialect by John Bellenden, archdeacon of Murray, by command of James V. and published in 1536. R. Holinshed published it in English, with considerable additions, in the first volume of his *Chronicles*. This work has been differently appreciated by national partiality on the one hand, and national prejudice on the other. Whilst it is allowed the merit of elegance and purity of style, it is charged with detailing marvellous tales and legends, and with introducing imaginary and fictitious circumstances, in order to ornament and dignify the antiquity of the Scots nation. As to his general character, Boethius was a great master of classical and polite learning, well skilled in divinity, philosophy, and history; but too credulous, and much addicted to the belief of legendary stories. With regard to his other accomplishments, he was discreet, genteel, well-bred, attentive, generous, affable and courteous. *Biog. Brit.*

BOECKEL, **JOHN**, born at Antwerp in November 1535, was admitted doctor in medicine at Bourges in 1564. At Hamburg, where he went to reside, he was soon distinguished for his superior skill, and appointed teacher of anatomy and medicine, an office he filled with sufficient reputation several years. He died there March 21st, 1605. His works are "*De peste quæ Hamburgum civitatem, anno 1565, gravissimè affixit*," Henricopoli, 1577, 8vo.; "*Synopsis novi morbi, quem plerique catarrhum febrilem vocant, qui non solum Germaniam, sed pene universam Europam gravissimè*"

vissimé affixit." Helm. 1580, 8vo. This may be considered as the earliest record of the contagious catarrhal fever, which has many times since visited the world, and which has, in this country, been familiarly denominated the influenza. "Anatomia vel descriptio partium corporis humani," Helm. 1585, 8vo. The text book from which the author gave his lectures, "De plultris. Utrum animi hominum his commoveatur, necne?" a question much agitated at that period of the world, but long since laid asleep. Haller. Bib. Anat. Eloy Bib. Hist. Med.

BOECLER, JOHN-HENRY, an eminent German philologist, was born at Cronheim in Franconia, in 1610, and preferred, at the age of 21, on account of his great learning, to the office of professor of eloquence at Strasburg. In 1648 he was invited to Sweden by queen Christina, and appointed to the chair of eloquence at Upsal, and to the office of royal historiographer; but being obliged by ill health to quit the country, he became professor of history at Strasburg. He was counsellor both to the elector of Mantz and to the emperor, and received a pension from Louis XIV. He died in 1692. His principal works are "Commentationes Pliniane;" "Timur, vulgo Tamerlanus," 4to. 1657; "Notitia Sti. Romani Imperii," 1681, 8vo; "Hillo ia, schola principum;" "Bibliographia critica," 1715, 8vo.; "Dissertationes Academicæ," 3 vols. 4to. 1710; "Animadversiones Polybium," 4to. 1611; "Commentatio in Grovii librum de jure belli et pacis," 4to. 1712. He wrote, besides, Latin commentaries on various ancient authors, and several tracts on German history. Nouv. Dict. Hist.

BOEDROMIA, in *Antiquity*, from *βοδρομιος*, *helper*, derived from *βο*, *I cry*, and *δρομα*, *I run*, solemn feasts held at Athens, in memory of the succour brought by Ion, son of Xuthus, to the Athenians, when invaded by Eumolpus, son of Neptune, in the reign of Erechtheus. Plutarch gives another account of the boedromia, which, according to him, were celebrated in memory of the victory obtained by Theseus over the Amazons, in the month Boedromion, called by the Corinthians "Panemos," which was, in the ancient chronology, the third month of the Athenian year. It consisted of thirty days, and answered to the latter part of our August and beginning of September.

BOEHM, in *Biography*. See BEHMEN.

BOEHMER, PHILIP ADOLPHUS, son of Justus B. professor of anatomy at Hall in Saxony, under whom he received his education; was admitted doctor in medicine in 1736. As he applied his mind particularly to the study of midwifery, he gave for his inaugural thesis, "De precavenda polypo um generatione." His next dissertation, which was published in 1741, in 4to. was "Situs uteri gravidæ, ac tætus, ac sede placente in utero." In this he has given a critical examination of the midwifery forceps used in England, which he compares with, and prefers to Leuret's. These pieces were added by the author to his edition of fir Richard Manningham's "Compendium artis obstetricæ," published in 1746, 4to. Having acquired celebrity by these and other works, he was adopted member of the Acad. Nat. Curios. and foreign associate of the Royal Academy of Surgery at Paris. He was also appointed to succeed his father as professor of anatomy and medicine in the university at Hall. In 1749 he published "Institutiones osteologicæ, in usum prælectionum," 8vo. Haller particularly commends in this work the engravings of the embryos, and some fœtal skeletons. His "Observationum anatomicarum, fasciculus primus," folio, was published in 1752. Among many rare and curious objects are, an engraving of a pregnant uterus, to shew the membrana decidua, and a fœtus in one of the Fallopian tubes, with the placenta. The second collection, also in folio, published in

1756, contains a smaller fœtus in one of the tubes, and a child with two bodies and only one head. For the titles of the remainder of his dissertations, see Haller. Bib. Anat. and his collection of medical theses, in which the greater part of them is inserted.

BOEHMERIA, in *Botany* (named by Jacquin in honour of George Adolph Boehmer, professor of anatomy and botany at Wittenburgh), a genus of the class *Monocœcia Tetrandria*, formed by Swartz for three plants, not described by Linnæus, natives of the West Indies, to which he added two others, the *urtica cylindrica* and the *caturus ramiflorus* of Linnæus. It constitutes a connecting link between *urtica*, and *parietaria*. Nat. Ord. *Scabridæ Urticæ* Jusseu. Schreb. 1471. Jacq. Americ. 246. Swartz. prod. 34. Jusseu. 403. Gen. Char. Male flowers on the same plant with the female, either distinct or mixed. *Cal.* perianth one-leaved, four parted to the base; segments lanceolate, acute, somewhat erect, coloured. Schreb. (tubular, Jusseu and Bosc.). *Cor.* none. *Nect.* none. *Stam.* filaments four, longer than the calyx, awl-shaped, erect; anthers roundish, ovate. Female flowers, *Cor.* none. *Pist.* germ ovate, compressed; style filiform, erect, permanent; stigma simple, pubescent. *Pericarp.* none. *Seed.* roundish, compressed, margined. Schreb. (single, very small, enclosed in the permanent calyx. Juss. Bosc.). The flowers are separated from each other by numerous, dense, ovate-acuminate, bractes or scales.

Species, 1. *B. caudata*. Brown Jam. 238. "Leaves opposite, ovate, acute, ferrate; racemes very long, pendulous; flowers diœcous; stem suffruticose." A shrub ten or twelve feet high. Brown calls it the nettle-tree. 2. *B. littoralis*. "Leaves opposite, ovate-lanceolate, ferrate; flowers conglomerate, axillary, monœcous, mixed; stem herbaceous, four-cornered." Native of Hispaniola. 3. *B. cylindrica*: "Leaves opposite, ovate, acuminate ferrate; racemes spiked, axillary, erect, simple." An annual plant, with a lucid, herbaceous stalk, dividing into several branches; leaves with three longitudinal veins; on pretty long petioles. A native of North America and Jamaica. 4. *B. ramiflora*. "Leaves alternate, broad-lanceolate, acuminate, ferrate, wrinkled; flowers aggregate, axillary and lateral, monœcous, distinct. Males three-stamened." A shrub, eight feet high, with long branches; leaves sickle-shaped, rugged on very short petioles, placed towards the end of the twigs; very different in size, some being two inches, and others a foot in length on the same twig. Male flowers small, yellowish, numerous, aggregate, on the leafless old branches. Female flowers whitish on the younger twigs to the very end. Native of Jamaica and other Islands of the West Indies. 5. *B. birta*. "Leaves alternate, ovate, acute, ferrate, hirsute; flowers monœcous, heaped, axillary, mixed." A native of Jamaica.

La Marck has not inserted this genus either in the alphabetic part of the Encyclopedic, or in the subsequent systematic series of figures. He follows Linnæus in referring the *cylindrica* to *urtica*, and the *ramiflora* to *caturus*.

BOEL, PETER, in *Biography*, an excellent painter of fruit, flowers, and animals, was born at Antwerp in 1625, and having been a disciple of Snyder's, whose widow he married, he went to Italy, where his uncle Cornelius de Waal resided, and in his return through France, was much employed, particularly at Paris, where he continued for sometime. He died in 1680. As an art he copied after nature, with a free and bold pencil, and a tint of colour that was natural and beautiful. There are some few slight, but spirited, etchings by Boel, from his own compositions, representing various animals, &c. Cornelius Boel, who flourished in 1611, and Coryn, or Quirin Boel, who flourished in 1660, both engravers, were of the same family. Pilkington. Strutt.

BOELE-BOELE, in *Geography*, a district of the island of Celebes, situated in the bay of Boni, at and near a river of the same name. To the west it has Wauwo Woelè; to the south, the river Cassa; to the north, the river Tanka; and to the east, the shores of the bay. It is sometimes called *Telbolimpoe*, and has three chief townships, viz. Boele-boele, Lamant, and Radja, which are all independent of each other. The kings of Boni consider it as an appendage of their crown.

BOELE-COMBA, a territory of Celebes, which was anciently a separate kingdom, but in later times it was subjugated by the Macassers; and is become one of the provinces belonging to the Dutch East India company. It stretches from the river Kalengkongang, which divides it from Boutain, to Bera, or rather to the river Bampang, which runs between them; to the north of it lie the mountains of Kyndang, which separate it from Boni, or rather from the highlanders of Touraayo; and to the south, it is washed by the sea. The land is fertile in rice, and abounds in game and extensive forests; but the timber is not adapted to the construction of houses. When the west monsoon renders it dangerous for ships to lie in the road before Boele-Comba, they run into the river Kalekongang, near the mouth of which stands the palisadoed fort Carolina, in which the resident of the Dutch East India company, who is a junior merchant, has his abode. The province of Bera reaches from the river Bampang eastward, along the sea-coast to the point of Lassèem or Lassoa, and thence northward to the point of Kadjang; and on the land side, it borders upon Boele-Comba, Tourang, and Kadjang, belonging to Boele-boele. This country belongs to the Dutch company. It is barren and rocky, but has some woods which furnish timber fit for building proas. The men are good warriors both by sea and land; the richest are merchants; and others employ themselves in building proas, and in manufacturing a sort of coarse white cloth from the cotton which the place supplies.

BOELON. See **BÆLON**.

BOEN, in *Geography*, a town of France in the department of the Loire, and chief place of a canton in the district of Montrbrison, seated on an eminence near the river Lignon; 6 leagues south of Roanne, and $3\frac{1}{2}$ north of Montrbrison. The place contains 1220, and the canton 10,929 persons; the territory comprehends 305 kilometres, and 22 communes.

BOENAC, in *Ichthyology*, a species of **BODIANUS**, described by Dr. Bloch. The body is of a clear olivaceous colour, marked with seven oblique brown bands; and the caudal fin is rounded. This fish is mentioned as a native of the seas about Japan, where it is called *yeau boenac*.

There are seven rays in the gill membrane of this species, fifteen in the pectoral fin, six in the ventral fin, eleven in the anal fin, sixteen in the caudal fin, and twenty-five in that on the back.

BOENASA, in *Ancient Geography*, a town of Cappadocia, in the interior of the Galatic Pontus. Ptolemy.

BOEON, a town placed by Ptolemy in the interior of the Tauric Chersonesus.

BOEON, or **BOELO**, a town of Greece, in the Doric region, according to Thucydides, near mount Parnassus. This was one of the four cities which, according to Pliny, Strabo, and Steph. Byz. gave the name of "Tetrapolis" to the country possessed by the Dorians, near mount Oeta.

BOEONUS, *Diu*, an island of India, according to the Periplus of the Erythrean sea, placed by M. d'Anville at the south-west entrance of the "Barygazenus sinus."

BÆOTIA, a name given to two ancient kingdoms of Greece; one founded, or rather restored by Cadmus, and called by him Bœotia, from the ox (*bos*), which is said to have directed him to the place where he built the capital of his kingdom, afterwards known by the name of Thebes; the other in Thessaly, said to have been founded by Bœotus, the son of Neptune, and brother of Cœolus, by Arne, the daughter of Cœolus king of Cœlis. This Bœotus, according to Bryant (*Anal. Anc. Myth. vol. ii. p. 326.*), from whom the Bœotians are supposed to be descended, and from whom this country is said, by some, to have derived its name, was an imaginary personage, and merely a variation of Boutus and Butus, the ark; which in ancient times was indifferently styled Theba, Argus, Aren, Butus, and Bœotus. This Bœotus of Greece, according to the mythology of this writer, is the same with Doutus of Egypt, Battus of Cyrene, and Buto or Budde of the Indians. The history of the origin of this kingdom is intermixed with fables; but it is more certainly known, that the possessors of this settlement held it for more than 200 years; and that when they were expelled from it by the Thessalians, they sought a new establishment in that country, which till that time had been called Cadmeis, and which was then named Bœotia. We are informed by Diodorus and Homer, that these Bœotians signified themselves at the Trojan war; and the latter adds, that five of Bœotus's grandsons were the five chiefs who led their Bœotian troops thither. Whatever be the true etymology of the name Bœotia, given to this country, it was distinguished by several other appellations, according to its supposed founders: those who ascribed it to Ogyges, called it Ogygia; others called it Cadmeis, from Cadmus; and by others it was denominated Aonia, from Aon, the son of Neptune; and Hyanthis, from Hyas, the son of Atlas. It is now called Stramulippa; and Thebes its ancient capital, Thive, and corruptly by the Greeks, Stibes or Stives.

It bordered on the east with Attica, and was in time joined to it, being parted from it by the mountain Cithæron; on the north, it was bounded by the freight Euripus, now called the Negropont; on the west it had the kingdom of Phocis; and on the south, the gulf of Corinth. Its utmost extent from east to west was $1^{\circ} 10'$, and it was nearly of the same length from north to south, but approaching to a point eastward. Ephorus, from Strabo, calls it *μοινη τριθηλας ποταμος, sola trimaris*, because it was contiguous to three seas; and by means of its commodious havens it could carry on a commerce on one side with Italy, Sicily, and Africa; and on the other, with Egypt, the isle of Cyprus, Mauritania, and the Hellepont. It had also the large lake Copais, and the two large rivers, the Asopus and Ilmenus, besides other streams, by which it was watered and rendered fertile. This country is partly hilly, especially Aonia, properly so called; the rest is low and flat, and abounding with excellent pasturage and corn; but the air was so dense and foggy, that Horace thought it influenced the genius of the inhabitants. The Bœotians, in general, were reckoned not to possess that penetration and vivacity, which characterized the Athenians, whose air was remarkably pure, though separated from them only by mount Cithæron; but this, perhaps, might have been attributed more to education than to nature. As they employed their time more in bodily than in mental exercises, they were deficient with respect to that facility of expression, those graces of elocution, the knowledge derived from study, and those pleasing manners, which are more the work of art than nature. But it should not be supposed, that Bœotia produced no men of genius. Several Thebans have done honour to the school of Socrates. Epaminondas was not less distinguished for his knowledge than

for his military talents. It should also be remembered, that Bœotia was the birth-place of Heliod, Corinna, and Pindar. Its most remarkable places were the Trophonian cave, Theſpia, Aulis, the ſtraits of Thermopylæ and Thebes, which ſee reſpectively.

The government of Bœotia was altogether monarchical, and peculiarly deſpotic, the will of the kings being the law; and of theſe ſome governed more like tyrants than moderate ſovereigns. Plutarch, in his "Morals," mentions an ancient cuſtom that prevailed among them; which was the manner of introducing their new-married women into their new habitations. They were brought home in a kind of chariot, or cart, the axle-tree of which was immediately burnt, thus intimating to the bride, that ſhe was fixed with her huſband for life, and muſt not expect to return to her parents.

The Bœotians, as to their general character, were courageous, inſolent, and vain; and with them the transition was very ſhort from paſſion to inſult, and from a contempt of law to a total diſregard of the dictates of humanity. The ſmalleft expectation of advantage gave occaſion to the groſſeſt acts of injuſtice; and murders were frequently the conſequence of the moſt frivolous quarrels. The women were tall, well-formed, and generally of a fair complexion; and their voice was remarkably ſweet and tender; whereas that of the men was harſh and diſagreeable, and in ſome meaſure ſuited to their character. Of this character for inſolence and ferocity, which generally diſtinguiſhed the Bœotians, no traces were to be found in a body of young warriors, called the "Sacred Battalion," conſiſting of 300, who were brought up together, and maintained at the public expence in the citadel. Their exerciſes, and even their amuſements, were regulated by the melodious ſounds of the flute. To prevent their courage from degenerating into blind fury, care was taken to inſpire them with the nobleſt and the moſt animated ſentiments. From this band each warrior choſe a friend, to whom he remained inſeparably united, whom it was his ambition to pleaſe, and to ſhare his pleaſures and ſufferings in life, and his labours and dangers in battle. Theſe 300 warriors were at one time diſtributed in troops at the head of the different diviſions of the army. Pelopidas, who had frequently the honour of commanding them, having made them fight in a body, the Thebans were indebted to them for almoſt all the advantages they gained over the Lacedæmonians. Philip deſtroyed this cohort, that had been invincible, at Cheronæa; and the prince when he ſaw theſe young Thebans ſtretched on the field of battle, covered with honourable wounds, and lying ſide by ſide on the ground on which they had been ſtationed, could not refrain from tears, but bore a noble teſtimony to their virtue as well as to their valour. Plut. in Pelop. t. 1. p. 287.

For the ſucceſſion of the kings of Bœotia, after Cadmus, and the hiſtory of the kingdom as a monarchy, ſee THEBES. The Bœotians, after having expelled their kings, who had reigned in ſucceſſion from Cadmus to Xanthus, for about 300 years, formed themſelves into a republic, of which the chief magiſtrates were the prætor, or ſtrategos, the Bœotarchi, and the Polemarchi. The authority of the prætor, who was choſen from among the Bœotarchi, laſted only a year, and reſembled that which was veſted in the prætors of Achaia and Ætolia. The Bœotarchi aſſiſted him with their advice, principally in time of war, and commanded under him; and they conſtituted the ſupreme court in military affairs; ſo that the prætor could not act in a manner contrary to their determinations. They alſo bore a great ſway in the civil adminiſtration, and hence derived their title. Their number was uncertain, being 7, 9, or 11; they were choſen yearly, and obliged by law, as well as the prætor, to reſign their

office on pain of death, before the firſt month of the new year was expired. The Polemarchi were altogether civil magiſtrates; it being their province to maintain peace and concord at home, while the Bœotarchi were employed in the wars of the republic. Beſides theſe officers, there were four councils in which the whole authority of the ſtate conſiſted. Theſe were compoſed of the deputies that were ſent by all the cities of Bœotia; and without their approbation, the Bœotarchi could not declare war, make peace, conclude alliances, or tranſact any buſineſs of importance. The Bœotians, and eſpecially the Thebans, were continually haraſſed by the princes of Macedon; nevertheleſs they took part with Philip againſt the Romans, and could not be prevailed upon by the Athenians and Achæans to deſert him, and to join the other ſtates of Greece, till he was entirely defeated in the famous battle of Cynocephalæ. They then, foreſeeing their danger, ſent deputies to Flaminius, imploring his protection. He received them with great humanity, and put them upon the ſame footing with the other allies of the republic in Greece. Flaminius, at their requeſt, obtained the releaſe of the Bœotians who ſerved in the Macedonian army; but notwithstanding this favour granted them by the interpoſition of the præconſul, they neglected to make the neceſſary acknowledgments, and filled up all vacant offices with perſons who were enemies to Rome, and attached to the intereſts of Macedon. Flaminius was exaſperated by this conduct; and Brachyllus, their prætor, was murdered by the friends of Rome. The murderers, however, were diſcovered, and one of them, Piſiſtratus, was put to death. For this murder of their prætor the Bœotians determined to be revenged; and they took occaſion to aſſaſſinate all the Romans whom they found wandering about in the fields. In conſequence of this outrage, Flaminius ravaged their territories; but upon their conſenting to deliver up the offenders, he deſiſted from any further acts of ſeverity; and the Bœotians duly apprized of his lenity, continued ever afterwards faithful to the Romans. But as ſome of their leading men joined Perſes, king of Macedon, in his wars againſt the Romans, the whole country was, on that account, treated with great ſeverity; Rome being at this time under no apprehenſion of an invaſion from Antiochus, as ſhe was when Flaminius was ſo eaſily appeaſed. At the diſſolution of the Achæan league, Bœotia, with the reſt of Greece, was reduced to a Roman province. See ACHÆANS.

BOER, in *Geography*, a town of Germany, in the circle of the Lower Rhine, and county of Recklinghauſen, 6 miles W.S.W. of Recklinghauſen, and 42 N. of Cologn.

BOERHAAVE, HERMAN, in *Biography*, a profeſſor of medicine and chemistry, of ſuch eminence as to form a new æra in theſe ſciences, was born at Voorhout, about two miles from Leyden, in Holland, the 31ſt of December 1668. His father, James Boerhaave, the paſtor of the village, having nine children, took on himſelf the care of their education; and, as he intended Heiman for the church, he was careful to ground him well in Greek and Latin. In theſe languages he made ſuch rapid progreſs, that when he was only fourteen years of age, his father ſent him to complete his education to the public ſchool at Leyden; and, in 1684, he went from thence to the univerſity. His father dying ſoon after, and in ſlender circumſtances, the progreſs of our young ſtudent's attainments would have been interrupted but for the friendly aſſiſtance afforded him by Daniel Van Alphin, burgomaſter of Leyden, who furniſhed him with the means of continuing his ſtudies. The kindneſs of this worthy man was remembered by Boerhaave, with gratitude, to the end of his life. He now applied to the mathematics, and to acquire a knowledge of the Hebrew and Chaldee languages; propoſing, agreeably to the intentions

of his father to qualify himself for the ministry; and that he might relieve his patron from a part of his expence, for his sustentance, he gave private lessons to the students in mathematics, and here probably laid the foundation of that excellence in the art of communicating knowledge by lectures, for which he in time became so celebrated. In 1690, he took his degree in philosophy, and gave for his inaugural thesis, "De distinctione mentis a corpore," in which he refutes in a solid and judicious manner, the errors of Hobbs and Spinoza. This, however, did not prevent his being suspected of Spinozism, which made him quit his intention of entering into the service of the church, and turn his mind to medicine, particularly to the study of chemistry, as more suited to the activity of his disposition. To acquire a knowledge of anatomy, he read the works of Vesalius, Fallopius, and Bartholine, and attended dissections under Nuck. In medicine, he studied Hippocrates, and the rest of the Greek and Latin writers in succession, but returned to Hippocrates, whose works were always mentioned by him with veneration. Among the moderns, he gave the preference to our countryman Sydenham, whom he called the Divine Sydenham.

Thus qualified, in 1693, being 25 years of age, he was admitted by the university of Harderwyck, in Guelderland, to the degree of doctor in medicine. His thesis on this occasion was "De utilitate explorandorum excrementorum in ægris, ut signum." To the urine he paid the greatest attention. He now applied to the practice of medicine, from which, however, he is said to have derived but little profit. As his practice, therefore, employed but a small portion of his time, he had leisure for examining all the theories of medicine which had prevailed, in succession, from the earliest time, and of forming from them a theory, if far from perfect, much less exceptionable than any that had preceded it; and which, when matured, superseded them, and became the reigning doctrine over all Europe for more than half a century. Drelincourt, who had long been professor of the theory of medicine. Dying in 1701, the university of Leyden seized the opportunity this event afforded them of attaching him further to that place, by placing him in the vacant chair. This they were prompted to by gratitude as well as by prudence; Boerhaave having refused an advantageous offer of settling at the Hague, and though in no public office or capacity, he had already acquired a considerable reputation, and drawn a great many foreigners to Leyden, to hear his lectures in chemistry. On the occasion of this promotion he read his "Oratio de commendando studio Hippocratico." In Hippocrates, he particularly admired the correctness of his descriptions and histories of diseases, his patience in attending to the indications of nature, or the constitution, to which, with little interference, he frequently committed the cure of the disease, and his honest and sincere account of the termination of the disease, whether in health or death. In this he has not been always followed by writers of cases. In 1703, he was invited to accept a professor's chair at Groningen; but as he had refused, when much less known, an establishment at the Hague, he had no difficulty, now that his fame was more extended, and pupils were flocking to him from all parts, in rejecting this offer. The university at Leyden thought it necessary to reward this fresh proof of his attachment to the country by augmenting his salary. About this time he delivered his "Oratio de usu ratiocinii mechanici in medicina." These compositions were all published; and as they were drawn up and polished with care, they doubtless contributed in extending the fame of our professor over Europe. On the death of Peter Hotton, curator of the university garden, in 1709, he was appointed his successor, and made professor of botany. He now read his "Oratio qua

repurgatæ medicinæ facilis asseritur simplicitas;" shewing that the knowledge of medicine would be easiest obtained by avoiding hypotheses, and attending to facts and observations; and that diseases would be more certainly cured by using only a few choice and simple medicines, than by the heterogeneous compositions then in vogue. He now, in addition to his other studies, employed himself sedulously in acquiring a more extended knowledge of plants; and this continued to be his amusement and delight to the end of his life. "Often have I seen," Haller says, "the good old man, moving slowly along the garden, at a very early hour in the morning, attending to the culture of the numerous exotics he had introduced there, classing and arranging them for his lectures." One year only after being appointed professor in botany, he published "Index plantarum quæ in horto Lugduno Batavo reperiuntur," 8vo. This work was re-published by him in 1720, much enlarged and improved, including a history of the garden, 2 vols. 8vo. In 1709, appeared his "Aphorismi de cognoscendis et curandis morbis," 8vo.; "aureus in summabrevitate libellus," Haller says. A work universally read and admired, on which baron Van Swieten, his illustrious pupil, who had attended his instructions for near twenty years, published his Commentaries, in 1742, extending it to five volumes in 4to. About the same time he published his "Institutiones rei medicæ in usus annuæ exercitationis domesticæ," 8vo. These two works, the one treating of the history and cure of diseases, the other of the physiology of the human body, improved and enlarged at different times by the author, have passed through numerous editions, and have been printed in every country, and translated into every language in Europe. Schulten says, there is a version of them also in the Arabic. Boerhaave was now in the zenith of his reputation, and had such a confluence of students from all parts of the world, as never probably before occurred to any one professor. He gave lectures on the theory of medicine, in botany, and in chemistry, and delivered them with such clearness and precision, as to fill his pupils with equal astonishment and delight. Haller, who was two years under his tuition, speaks of him with enthusiasm. "Vix fui parem habuit." We have hardly since seen, and perhaps may never again see his equal. In 1714, he was made rector of the university. On laying down this office at the end of the year, he read his discourse "De comparando certo in physicis." It is only to be acquired, he says, by experiment, and by a careful and minute examination of natural objects. Bidloo dying at this time, he was advanced to the chair of professor in the practice of medicine; and on the death of Le Mort, in 1718, he was made professor of chemistry. He was now at the head of every branch of medicine; and his pupils were become so numerous, Dr. Maty says, that Leyden was scarcely sufficiently capacious to contain them. In addition to these numerous vocations, he was frequently consulted, in cases of difficulty and danger, by physicians in all parts of the world.

With these advantages, it will not excite surprise, that his wealth should accumulate and become extremely abundant. As his diet was frugal and sparing, and he was plain in his apparel, he has been accused of being too parsimonious; but it should be considered, that attached as he was to science, and immured in business of such variety and magnitude, he had no time for expence or luxury, except in what regarded the improvement of science. In procuring rare and valuable books, and in collecting plants from distant countries for his garden, he spared, we are told, no expence.

In 1718, Boerhaave had published "De Chemia, suos errores expurgante," which was all he proposed giving on that subject; but some of his pupils having at the intigation, he says, of the booksellers, ventured to print, in his

name, transcripts of his lectures, so incorrecly taken as to materially injure his fame, to vindicate himself from the disgrace this might bring upon him, he found himself under the necessity of preparing his lectures for the press; and, in 1732, he published them under the title of, "Elementa Chemiæ, quæ anniversario labore decuit, in publicis privatique scholis, Hermannus Boerhaave," 2 vols. 4to. The work is dedicated by a most affectionate address to his brother James Boerhaave. The first volume contains the history and the theory of the art, and is furnished with numerous engravings and descriptions of furnaces, and other instruments of chemistry. The second contains the processes, or operations of chemistry. In the first volume he gives a catalogue of all the works he had published, preceding it, with much modesty, with this declaration; "Sciaque, me nihil edidisse unquam, præter sequentia, quæ non absque verecundia recitanda sũto." At the back of the title-page he says, "Ut certus sit lector, hunc librum a me editum prodire, propria manu adscribendum putavi; nec pro meo agnosco, ubi hæc adscriptio abest, Boerhaave;" uniting, as his custom was, the H and the B.

The character of Boerhaave, as a chemist, is thus given by Macquer, in his Preliminary Discourse to his Dictionary of Chemistry. "Next to Stahl we place the immortal Boerhaave, though he excelled in a different way. This powerful genius, the honour of his country, of his profession, and of his age, threw light upon every subject which he treated. To the view which he took of chemistry, we owe the finest and most methodical analysis of the vegetable kingdom; his admirable treatises on air, on water, and on earth, and particularly on fire, which is an astonishing masterpiece, is so complete, that the human understanding can scarcely make an addition to it." To his moral character his disciple Haller bears the following honourable testimony: "Some, though few, will rival him in erudition; his divine temper, kind to all, beneficent to foes and adversaries, detracting from no man's merits, and binding by favours his daily opponents, may, perhaps, never be paralleled." In his conversation he was easy and familiar, and in his demeanour grave and sober, but at the same time disposed to pleasantry, and occasionally indulging in good-humoured raillery; so that he was compared to the admirableocrates, whose bust he is also said to have resembled in features. By his pupils, whom he regarded with the kindness of a parent, he was beloved and respected in a very high degree. Piety formed a distinguishing feature of his character; and devotion was his daily exercise.

As Boerhaave was of an athletic make, had accustomed himself to exercise on horseback, to spend much of his time in the open air, and to use a frugal and plain diet, he had been enabled thus far to endure the extreme fatigue of his professional labours, with only some occasional interruptions from illness; but being grown corpulent, and incapable of riding, his constitution began to be on the decline, so that, in 1729, he found it necessary to resign his offices of professor in chemistry and botany. The speech he made on this occasion, was published under the title of "Oratio cum cathedræ chemiæ et botanices valediceret," 4to. In this he recounts some of the most memorable occurrences of his life, and speaks with gratitude of the patronage and favours he had received from individuals, in enabling him to chuse his walk in life, as well as from the members of his own profession, who had admitted his improvements in the theory and practice of the arts he taught, with more kindness and less opposition than is usually given to innovators of any kind. This doubtless arose in part from the great learning and abilities he was known to possess, and from the high reputation he had thence acquired, demanding respect; and

partly from his disposition, averse from contention, and thinking but modestly of his endowments. From whatever cause it might arise, there was never perhaps so great a revolution in any science brought about with so little opposition as was made to that produced by Boerhaave. He had before, viz. in 1728, been admitted foreign associate of the Royal Academy of Sciences in Paris; and in 1730, he was elected a fellow of the Royal Society in London. The same year he was again made rector of the university at Leyden. On quitting that office, he read his "Oratio de honore medici servitute," which was also published in 4to. In this he again insists on the necessity of attending to the method nature takes in curing diseases, or the manner in which they terminate spontaneously, as practised by Hippocrates. Though this secession from public employment procured him some respite from his labours, he still continued revising and correcting his original works. He also spent much of his time in revising the works of other writers, and published more correct editions than were before extant; as the "Opera Anatomica et Chirurgica And. Vesalii," fol.; Albinus contributed to this work; of Bellinus, "De urinis et pullibus," 4to. 1730; of Prosper Alpinus, "De præfagienda vita et morte," 4to. 1733; Aretæus, "De causis, signisque morborum," fol. 1731; Luilius, "De lue venerea," fol. 1728, and some other works. Still, however, he enjoyed ease and relaxation from the more fatiguing part of his business, and he passed the principal part of his time, during the remainder of his life, at his mansion, a small distance from Leyden, in domestic recreations, with his wife and daughter, to whom he was much attached. Here he had a garden well-stocked with every thing that could contribute to his pleasure, and here he amused himself with his violin, in which he was a proficient. Towards the end of the year 1737, he became sensibly affected with difficulty of breathing, and a sense of suffocation, which incommoded him, whether walking or lying down. This went on increasing; and a small time before his death, he perceived a strong pulsation on the right side of his neck, which he attributed to a polypous concretion in the aorta. No remedy being competent to combat this dreadful disease, he expired calmly, in the midst of his family, on the 23d of September 1738. He was buried in the church of St. Peter's at Leyden, where his fellow-citizens erected an elegant monument to his memory. The pedestal is of black marble, supporting an urn, decorated with emblematic figures, representing the four ages of man's life, and the sciences in which he excelled. On one face of the pedestal is a medallion with the head of Boerhaave, surrounded with suitable decorations, his seal hanging under it, on which is engraved his favourite motto, "Simplex sigillum veri," simplicity the seal of truth; and underneath, "Salutifero Boerhavii genio sacrum," sacred to the health-restoring genius of Boerhaave.

In the course of this sketch of the life of Boerhaave, his principal works have been noticed; for a more complete catalogue of them, see Haller's Bib. Med. Pract. Anatom. et Botan. and Eloy's Dict. Hist.

BOERHAAVE. ABRAHAM KAN, professor of medicine in the university of Petersburg, was born at the Hague in 1715. He was the son of James Kan, and of Margaret the daughter of Herman Boerhaave. After receiving a good classical education, he went to Leyden, where applying to the study of medicine, under the celebrated Albinus Gaubius, and other masters, he was admitted to the degree of doctor in 1738. He had before obtained an honorary medal from the university, for his discourse, "De gaudiis schemismarum;" though he was more particularly attached to anatomy, which he cultivated with great success. The year following he took the name of his uncle Boerhaave. In

1740 he went to Petersburg, where his talents soon procured him the situation of professor in medicine in the university there, and of one of the members of the imperial academy. By Portal and Blumenbach, he is called archiater, or aulic counsellor, and first physician to the empress, confounding him with his brother, Herman Kaan B. who about the same time enjoyed that honour. In the course of a severe and tedious illness, from which he with difficulty recovered, he lost his hearing. This happened in 1749. He died in 1753. His works are, "Periphrasis dicta Hippocrati, per universum corpus anatomicè illustrata," Lugd. B. 1738, 12mo; in which he shews there is a constant inhalation or absorption, and an exhalation, or perspiration, carried on, not only on the surface of the body, but in all the principal cavities. "Impetum faciens dictum Hippocrati per corpus consentiens, philologicè et physiologicè illustratum," Lugd. Bat. 1745, 12mo. In this he treats of the action of the mind upon the body, by the means of the nerves; of the fabric and motion of the muscles; on the effects of opium, given to a dog, &c. He also gave the anatomy of an elephant, which he had an opportunity of dissecting, and of two monstrous infants, and a dissertation on what have been called, improperly he says, hermaphrodites; no real hermaphrodite having ever been produced. Haller. Bib. Anat. Portal. Bib. Chir.

BOERHAVIA, in *Botany*, (named by Vaillant in honour of the celebrated Boerhaave.) Lin. gen. 9. Schreb. 13. Reich. v. i. p. 6. Willden. 20. Jussieu 91.; a genus placed by most botanists in the class *Monandria Monogynia*, though in different species, there are from one to four stamens. Nat. Ord. *Aggregate—Nylagenes*. Jussieu.

Gen. Char. *Cal.* oblong, tubular and angular, placed beneath the coroll, with a contracted, entire mouth, permanent. *Coroll.* monopetalous, bell-shaped, upright, obtusely five-cleft, plaited, fixed on the calyx. *Nect.* fleshy, subcylindric, with a mouth slightly toothed, surrounding the base of the germ. *Stam.* filaments one, two, three, or four, inserted on the margin of the nectary, between its teeth; capillary, near the bottom (within the calyx) more slender, upright, about the length of the corolla; anthers twinglobular. *Pist.* germ. roundish, pedicelled, the pedicel surrounded by the nectary; style thread-shaped, twisted, as long as the stamens; stigma capitate. *Pericarp.* none; calyx enlarged, closed, encrusting the seed. *Seed* one, oblong, obtuse, angular. *Observ.* It is nearly allied to *Mirabilis*. The toothlets of the nectary are sometimes triangular, very small, and sometimes obsolete.

Ess. Gen. Cha. *Cal.* small, entire. *Cor.* one-petalled, bell-shaped, plaited. *Seed* one, encrusting with the enlarged calyx.

Dahl has injudiciously abolished this genus, and placed its species with the Valerians. In the opinion of Willdenow, it belongs properly to the class *trianðria*, and may readily be distinguished from valerian by its very entire calyx, so minute, as scarcely to be visible, without the assistance of a lens, on which account it appears to have been overlooked by Linnæus and La Marek. Professor Martyn, in his edition of Miller, has inadvertently given *Calyx* none, as part of its essential general character; though in the natural character translated from Schreber, he had properly assigned it one.

Species, 1. *B. erecta*, upright hogweed. "Stem erect, smooth; *Stamens* two." Jacq. and Miller. "Stem tetragonal, smooth, with viscous joints, and flowers in a corymbose panicle." Willden. Stem two feet high, sprinkled with very minute protuberances as fine as hairs. Leaves waved, ovate, acute, rough at the margin, growing by pairs on long petioles from the joints of the stem, which are placed at a considerable distance from each other. Corolls cylindrical, white, with five reddish shades; segments acute, with small

teeth interposed. Stigma capitate. Discovered by Dr. Houston at La Vera Cruz in 1731, and since found at the Society Isles. 2. *B. adscendens*. "Leaves oblong-ovate, somewhat fleshy; flowers panicled; peduncles two-flowered; stem ascending." Willden. Stem smooth, tetragonal; leaves petiolate, opposite, veined, entire, smooth; the young leaves and the margin and petioles of the older ones hairy; hairs jointed as in veronica aphylla; panicle terminal, spreading, naked; peduncles two-flowered, involved in membranaceous bracts; fruit club-shaped, rough with small tubercles. A native of Guinea. Willden. 3. *B. diffusa*. "Stem smooth and even, spreading; leaves ovate." Linn. "Stem round, pubescent; flowers in corymbose heads." Willden. Leaves white underneath; flowers purple, with one stamen. A native of the East and West Indies. Cultivated in the royal garden at Hampton Court 1690. Mr. Miller received seeds from Jamaica by Dr. Houston. 4. *B. hirsuta*. "Stem spreading, pubescent; leaves ovate, repand, or serpentine." Reich. "Stem roundish, hairy; flowers in heads." Willden. Stems a foot high; peduncles axillary, sustaining small close heads of scarlet diandrous flowers, which generally fall off in about half a day. A native of Jamaica. 5. *B. plumbaginea*. "Leaves subcordate, orbiculate-acute, pubescent beneath; flowers in umbels." Willden. Umbels axillar, on long peduncles; coroll of a pale rose colour; stamens three; fruit turbinate, striated, crowned at the apex with pedicelled tubercles. Willden. A native of Spain. 6. *B. scandens*. La Marc. Tab. 4. "Stem erect; flowers two-stamened; leaves cordate, acute." Linn. "Stem erect, flowers two-stamened, in umbels; leaves cordate." Willden. Stem shrubby, very stiff, smooth, with alternate branches; leaves smooth; umbels of six green flowers; involucre of five leaves. A native of the rocky coasts of Jamaica and other West India islands. Cultivated in 1691, in the royal garden at Hampton court. 7. *B. excelsa*. "Stem erect; lower leaves cordate-ovate, upper ones ovate, flowers with three stamens in umbels." It resembles the scandens, but differs from it in its taller stem, in its upper ovate leaves, in its doubly larger purple flowers, and in the number of its stamens. Native place unknown. Described by Willdenow from a living plant. 8. *B. repnla*. "Stem erect; leaves cordate, repando sinuate; flowers in umbels, with three stamens." Willden. Resembles the scandens, but differs from it in its herbaceous stem and opposite branches and peduncles. A native of India and China. 9. *B. chærophyllodes*. (Valeriana Chærophyllodes. Smith Ic. ined. fusc. 5.) "Leaves bipinnatifid, toothed; flowers with three stamens in umbels." Willden. It has entirely the habit of a Boerhavia, and agrees in all the generic characters excepting only the style which is trifid. 10. *B. repens*. "Stem creeping." Linn. Native of Nubia, between Mocho and Tangos. 11. *B. angustifolia*. "Leaves linear, acute." Linn. Native place unknown. 12. *B. tetrandra*. Stem creeping; flowers with four stamens. Forst. Prod. 2. Native of the Society Isles, found by Forster in the island of Huahine 1774.

These are all the species in Willdenow's edition of the Sp. Pl. La Marek (Illust.) has made the hirsuta and the repens the same as the diffusa, and appears to have been unacquainted with the adscendens, plumbaginea, excelsa, repanda, chærophyllodes, angustifolia, and tetrandra; but has inserted two others, which as far as can be determined from their specific characters, seem to be distinct species. *B. paniculata*. "Stem erect; leaves ovate, acute, panicle naked, filiform, very viscous." A native of South America. *B. tuberosa*. "Stem erect, shrubby; root tuberose, esculent." A native of Peru. The following may possibly be the hirsuta, though he unites that species with the diffusa. *B. obtusifolia*. "Stem procumbent, spreading, viscidly pubescent;

cent; leaves ovate, obtuse; umbels small, somewhat in heads, lateral." A native of South America.

Propagation and Culture. None but the first, third, fourth, and sixth, have been cultivated in England. They will not thrive in the open air, but must be raised from seeds, and treated like other tender exotic plants. The first three are annual, and when they grow too tall to remain under a common frame, may be planted in a warm border, where, if the season prove favourable, they ripen their seeds; but a plant or two should always be placed in the stove, to ensure a succession of seeds. The fourth, which is perennial, may be preserved in a warm stove two or three years. See Martyn's Miller.

BOERNÆR, FREDERIC, in *Biography*, professor in medicine at the university of Wittemberg, in Saxony, and an active member of the Acad. Nat. Curios. received his education at Leipzig, where he was born, June 17, 1723. He published several dissertations on medical subjects, but his principal work is "Noctes guelphicæ, five opuscula medico-literaria," Roslock, 1755, 8vo. He died June 1761. Eloy. Dict. Hist.

BOERNERIANUS Codex, in *Biblical History*, a MS. of part of the N. T. noted G, in the second part of Wetstein's N.T. It belonged to Dr. C. F. Boerner, was collated by Kuster, and described in the preface to his edition of Mill's Greek Testament. It contains the epistles of St. Paul, that to the Hebrews excepted, which was formerly rejected by the church of Rome; it is written in Greek and Latin, according to one of those versions, which were in use before the time of Jerom. The Latin is interlined between the Greek, written over the text, of which it is a translation. Stemmler supposes that the Latin was written since the Greek; but professor Matthiæ, who published this MS. at Meissen in Saxony in 1791, suggests that an uniformity in the hand-writing, and a similarity in the colour of the ink evince, that both the Greek and Latin texts proceeded from the same transcriber. That it is an ancient MS. appears, says Michaelis, from the form of the characters, and the want of accents and marks of aspiration. It seems to have been written in an age when the transition was making from the uncial to the small characters; and from the correspondence of the letters *r*, *s*, and *t*, in the Latin translation, to that form which is found in the Anglo-Saxon alphabet, it is inferred, that this MS. was written in the West of Europe, and probably between the 8th and 12th centuries. This MS. is preserved at present in the electoral library at Dresden: and a copy of it is kept in the library of Trinity College, Cambridge, among the books and MSS. that were left by Dr. Bentley. Michaelis on the N. T. by Marsh, vol. ii. and iii.

BOERO, in *Geography*. See BURRO.

BOESCHOP, a town of Brabant, on the river Nethe; 12 miles N. E. of Malines.

BOESEROENS, or **BUDGEROONS**, three small uninhabited flats of the East Indies, situated in the strait that lies between the island Saleyer and the point of Celebes, called Laffem. These three islands almost block up the passage between the southern part of Celebes and the northern part of Saleyer, the whole space between which is about a league and a half. The strait is parted between the southernmost and middlemost, or between the latter, and the northernmost of the Budgeroons. This one of the most dangerous parts of the navigation for ships sailing to or from the Moluccas, or spice islands; and it cannot be avoided without going round to the south of Saleyer, which is a much more dangerous route, on account of the great number of shoals and sunken rocks, which abound there, and are not accurately laid down in the charts.

BOESIPPO. See BÆSIPPO.

BOETHICUS, in *Entomology*, a species of *HESTERIA*, (Pleb. Rur. Linn.) that inhabits India. The wings are tailed, bluish-brown, pale ash colour beneath, and undulated with whitish; a double ocellar spot in the anal angle.

BOETHIUS, ANICIUS MANLIUS TORQUATUS SEVERINUS, in *Biography*, descended from one of the most illustrious consular families of Rome, lived in the time of the emperor Zeno, near the end of the 5th century. He was born at Rome about 470, the same year with Martianus Capella, another Roman writer on music. He is said to have spent 18 years in the schools of Athens, pursuing the study of philosophy under Proclus; others, however, have questioned this fact, and it has generally been allowed, that the term of 18 years is too long. Nevertheless, his visit to Athens is justified by much internal evidence, adduced by Brucker, (Hist. Crit. Philos. t. iii. p. 524—527.) and by an expression, though vague and ambiguous, of his friend Cassiodorus, (Var. i. 45.) "longè positas Athenas introiit." It is certain, that the erudition of the Latin language was insufficient to satiate his curiosity, and that he devoted much of his time and attention to the study of Grecian science and letters. From a letter of Cassiodorus, written in the name of Theodoric, it appears that he had the honour of introducing to the Romans in their own language, the music of Pythagoras, the astronomy of Ptolemy, the arithmetic of Nicomachus, the geometry of Euclid, the logic of Aristotle, and the mechanics of Archimedes. He alone was esteemed capable of describing the wonders of art, a sun-dial, a water-clock, and a sphere which represented the motions of the planets. He commented upon parts of Aristotle, Cicero, and Porphyry; and from the commendations which he bestows upon the latter, as the best interpreter of the former, he seems to have united the Platonic with the Aristotelian doctrine. Boethius seems to have been the first who applied scholastic philosophy to the service of Christian theology; and he employed himself in defending the orthodox creed against the Eutychian, Arian, and Nestorian heresies, in a treatise "De Unitate et Uno." In civil life he attained to peculiar honours; as he was consul in 487, and also in 510; and he was also created patrician, and advanced to the post of master of the offices. He married the daughter of his friend, the patrician Symmachus, and he enjoyed the peculiar satisfaction of seeing his two sons elevated to the consulate together in 522. Few persons passed through life with a greater share of outward respect and honour; and few could be more distinguished by the testimonies that were given to his benevolence and liberality, his virtue and patriotism, as well as to his singular talents and learning. His own affection claims our assent, that he had reluctantly obeyed the divine Plato, who enjoined every virtuous citizen to rescue the state from the usurpation of ignorance and vice. For the integrity of his public conduct he appeals to the memory of his country. His authority had restrained the pride and oppression of the royal officers; he had always pitied and often relieved, the distress of the provincials, whose fortunes were exhausted by public and private rapine; and he alone had the courage to oppose the tyranny of the Barbarians, elated by conquest, excited by avarice, and as he complains, encouraged by impunity. In these honourable contests, his spirit soared above the consideration of personal danger, and perhaps of prudence. In addition to his other learned labours, he had formed a design of translating all the works of Plato and Aristotle into Latin; but was prevented from executing his purpose by a premature death. Having for some years enjoyed the favour of Theodoric, the Gothic king of Italy, he was at length suspected of being hostile to

his government, and of concurring with others, and particularly with Albinus, who was accused and convicted on the presumption of *hoping*, as it was said, the liberty of Rome. "If Albinus be criminal," exclaimed Boethius in the presence of the king, "the senate and myself are guilty of the same crime. If we are innocent, Albinus is equally entitled to the protection of the laws." The advocate of Albinus was soon involved in the danger and perhaps the guilt of his client; their signature, which they assumed to be a forgery, was affixed to the original address, inviting the emperor Justin to deliver Italy from the Goths; and three witnesses of honourable rank, but probably of infamous character, attested the treasonable designs of the Roman patrician. Upon this kind of evidence, Boethius was committed to custody, and rigorously confined in the tower of Pavia; and a servile senate, at the distance of 500 miles, pronounced a sentence of confiscation and death against the most illustrious of its members. During his confinement, he composed his treatise "De consolatione philosophiæ," mentioned in the sequel of this article; and at length the executioners of Theodoric's mandate fulfilled the savage commission with which they had been entrusted, or, perhaps, even exceeded it, by the mode of putting him to death. Some say that he was beheaded; but others relate, that a strong cord was fastened round his head, and forcibly tightened, till his eyes almost started from their socket; and he was then beaten with clubs till he expired. This event happened, according to some, in the year 526, but according to others in 524. Boethius, in his last hours, derived some comfort from the safety of his wife, of his two sons, and of his father-in-law, the venerable Symmachus. But Symmachus, perhaps indiscreet in the mode of testifying his grief, was sometime after dragged in chains from Rome to the palace of Ravenna, and there put to death, A. D. 525. Theodoric, it is said, experienced the bitterness of self-reproach, and the anguish of an unavailing repentance for the murder of these two illustrious senators, Boethius and Symmachus. His daughter Amalautha is said to have restored to the sons of Boethius the confiscated estates of their father.

His celebrated tract on music, divided into five books, was first printed in black letter, with his treatises on arithmetic and geometry, at Venice, 1499. It is remarkable, that in this copy the Greek of the famous *senatus consultum*, against Timotheus at Lacedæmon, is omitted; though it was afterwards found in a beautiful MS. of Boethius, *De musica*, 15 B. IX. of the 11th century, in the British Museum, where the infamous chromatic ($\alpha\beta\gamma\delta\epsilon\zeta\eta\theta$) is said to have been substituted by that musician to their grave and simple enharmonic ($\epsilon\upsilon\alpha\beta\gamma\delta\epsilon\zeta\eta\theta$), in the same manner as it is printed in the Oxford edit. of Aratus. (See Dissert. on the Mus. of the Ancients, p. 27.)

It seems necessary here to give some account of this famous treatise on music by Boethius, which, to read, was long thought necessary to the obtaining of a musical degree in our universities; and which, with great parade, has been so frequently praised, quoted, and pronounced, by writers on that art, to be of the greatest importance to every musician, yet contains nothing but matters of mere speculation and theory, translated from Greek writers of higher antiquity; which if necessary to be known at this time, would be more profitably studied in the original; but the theory of every art being vain and useless, unless it guide and facilitate practice, the definitions, calculations, and reveries of Boethius, are no more useful or essential to a modern musician than Newton's *Principia* to a dancer.

In the proemium, or introduction to his first book, "De Musica," he treats of the *morality* of music, and gives us all the old stories concerning its miraculous powers of exciting

virtue, repressing vice, curing diseases, &c. And in this book we find whence Zarlino, and all the Italian writers on music, down to Padre Martini, drew their extensive divisions of music into *mundane*, *human*, and *instrumental*. For Boethius says, "Tres esse Musicas," lib. i. cap. 2. So had Arist. Quintilianus informed us, long before the birth of Boethius. And as far as we are able to divine at present concerning these distinctions, the ancients meant by *mundane* music, the music of the spheres. By *human*, or *humane* music, the perfect organization of our frame, and the union of soul and body. By the last only, the instrumental, we are brought to real music, by the grateful production and union of tuneful sounds.

Then we have definitions, such as are given in Euclid, and all the Greek writers, on harmonics and speculative music in Meibomius. After which, we have the doctrines of proportion and ratios, instituted by Pythagoras, who would not trust to the various and fallacious judgment of the senses, but had recourse to reason and calculation to settle his doubts. The account of the discoveries and harmonical laws established by Pythagoras, not only inserted in Boethius, but all subsequent writers, is taken from Nicomachus, one of the seven Greek writers on music in Meibomius. In the same book, we have a very superficial and unsatisfactory account of the genera. But we are indulged with several chapters on the music of the spheres from "Cicero de Repub." lib. vi. where the supposed analogy between the planets and the septenary, or seven sounds in music, is asserted.

At the close of this book, chap. xxxiv. Boethius estimates theory and speculation far above practice in music. But what, we may ask, is the use to the world of such a theory as he describes, without practice? Or, indeed, practice, without the support of what is now understood by theory? The speculative theorists, confined to meditation and experiments in harmonics, talk of music without hearing it; and the mere practitioner hears it without understanding it. Boethius allows him only to be a musician who can examine, judge, and give reasons for what is done. Here we have the origin of the verses ascribed to Guido:

Muscorum et cantorum,
Magna est distantia, &c.

The whole second book is relative to the dispute between the Pythagoreans and Aristoxenians, which is not yet settled, about dividing the scale, whether by the ear, or by numbers. All the musicians in Europe are now disputing whether we should temper our scales on fixed instruments, or adopt the triple progression of Pythagoras, and tune by perfect 5ths. See TRIPLE PROGRESSION, and TEMPERAMENT. We have here the tone-major and tone-minor to discuss; which we talk about, but never feel or think of the distinction in our modulation or performance. The *apotome*, *comma*, and *limma*, are left for the amusement of speculative harmonists to talk about, and for musicians to practise with their ears and fingers, *sans y penser*.

In the third book, Boethius continues his controversy with the Aristoxenians, and proves what has been long settled, that there is no such thing in music as a literal *half-note*. The octave is said to contain five tones and two semitones; and in the temperament of equal participation, the twelve semitones of the octave must be nearly equal.

In book iv. the subject is pursued of splitting of tones; for the ancients could "divide and subdivide a tone from south to south-west side."

We were very much disappointed formerly at the non-performance of a promise made, book v. at chap. 3. the title of which is "Musicarum per Græcas ac Latinas literas notarum nuncupatio." But Meibomius says the promise does not extend to the Roman notation in the Selden MS. at Oxford; nor had the Romans any notation of their own

in the time of Boethius; and all the musical terms he uses are Greek, as were those of Vitruvius.

Even the eulogists of Boethius confess, that his work is so purely theoretic, that in reading it we never think of practice. Let us leave it then to philosophers who are content with imaginary sounds. The mention of instruments, or of the voice as employed in singing, never occurs. No allusions to the music of his time, but all is abstract speculation, tending doubtless to the perfection of the art, but seeming little connected with it. The harmony he talks of is more the *harmonia mundi* of Kepler, than that of Handel and Haydn. Guido said, that Boethius's work was only fit for philosophers. In the middle ages, so few understood Greek, that those who were curious to know something about the miraculous powers of that music, imagined that they should find it in Boethius's translation, who had been educated at Athens. Such speculations are curious and amusing, in moments of meditation, to scientific and inquiring minds; but practical musicians, whether composers or performers, can afford little time for such sublime and spiritual amusements. Nevertheless, he must be a dull and incurious professor, who seeks not the reason of things, the principles of his art, and origin of sounds. If he have a mathematical turn, let him read Galileo. Daniel Bartoli, D'Alembert, Holder, Rameau, Tartini, and Smith's harmonics. They are all intelligible, and lead to knowledge which he will be expected to possess; but for any thing useful that he can acquire from Boethius's speculations, or from the Greek theorists, his prototypes, that will make him a better composer or performer, the case is hopeless. Yet there are, who, after allowing that "it was of so little use in practical music, that they never thought of it in reading Boethius;" yet returning afterwards to former prejudices, it is insisted on, that "he has communicated to the world such a knowledge of the fundamental principles of the music of the ancients, as is absolutely necessary to the right understanding of our own system."

When we speak of the inutility of Boethius's work on music to the musical students of modern times, we presume not to extend our censures further. The writings of this great and good man on other subjects have been too long held in reverence to be depreciated slightly. His most celebrated production was his ethic composition "De consolatione philosophiæ," and has always been admired both for the style and sentiments. It is an imaginary conference between the author and philosophy personified, who endeavours to console and soothe him in his afflictions. The topics of consolation contained in this work, are deduced from the tenets of Plato, Zeno, and Aristotle but without any notice of the sources of consolation which are peculiar to the Christian system. It is partly in prose, and partly in verse; and was translated into Saxon by king Alfred, and illustrated with a commentary by Asser, bishop of St. David's; and into English, by Chaucer and queen Elizabeth. It was also translated into English verse by John Walton, in 1410, of which translation there is a correct manuscript on parchment in the British Museum. Few books have been more popular, especially in the middle ages, or have passed through a greater number of editions in almost all languages. It has been observed by Mr. Harris, in his "Hermes" that "with Boethius the Latin tongue, and the last remains of Roman dignity, may be said to have sunk in the western world." To the same purpose, Gibbon says, "that the senator Boethius is the last of the Romans, whom Cæsar or Tully would have acknowledged for their countryman." Fabr. Bib. Lat. tom. ii. p. 146, &c. Le Clerc, Bib. Chois. t. xvi. p. 163—275. Burney's Hist. Mus. vol. ii. p. 31, &c. Gibbon's

Hist. Rom. Emp. vol. vii. p. 43, &c. Brucker's Hist. Phil. by Enfield, vol. ii. p. 313.

BOETTICHER, GOTTLIEB, a physician of eminence, and in considerable practice at Berlin during the early part of the last century, published various works on the theory and practice of medicine. The principal are, on the existence of a nervous fluid, "De vera fluidi nervorum existentia," Berlin, 1721, 4to.; "De morborum malignorum, imprimis pestis et pestilentie explicatio," 4to. 1713; this has been several times reprinted. He contends that the plague is contagious; and that the infecting effluvia may be retained, and conveyed in full vigour, in the clothes or bedding of the sick, to distant countries; a doctrine that has been lately strongly opposed. Pregnant women, affected with the plague, constantly part with the fruit of the womb before they die. Hypochondriac persons, he thinks, are not susceptible of the contagion. But in this he is probably mistaken; as we know lunatics do not enjoy such an exemption from contagious diseases in this country. He recommends bleeding on the first attack of the fever, and then to have recourse to sudorifics. "De respiratione factus in utero," 4to, 1702. Haller Bib. Med. et Anat.

BŒUF, LE, in *Geography*, a place in the north western corner of Pennsylvania, at the head of the north branch of French creek, and 50 miles distant by water from fort Franklin, where this creek joins the Alleghany. The French fort of Le Bœuf, from whence the place has its name, lies about two miles east from Small lake, which is on the north branch of French creek; and from Le Bœuf, is a portage of 14 miles northerly to Presque isle in lake Erie, where the French had another fort. N. lat. 42° 1'. W. long. 79° 53' 20".

BŒUF, in *Ornithology*, according to Salerne, the common name of the bulfinch (*loxia pyrrhula*) in the canton of Solagne. The troglodyte, *sylvia troglodytes* of Latham, is likewise called by the same name (*bœuf*) in Switzerland.

BŒUF de Marais. The French call the common bittern (*ardea stellaris*), because it frequents marshes, and has a loud cry, and emits a sort of roaring noise that has been compared to that of an ox or bull, by this name. "Il u'y a," says Belon, "bœuf qui pût crier si haut."

BŒUF d'Afrique, in *Zoology*. By this name some French writers distinguish the buffalo; the epithet is misapplied, because that animal is equally common in India, whence indeed, it is supposed, the African buffalo first originated.

BŒUF a Besse, synonymous with *bison*. By some it is likewise called *bœuf des Illinois*.

BŒUF Guerrir. Under this denomination the French describe a race of African oxen, which the Hottentots call *backleys*; the word *backley* in their language signifying war, to the purposes of which they are trained up, in the same manner as elephants are by the Indians. War oxen of this description are instructed also to guard the herds of the common oxen.

BŒUF de Mer, in *Ichthyology*, is the name of the long-beaked ray, *raja oxyrinchus* of Linnæus.

BŒUF de Mer, in *Zoology*, the common French name for any of the *PHOCÆ* tribe of animals, corresponding with the general English name of *sea-coot*.

BOFFRAND, GERMAIN, in *Biography*, a celebrated French architect and engineer, was born at Nantes in 1667, and having been educated at Paris, he employed himself for some time in sculpture during the winter, and studied architecture in the summer. His talents at length engaged the attention and patronage of Hardouin-Mansart, an eminent architect, who obtained for him a place in the commission for the royal buildings. In 1709, he became a member of the

Royal Academy of Architecture, and was much employed at Paris, and by several German princes, in furnishing designs for various edifices. His style of building was grand and noble, and formed after the model of Palladio. He was likewise a skilful engineer, and constructed a great number of canals, sluices, bridges, and similar works. As architect to the general hospital of Paris, he gratuitously served the institution; and, as he was disinterested in his temper, he was lively and amusing in conversation; and he indulged his taste for literature by the composition of several pieces, adapted to the purpose of producing temporary gaiety and mirth, for the Italian comedy. His "Book of Architecture," with plates, was printed at Paris in 1745, folio; and contains an account of the general principles of the art, exemplified in his own works. In this work he has also introduced a curious memoir, describing the method of casting the bronze equestrian statue of Lewis XIV. He retained his gaiety of disposition to the age of 87 years, and died at Paris in 1755. *Encycl. Hist. Gen. Biog.*

BOFIN, BOFFIN, or BAFFIN *Lough*, in *Geography*, one of those large lakes in Ireland into which the river Shannon expands, situated between the counties of Roscommon and Leitrim.

BOG, derived from the Italian *bucca*, a *hole*, or rather from the Belgic *boogen*, to *bend*, on account of its giving way when trod upon, in *Agriculture*, a quaggy sort of earth, generally met with in low situations, covered with coarse grasses, but of so little solidity as to be incapable of supporting the tread of heavy animals; caused by the dissolution, decay, and deposition of different vegetable and other substances, from the stagnation and detention of the water that oozes along on the clayey or other thin tenacious strata below, or which springs up through the fissures, or other openings of them. They are of different kinds, depths, and consistencies, according to the different circumstances of the case, and the nature of the situation of the ground on which they are formed, as well as that of the earthy material that enters into their composition. Dr. James Anderson, in his treatise on draining bogs and swampy grounds, remarks, that clay is a substance that strongly resists the entrance of water into it; but, when it is long drenched with water, it is in process of time, in some measure dissolved thereby, losing its original firmness of texture and consistence, and becoming a sort of semi-fluid mass, which is called bog. And as these bogs are sometimes covered with a surface of a particular kind of grass, with very matted roots, which is strong enough to bear a small weight without breaking, although it yields very much; it is in these circumstances denominated a *swaggle*.

But whatever be the nature of the bog, it is invariably occasioned by water being forced up through a bed of clay, as just described, and dissolving or softening a part thereof. A part is only mentioned, because, whatever may be the depth of the bog or swaggle, it generally has a partition of solid clay between it and the reservoir of water under it, whence it originally proceeds. For if this were not the case, and the quantity of water were considerable, it would meet with no sufficient resistance from the bog, and would of course, issue through it with violence, and carry the whole semi-fluid mass along with it. This would more inevitably be the case, if there was at first a crust at the bottom of the bog, and if that crust should ever be broken, especially if the quantity of water under it was very considerable. And as it is probable that, in many cases of this sort, the water slowly dilutes more and more of this under-crust, no doubt is entertained but that in the revolution of many ages, a great many irruptions of this kind may have happened; although they may not have

been deemed of importance enough to have the history of them transmitted to posterity.

It has been remarked by Mr. King, in the *Philosophical Transactions*, No. 170, that the springs, with which Ireland abounds, are generally dry, or nearly dry in the summer time, and that grass and weeds grow thick about the places where they burst out. In the winter, he observes, they swell, run, soften, and loosen all the earth about them. The sward or scurf of the earth, which consists of the roots of grass, being lifted up and made fuzzy by the water, at that season (he has seen it lifted up a foot or two at the head of some springs), is dried in the spring, and does not fall together, but withers in a tuft, through which arises new grass, which is also lifted up the next winter. By this means the spring is more and more stopped, and the scurf grows thicker and thicker, till at first it makes the appearance which we call a quaking bog; and as it grows higher and drier, and the roots of the grass and other vegetables become more putrid, together with the mud and slime of the water, it acquires a blackness, and grows into that which we call a turf-bog.

It is, however, confessed, that there are quaking-bogs caused otherwise. When, it is observed, a stream or spring runs through a flat, the passage, if not kept open, fills with weeds in summer, trees fall across it and dam it up; then in winter the water stagnates further every year, till the whole flat is covered. Afterwards a coarser kind of grass shoots up, peculiar to these bogs; this grass grows in tufts, its roots consolidate together, and its height increases every year, in-somuch that he has seen it as tall as a man. This grass rots in winter, and falls on the tufts, and with it the seed, which springs up the next year; and so continues making an annual addition. Sometimes the tops of the flags and grass are interwoven on the surface of the water, and this becomes by degrees thicker till it lies like a cover on it; then herbs take root in it, and by the matting of their roots, it becomes very strong, so as to bear a man. He has gone on bogs which would rise before and behind, and sink where he stood to a considerable depth, under which was clear water.

It is further observed, that Ireland abounds in moss more than any other country; this moss is of divers kinds, and that which grows in bogs is very remarkable. The light spongy turf is nothing but a congeries of the threads of this moss, before it be sufficiently rotten; the turf then looks white, and is light. It has been seen in such quantities, and so tough, that the turf-spades could not cut it. In the north of Ireland, they denominate it old-wives tow, being not much unlike flax. The turf-holes in time grow up with it again; and all the little gutters in bogs are generally filled with it. To this he chiefly imputes the red or turf bog; and from the same cause even the hardened turf, when broken, is stringy, though there plainly appear in it parts of other vegetables; and he is almost, from some observations, tempted to believe, that the seed of this bog-moss begets heath, when it falls on dry and parched ground. However, the moss is so fuzzy and quick-growing a vegetable, that it greatly stops the spring, and contributes to thicken the scurf, especially in red bogs, where he remembers to have observed this most particularly. The situations of land may sometimes contribute to the formation of bogs in it, as flat spots of ground lower than the level of an adjoining river or lake; for when that part is filled up by the slime and earth brought from the surrounding grounds, and the rotten plants and animals, which are buried in it, have choked it up, it will become a bog; and then the water will continue to flow into it from the river or lake, especially when either of these is swelled by a fall of rain or melting of snow. These waters may also sometimes have

this effect, without a communication above ground, by soaking through a sandy or gravelly soil. And another cause that may contribute to the production of bogs, may be the fall of a number of trees, which, by occasioning a stagnation in the water brought down from higher grounds, may cause the depolition of much earthy vegetable, and other materials, and consequently the production of boggy appearances in the places where such obstructions are met with.

Bogs are discriminated by different titles, according to the nature of the circumstances under which they occur; as *peat-bogs*, *quaking-bogs*, *spring-bogs*, and *turf-bogs*. The first being that sort of bog which is principally composed of peat-earth. The second such a kind of bog as, when trodden upon, affords an elastic kind of motion, or shaking under the foot. The third is such a bog as arises from the oozing or springing up of water through the stiff strata of materials on which it is formed. Mr. Elkington, the celebrated drainer, makes two classes of this sort of bog; the first of which is distinguished by the springs rising out of the adjoining higher grounds, in a regular line, along the upper side of the wet surface; while, in the latter, the number of springs that appear are not confined to one regular direction along the upper side, but burst out promiscuously over the whole surface, especially towards the lower side, forming quagmires all round, that shake and bend under the feet like a suspended cloth, over which it is dangerous for the lightest cattle to pass, and which shew themselves at a distance by the verdure of the grass, which the quags or spots immediately round the springs produce. The last is a sort of bog constituted of materials which partake of the nature of turf.

Whenever bogs are met with, draining is unquestionably the first step to be taken towards their improvement. For the full accomplishment of this purpose, Mr. Elkington's mode may in many cases be successfully resorted to, and with great and sudden effect; though the improver should not be too sanguine in his expectations, or imagine that it is in every case an easy operation to free this sort of land from an excess of moisture. There are probably some bogs which cannot, without great difficulty, be drained at all; and others that would cost the value of the land, in drains and machinery, to effect such improvements in them. But notwithstanding unsuccessful trials may sometimes be made, the drainer ought not to be totally discouraged from further attempts, where there is a tolerable prospect of succeeding in the business at last; as the cases are no doubt very numerous, in which this sort of land may be effectually drained at an easy expence, and thereby brought from a state of inutilty to yield considerable profit to the owners and the public. See *DRAINING of Boggy Lands*.

It is observed in the appendix to Mr. Johnston's account of Mr. Elkington's mode of draining, that in the improving of bogs, after their being drained, as the great object is to get the ground brought to such a state, as to be fit for being laid down with grass seeds, when it may be considered in such a state of improvement, that any subsequent crops will require no more than ordinary management to cultivate them; the first thing to be done, where they are extensive, is to have them divided into proper inclosures by open ditches, by which means much surface water may be carried off, as well as by properly attending to the formation of the ridges and furrows in ploughing, and giving them a direction towards the open ditches, by which the rain or surface water may be discharged as it falls; and after this has been effected, to have the surface well levelled by means of the spade, as being in most cases more effectual than by the plough. The better sorts of the materials thus removed may be mixed up with lime or other substances, and set upon the land; while

those of the coarser kinds are made use of to fill up the inequalities on the surface. Paring and burning, where there is much coarse vegetable matter, may be practised with advantage. In order to this, whatever earth remains unemployed, in filling up hollows, should be burnt, together with that taken out of the ditches, unless the latter has been already carried off for fuel. The greater quantity of ashes there is, the greater will be the improvement of the soil itself, and the more will the earth be benefited. The ashes, after being well incorporated with the soil by means of light or superficial ploughing, frequently so enrich it, as to produce excellent crops for two years or more. The effects of the ashes and burnt materials have been said, in some cases, to be increased by the addition of a little lime. When the turfs have been reduced to ashes, spread over the surface of the ground, and turned in with a little furrow, turnips or potatoes ought to be the first crop. If the former, they may be sown broad-cast, and fed off by sheep, by the dung and urine of which the soil will be greatly benefited, as well as by the refuse of the plants, and the consolidation produced by their treading upon it. It will then be in a state for a crop of oats or barley, which should be sown with grass-seeds, and well rolled down. The ploughing after the turnip crop, thus eaten off, should be very slight, in order not to bury the enriching materials too deep; in which view oats ought to be preferred to barley. If the soil be full of the roots of rushes, weeds, and coarse plants, a summer fallow may be necessary before any crop be taken: and when the ashes have been made in a particular part of the field, they may be spread over the surface before the seed furrow is given, and the roots and tough clods, after being collected and burnt, may be spread along with them.

If the bog be very soft and deep of peat, so as not to admit horses for ploughing the first year, a crop of turnips broad-cast may be got by sowing the seed among the spread ashes, harrowing it in with a light harrow and roller drawn by men. This crop, being cut off as above, will leave the land the ensuing year so much consolidated as to admit the plough.

When the surface has not been pared and burnt, fallowing for two years may be necessary to reduce the soil to a proper mould, in the last stage of which the lime or other manure must be applied. In this case two white crops, with an intervening one of turnips, potatoes, &c. may be taken before the grass-seeds are sown.

Boggy soil, of whatever kind, after being once broken up and pulverised by tillage and a course of fallow, should not be over-cropped before being laid down in grass; and, when brought into a good sward of grass, should not be too soon broken up again, but continue so, bush-harrowing and top-dressing it when the herbage begins to mofs. Repeated rolling is also necessary in such soils.

It is probably a better practice to feed sheep the first and second years of the grass than to cut it for hay, as it causes the roots of the grass to strike more horizontally through the soil, and more closely to cover the surface. With this view a greater proportion of white and yellow clover, and other short grass seeds, should be sown.

In the manuring of soft boggy lands some caution is necessary; for, though the ploughings, previously to the application of the dung, may be made deep with advantage, the subsequent furrows should be very superficial, and the dung regularly and uniformly blended with the soil; for, when this is not the case, it is apt to sink down too much, and be of little utility. The same thing takes place with respect to lime; and even when marle is buried too deep it is said to lose its power as a manure.

On soft boggy ground, merely intended for pasture, nothing will produce a more rapid improvement than the application of a thin covering of marle. In order to this, the directions already given, with respect to paring and burning, should be observed.

Marle, which is often found under a gravel or clay, may also be of great service: but if a loamy earth be near at hand, it will, perhaps, be less expensive to the farmer to bring such earth to cover the bog, than it will be to dig up the clay. But of whatever kind the earth be which is laid upon the bog, the quantity should always be sufficient to cover its whole surface four, five, or six inches deep, according to the stiffness of the soil so brought.

Sea-sand, as being frequently mixed with shells, is well suited to this purpose, if the boggy ground be situated near the sea, so that it can be easily procured. The great weight of these materials tends equally to consolidate the bog, and press out the moisture from the spongy peaty earth; therefore the thicker they are applied the better. A slight sprinkling of lime over it will add to the effect, and bring up much white clover and other sweet grasses.

The most barren earths or soils, when used in this way, may have good effects; but lime-stone gravel, where it can be procured, is to be preferred to all others. After the land has been treated in this manner, and lain some years in pasture, it may be broken up for tillage, and crops of grain taken before being laid down with grass-seeds. By ploughing, part of the natural soil will be turned up, and intimately mixed with the earth, &c. that has been laid upon it, and, if lime or dung be added, will together form a very fertile mould. When boggy grounds are much over-run with rushes, and other coarse, sour, aquatic plants, scarcely any thing tends more to the first part of its improvement than that of over-stocking it with different sorts of cattle, as soon as ever it is sufficiently solid to bear them with safety; care must, however, be taken not to put them on till it is quite firm, as if that be done they will not only poach the surface, but the coarse herbage will remain without being eaten closely down. The practice of cutting the rushes frequently in their young and tender state, is also of considerable utility. By these means alone a better kind of herbage is speedily brought up, and much improvement produced.

Another considerable means of improving this sort of land, where the situation is such as to admit of it, or when it lies near the side of a large river or stream, of which, by means of proper dams and cuts, a command can be obtained, is that of floating it with water, a process that, when judiciously managed, never fails to produce abundant crops of grass. And that it is a mode of improvement well suited to this sort of land, is evident from the effects that have been produced in different instances; and from the observations of Mr. Boswell, that it requires more and longer watering than any sandy or gravelly soil: the larger the body of water that can be brought upon it the better, its weight and strength will greatly assist in compressing the soil, and destroying the roots of the weeds that grow upon it; neither can the water be kept too long upon it, especially in the winter season, immediately after the after-math is eaten; and the closer it is eaten the better. The manner of conducting the business of watering must be suited to the circumstances of the particular cases.

After being thus improved, it must next be determined to what lasting purpose it may be best applied. The too great moisture of these soils, which always lie flat, renders them unfit for continued tillage, and their mould becomes so loose by frequent ploughing, that it frequently does not afford

sufficient stability to the roots of corn. For this reason barley, oats, and rye do better here than wheat, which requires a firmer footing; but neither of them should be sowed thick, because the fruitfulness of the soil will always make up in the size of the plants, what some might think wanting in their number. The most beneficial method of employing this sort of land is, undoubtedly, that of converting it into meadow, because, when thus prepared, and not injudiciously exhausted by crops of corn, it will yield great quantities of excellent grass. It is, however, usual to begin with sowing some kind of grain on this prepared surface, to indemnify the farmer by the plentiful crop which it generally yields; such, indeed, as sometimes defrays at once the whole expence of the improvement. In some cases the most profitable method may be to sow it in the autumn with rape, the leaves of which shading the surface in hot weather, and rotting in the winter, contribute greatly to mellow the earth; the strong roots of this plant open the soil too, and its seed brings a great return when sold for making oil. One or two ploughings after this will prepare it for a crop of wheat. After this is taken off, and the stubble turned down, white clover and grass-seed should be sown, and the ground laid down for a lasting meadow; or if turnips be sown, or cabbages planted in the autumn, these in the spring may be succeeded by barley, with which the grass-seeds may be sown.

In crude moory or black peat boggy improved lands, Mr. Marshall remarks, that what is most desirable is a crop that is sown and reaped during the summer months, and which demands neither labour nor attendance in the humid seasons of autumn, winter, or spring; and such a crop is found in rape, which is luckily natural to the climate, and at the same time highly profitable. Trials with this may be made at but a trifling expence on a small portion of the ground, the proof of which answering, it is observed, "is not whether the plant will thrive as herbage, but whether it will mature its seed on the given soil in the given situation."

After a recompence has been obtained by crops of this sort, which may be repeated, as there is no danger of exhausting such deep soils, the foundation of more lasting profits is to be laid; which may be effected by sowing grass-seeds, with or over the rape crops, or after the stems have been drawn, according to seasons and the circumstances of the land, stocking, as directed above, till such time as the surface becomes sufficiently firm, and the soil has attained a suitable texture for mixed cultivation, which time may be much shortened by the application of fossil substances of the calcareous kind in any period of the improvement.

When either through necessity, or want of other arable land, or out of choice, the farmer intends to continue ploughing his improved bogs, the surface must be raised in ridges, and the further management of it may be like that of most other ploughed grounds.

If a soil of this kind happens to be situated near a town, a greater profit may accrue from planting it with garden stuffs than from any sort of grain, as beans, peas, cabbages, potatoes, turnips, carrots, &c. are found to thrive exceedingly well in earth of this kind.

Bog, moving or migrating. These soft masses of earth have been sometimes known to move out of their place. An instance of this there was in Ireland, in the year 1697, about Charleville in the county of Limerick. There was heard for some time a noise under ground like that of thunder at a great distance, or almost spent; and soon after this the earth of a large bog in the neighbourhood began to move, and a hill or rising situated in the middle of it stood no longer above the level of the rest, but sunk flat. The bog not only moved itself, but carried with it the neighbouring pasture-lands,

lands, though separated by a large and deep ditch; the motion continued a considerable time, and the surface of the moving earth rose into a sort of waves, but without breaking up or burbling any where. The pasture land rose very high, and was carried on with the same motion till it rested upon a neighbouring meadow, the whole surface of which it covered, remaining sixteen feet deep upon its surface. The whole quantity of the bog was torn from its former seat, and left great gaps in the earth where it had joined, which threw up foul water, and very stinking vapours. Phil. Trans. N^o 233. The whole country came in to see so strange a sight as this, for it continued moving a long time; but few guessed the true cause of it, which was this: a more than ordinary wet spring occasioned the rising of the bog to a great height in one part, and thence propagated itself through the whole bog; so that the hill in the midst was undermined, and naturally sunk flat; this and the more than ordinary weight of this large bog pressing upon the adjoining pasture-land, forced up its foundations, which were only a loose sand. This was pushed on sideways, where there was a descent from the bog, and at length having given the bog more room, all was quiet and remained in that state. The bog was more than forty acres of ground.

Another instance of this kind occurred, in March 1745, at the bog of Addergoole, about a mile and a half from the town of Dunmore, in the county of Galway. In consequence of a violent storm, attended with a fall of rain, resembling a water-spout, the turbary, which the turf-cutters had just left, containing about twelve acres, was put into motion, and floated till at last it subsided upon a piece of low pasture of near thirty acres, by the side of the river, where it spread and settled. The moving-bog choked up the river, which consequently overflowed the back grounds, and in a little time a lough or lake of near 55 acres covered the adjacent fields. A passage for the river was formed as speedily as possible; but before it could be finished, and the lake discharged, it was supposed to have covered 300 acres; however, in seven or eight days it gradually decreased to 50 or 60 acres, of which extent it continued. Irish Transactions, vol. ii. p. 4.

Bog, ancient *Hypanis*, in *Geography*, a river of Poland, which rises in Podolia and joins the estuary of the Dnieper or Nieper, a little above Oczakow, about N. lat. 46° 32'. E. long. 32° 32'. This river separates Poland and a portion of European Turkey from Russia. By taking up the Ingul, the Sinucha, and the Guilon, besides other streams in its course, it becomes a very considerable river.

Bog-bean, in *Botany*. See *MENYANTHES*.

Bog-berry. See *VACCINIUM*.

Bog-moss. See *SPLACHNUM*.

Bog-bush. See *SCHOENUS*.

Bog-wood. See *WOOD subterraneous*.

Bog-ore. See *IRON*.

BOGA, in *Ichthyology*, synonymous with *Bogue*, and *Sparus loops*.

BOGAERT, MARTIN VANDEN, surnamed *Desjardins*, in *Biography*, an eminent sculptor, was born at Breda, in Holland, in 1640, and settling in early life at Paris, he became a member of the Royal Academy, at the age of 31 years. The first of his most considerable works was an equestrian statue of Louis XIV. erected at Lyons in the place Bellecour. He also adorned the gate of the church of the Mazarin college with six groups of stone, representing the evangelists and the Greek and Latin fathers of the church; and besides many other works, the most distinguished was the monument erected in the place of Victory, at the expence of

marechal du Feuillade, on which the king, crowned by victory, is exhibited in a standing posture, invested with the regal ornaments, and having under his feet a cerberus, to denote his triumph on occasion of the triple alliance. This group is 30 feet high, and was formed by a single cast, under the particular direction of Desjardins. This artist died rich in 1694. *Encycl.*

BOGAHA, in *Botany* and *Mythology*, a tree held sacred in Ceylon, on account of the imagined preference given by the deity Buddou to the shade of this tree, above all others. Wherever it is found throughout the island, persons are appointed to watch over it, and preserve it from dirt or injury. It is held in the same estimation among the followers of Buddou, as the baayan tree is among the Brahmins. The Candians hold their great festival under the shade of a tree of this kind, which stands at Annarodgburro, an ancient city in the northern part of the king of Candy's dominions; and none but his own subjects are permitted to approach this sanctuary. Tradition says, that the bogaha tree suddenly flew over from some distant country and planted itself in the spot where it now stands. It was intended as a shelter for the god Buddou, and under its branches he was wont to repose, while he sojourned on earth. Near this hallowed spot 90 kings are interred, who all merited admission into the regions of bliss by the temples and images they constructed for Buddou. They are now sent as good spirits to preside over the safety of his followers, and protect them from being brought into subjection to Europeans; a calamity against which they continually pray. Around the tree are a number of huts, erected for the use of the devotees, who repair hither: and as every sort of filth and dirt must be removed from the sacred spot, people are retained for the purpose of continually sweeping the approaches before the worshippers, and to attend the priests during the performance of the ceremonies. Percival's Ceylon.

BOGANEU, in *Geography*, a town of Bohemia, in the circle of Chrudim; 6 miles S. of Chrudim.

BOGAR. See *BOKHARA*.

BOGAROVSKOI, a town of Siberia, 130 miles N. of Tobolsk.

BOGAS, or **BOGHAS**, a small town of Egypt, at the mouth of the Nile; 3 miles N. of Damietta. See *BOGHASS*.

BOGATOI, a town and district of Russia, in the government of Kursk, seated on the rivulet Penna, falling into the Psoi; 48 miles S.S.W. of Kursk.

BOGAZI, a town of Asiatic Turkey, in the country of Diarbekir, 50 miles W. of Diarbek.

BOGAZI, signifying in the Turkish language a "canal," or "strait," a name given by the Turks to two straits, adjoining to the island of Samos; one, called Little Bogazi, and scarcely half a league broad, separates Samos from the continent of Asia; the other, called the Great Bogazi, and nearly two leagues broad, lies to the west, and separates this island from the small Fournis islands, so denominated, because, at a distance, they appear like the roofs of ovens; they were anciently called "Corceæ insule." This is a passage much frequented by ships sailing from Constantinople to Syria and Egypt, and they find here good anchorages.

BOGDANA, a town of European Turkey, in Moldavia, on the borders of Transylvania; 60 miles S. of Niemez.

BOGDEN, MARTIN, in *Biography*, a favoured pupil of T. Bartholine, and strenuous defender of his fame and opinions, was born at Dresden, about the year 1630. After visiting France, England, and other parts of Europe, to improve himself in knowledge, he took the degree of doctor in medicine at Basle in Switzerland, in 1652, and at the

end of four or five years, passed principally with Bartholine, to whom he was strongly attached, he settled at Bern. His works are principally controversial, defending the priority of the discovery of the lymphatics by Bartholine, against Rudbeck the Swede, who claimed it; and who, if he did not discover them, Haller says, has the merit of having more fully and accurately described them, than Bartholine had done. Bogden, in this contest, displayed much learning, but equal roughness and ill-humour. The titles of his works are: "Rudbekii insidiæ structæ vasis lymphaticis Thomæ Bartholini," 4to. and "Apologia pro vasis lymphaticis Bartholini, adversus insidias secundo structas ab Olao Rudbek." Hafniæ, 1654, 12mo. "Simeonis Seth, de alimentorum facultatibus," Gr. and Lat. 8vo. 1658. "Observationes Medicæ ad Thomam Bath." The observations, 12 in number, are published in the "Culter Anatomicus," of Lyser; Copenh. 1665. Haller Bib. Anat. Eloy. Dict. Hist.

BOGDIKOTZ, in *Geography*, a town of Russian Siberia, on the Tchulim; 6 miles N.W. of Atchinsk.

BOGDINSKOI, or **BOGDOM DABASSU**, an inexhaustible salt-lake of Siberia, in the steppe towards Tzaritzin; the salt of which, according to Pallas, is better than that of the Elton.

BOGDO, GREAT, the highest mountain of central Asia, according to the reports of the Monguls and Tartars, is properly a central summit of the Altaian chain of mountains, which gives source to the Upper Irtysh, and seems to be delineated in Arrowsmith's map of Asia at longitude 94°, and latitude 47°. See **ALTAI** and **BELUR**.

BOGDO, Little, is a mountain of Asiatic Russia, lying to the north of the Caspian sea, near which is a salt lake of the same name.

BOGDOMANTIS, in *Ancient Geography*, a country of Asia Minor. Ptolemy.

BOGDOY, in *Geography*, a name given by the Russians to the Manchews, or Mandshurs, who inhabit the eastern part of Chinese Tartary, an extensive and populous district N.N.E. of China, and who are subject to the Chinese empire. See **MANDSHURS** and **CHINESE TARTARY**.

BOGENSEE, a town of Denmark, in the island of Funen; 12 miles N.W. of Odensee.

BOGESUND, a small town of Sweden, in West Gothland, 4 leagues S. of Falkioping.

BOGGILCUND, a district or circar of Allahabad, in Hindoostan, situate west of Benares.

BOGGY CREEK, a creek of America, which rises among the eastern branches of Poplar creek, and empties into the Tennessee, just above the Muscle shoals. Hurricane creek is a branch of Boggy creek.

BOGHASS, a canal or strait, so called in the language of the country, at the mouth of the western or Bolbitic branch of the Nile, now called the branch of Rosetta. This passage is not navigable through its whole width; there being only a narrow channel, which, owing to the instability of the bottom, and the agitation of the sea, is continually shifting. A pilot or master of the Boghass is continually employed in founding this changeable passage, and giving directions to those who navigate it. The increasing danger of this passage led to the operation of cleaning the canal of Alexandria, and thus to facilitate the communication between Alexandria and the rest of Egypt. See **BOGAS**.

BOGIA. See **BOUJEIAH**.

BOGILLANA. See **BAGLANA**.

BOGLIASCO, a town of Italy in the state of Genoa, near the sea-coast; 6 miles E. of Genoa.

BOGLIO, or **BEUIL**, a mountainous territory of Italy,

in the principality of Piedmoat, and county of Nice, seated near the Alps; its chief place has also the same name. This country was surrendered to France in May 1796.

BOGLIPOUR, a town of Hindoostan, and capital of a province in the country of Bahar, near the Ganges; 35 miles S.E. of Monghir, and 115 N.W. of Moorshedabad.

BOGLORAY, a town of Poland, in the palatinate of Sandomirz; 24 miles E.S.E. of Sandomirz.

BOGMUTTY, a river of Hindoostan, which runs into the Ganges near Monghir, in the country of Bahar.

BOGNOR, or **HOTHAMPTON**, (as it is sometimes called in honour of its founder,) is a pleasant retired hamlet on the southern coast of England, in the county of Sussex. This place has only risen into notice within a few years, being, previous to 1790, merely inhabited by a few fishermen. About this period Sir Richard Hotham purchased some ground here, where he built a house for himself, and had others erected for the accommodation of bathers. His plan of making this a fashionable bathing place has succeeded, but it was not much frequented till after his death, which happened in 1799. Soon after this event, the ground and houses were sold in different lots. Some of the purchasers have built additional dwellings, and Bognor is now become a place of great resort during the summer months. The adjacent villages of Bersted, Felpham, &c. also receive a number of summer visitors, who resort to this coast for the purpose of its fine beach and mild air. Bognor is 7 miles S. of Chichester, and 67 S.W. from London. It has a good hotel, an assembly-room, a library, and some other establishments for the accommodation and amusement of its visitors.

BOGODUKHOF, a town and district of Russia, in the government of Kharkof, seated on the Merlo, falling into the Vorokla; 84 miles N.N.W. of Kharkof.

BOGOE. See **BOOG**.

BOGOGNANO, a town of the island of Corfica, 5 leagues N.E. of Ajaccio.

BOGOI AVLANSKIO, a town of Russia, in the government of Ufa; 48 miles S. of Ufa.

BOGOI AVLANSKOI, a town of Russia, in the government of Archangel, near the coast of the White Sea; 72 miles S.W. of Archangel.—Also, a town of Russia, in the same government, near the river Onega, 100 miles S. of Archangel.—Also, a town in the same government, on the Pinega; 70 miles E. of Archangel.—Also, a town of Russia, in the province of Ulting; 51 miles E.N.E. of Ulting.—Also, a town of Siberia, on the Tchulim; 80 miles E.N.E. of Tomsk.

BOGOMILI, or **BOGARMITÆ**, in *Ecclesiastical History*, a sect sprung from the Manichees, or rather from the Mafsalians, towards the close of the eleventh century; whose chief, Basil, was burnt alive by order of the emperor Alexius Comnenus. Being condemned to be burnt, he declared that the fire would not hurt him; upon which the Greeks who carried him to execution, first took off his cloak, and flung it into the fire, to try whether it would prove incombustible; whilst it was burning, the poor fanatic cried out, "Do you not see that my cloak is untouched, and carried away in the air?" upon which they cast him also into the fire, where he was soon consumed to ashes. Du-Cange derives the name from two words in the Bulgarian language; *Bog*, *Deus*, and *milvi*, *miserere*, have mercy. The Bogomili denied the Trinity; maintaining that God had a human form; that the world and all animal bodies were created by evil angels; and hence they concluded, that the body was the prison of the immortal spirit, and that it ought to be enervated by fasting, contemplation, and other exercises, so that the soul might be gradually restored to its primitive liberty; and that wedlock

was to be avoided; and they also maintained that it was the archangel Michael that became incarnate. They rejected the books of Moses, and only admitted seven books of scripture; they maintained the Lord's prayer to be the only eucharist; that the baptism of the Catholics was only that of St. John, and their's that of Jesus Christ; and that all those of their sect conceived the Word, or *Logos*, as much as the Virgin, denying the reality of Christ's body, which they considered only as a phantom. They also held, that the body, upon its separation by death, returned to the malignant mass of matter, without either the prospect or the possibility of a future resurrection to life and felicity. *Mosh. Eccl. Hist. vol. iii. p. 110. Jortin's Rom. on Eccl. Hist. vol. v. p. 46.*

BOGORDSKOI, in *Geography*, a town of Russia, in the government of Archangel; 8 miles S. W. of Mezen.

BOGORODITZK. a town of Russia, in the government of Archangel, on the Dwina; 44 miles S. S. E. of Archangel.

BOGORODSK. a town and district of Russia, in the government of Moscow, on the Khafma; 28 miles E. of Moscow.

BOGORODSKOI, a town of Russian Siberia, in the province of Tomsk, seated on the Oby. The church belonging to this town is famous for a celebrated picture of the Virgin Mary, called "Oeditria," which is brought every year, on the 21st of May, in procession to Tomsk. There are iron works in this place.

BOGOROSTAN, a town and district of Russia, in the province of Ufa, seated on a river falling into the Samara.

BOGOTA, a town and province of New Granada, in Spanish South America, seated near the river Magdalena. The town is called *Santa Fe de Bogota*, and is the capital of the kingdom of New Granada; it is situate on the banks of the small river Pati, which runs into the Magdalena. It was made an archbishop's see by pope Julius III. in 1554, and an university was erected here in 1610. It has a sovereign court of judicature, the president of which is governor of the whole province or kingdom of New Granada. Near it are some gold mines, and the chief modern mines of Peruvian emeralds, justly preferred to all others, since those of Egypt have been neglected. Among the numerous cataracts of this country Bouguer mentions that of the river Bogota, which passes the city of the same name about 8 leagues before it joins the Magdalena, said to be a vertical fall of more than 1200 feet. N. lat. 4° 20'. W. long. 73° 40'. When the Spaniards took possession of this part of South America, they found in Bogota a nation more considerable in number, and more improved in the various arts of life, than any in America, except the Mexicans and Peruvians. The people of Bogota subsisted chiefly by agriculture. The idea of property was introduced among them, and its rights secured by laws, handed down by tradition, and observed with great care. They lived in large towns; they were decently clothed, and their houses, compared with those of surrounding tribes, might be termed commodious. Government had assumed, in this state of civilization, a regular form, and a jurisdiction was established, which took notice of different crimes, and punished them with rigour. They were acquainted with the distinction of ranks, and their chief reigned with absolute authority. He was attended by various officers and guards, carried with much pomp in a sort of palanquin, and the road was swept before him and strewed with flowers. For the support of this expence taxes were levied on the people, who regarded their prince with veneration, and seldom approached him but with an averted countenance. One of the chief causes of

that obsequious spirit, which prevailed among the people of Bogota, was the influence of superstition. The respect they paid to their monarchs was inspired by religion; and the heir apparent of the kingdom was educated in the innermost recess of their principal temple, under such austere discipline, and with such peculiar rites, as tended to fill his subjects with high sentiments concerning the sanctity of his character, and the dignity of his station. This superstition, which, in the rudest period of society, is either altogether unknown, or wastes its force in childish unmeaning practices, had acquired such an ascendant over those people of America, who had made some little progress towards refinement, that it became the chief instrument of bending their minds to an untutored servitude, and subjected them, in the beginning of their political career, to a despotism hardly less rigorous than that which awaits nations in the last stage of their corruption and decline.

The people of Bogota (as well as the tribe of the Natchez) had advanced beyond the other uncultivated nations of America, in their ideas of religion, as well as in their political institutions. The sun and moon were the chief objects of their veneration. They had temples, altars, priests, sacrifices, and that long train of ceremonies, which superstition introduces wherever she has fully established her dominion over the minds of men. But the rites of their worship were cruel and bloody; they offered human victims to their deities, and many of their practices resembled the barbarous institutions of the Mexicans. *Robertson's Hist. America, vol. ii.*

BOGRA, an uncultivated mountainous tract on the north of the barony of Muskery, in the county of Cork, and province of Munster, Ireland. It is upwards of ten miles long, and in some parts six miles in breadth; and is a common to the adjacent estates. In winter it is for the most part deep, marshy, and impassable; but in summer hard and firm, producing grass and heath, and is then grazed by vast herds of cattle, which are removed to the lower lands when this season is over. Large quantities of turf are also procured from it. Dr. Smith has applied to it these lines of Thomson:

"The brown burnt earth
Of fruits and flowers, and every verdure spoiled,
Barren and bare, a joyless dreary waste
Thin cottaged; and in time of trying need
Abandoned."

Many considerable streams flow from this high and wild tract, which discharge themselves into the Lee or Blackwater, as their direction is south and north. *Smith's Cork.*

BOGRUSH, in *Ornithology*. The *Motacilla Schanobanus*, Linn. and *Red Warbler* of Latham, is described under this name in the *Arctic Zoology*.

BOGUE, in *Ichthyology*, the French name of a fish of the *SPARUS* genus, *Sparus boops* of Linnæus.

BOGUE, BELY, in *Mythology*, the white god to whom the Slavonians paid their adorations. His statue, smeared with blood, was covered with flies. His rites consisted in diversions, games, and feasts. He was a beneficent deity, corresponding to the good principle, the "Oromazes," of the Persians. The black god, "Toherry Bogue," corresponded on the contrary to the evil principle, the maleficent being Arimanes. He was worshipped by bloody sacrifices, and the prayers of his votaries were addressed to him in a mournful and plaintive voice.

BOGUSLAW, in *Geography*, a town of Poland, in the palatinate of Kiovia; 32 miles S.E. of Bialacerkiew. N. lat. 49° 36'. E. long. 31° 12'.

BOGUTCHAR, a town and district of Russia, in the govern-

government of Voronetz, on a rivulet of the same name, falling into the Don.

BOGWANGOTD, a town of Hindoostan, near the Ganges; 11 miles N. of Moorshedabad.

BOHABOL, in *Ancient Geography*, a town of Asia in Syria.

BOHADSCHIA, in *Botany*. See **PELTARIA**.

BOHAIN, in *Geography*, a town of France, in the department of the Aisne, and chief place of a canton, in the district of St. Quentin; 10 miles N.N.E. of St. Quentin. The place contains 2152, and the canton 13781 inhabitants. The territory comprehends 172½ kilometres, and 14 communes.

BOHAR, in *Ichthyology*, a species of **SCIÆNA**, described by Forskal, as a native of Arabia. The colour is red, lined, and clouded with white. Forst. Fn. Arab.

This bears a strong affinity to another fish described by the same writer, as an inhabitant of the same country, **Kasimira**. Gmelin expresses a doubt whether it does belong to the **SCIÆNA** genus. The body is of an oblong form, and covered with smooth scales. When alive there are two large spots on the back, which disappear after the fish is dead. There are two short cirri, or beards before the nostrils: in the upper jaw two subulate teeth, which project beyond the lower, the two middlemost of which are placed remote. The lateral line runs nearer to the back. Dorsal and anal fins rounded behind, and the unarmed part of both sealed, the spines of the latter growing gradually larger: ventral connected by an intermediate membrane. Tail bifid. Gmelin.

BOHAROWCZE, in *Geography*, a town of Poland, in the palatinate of Kaminiéc; 60 miles N.W. of Kaminiéc.

BOHDANICE, a town of Bohemia, in the circle of Chrudim, which has the privilege of holding fairs.

BOHEA, in *Botany*. See **THEA**.

BOHEMIA, in *Geography*, called in German *Boierheim*, *Boiheim*, *Boheim*, and corruptly *Boehmen*, that is the habitation of the Boii (see **BOII**); a kingdom of Europe in the Austrian dominions; bounded on the north by Misnia, Lusatia, and Silesia; on the west, by the circle of the Erzgebirg, the Voghtland, the margraviate of Culmbach, and the Upper Palatinate; or, in general, by Franconia; on the south, by Bavaria and Austria; and on the east, by Moravia, Silesia, and the county of Glatz. Bohemia is environed on all sides with high mountains and large forests; towards the south it is separated from Austria by a ridge of considerable elevation, which passes to the north-east of Bavaria; and on the north-west, it is parted from Saxony by a chain of metallic mountains, called the Erzgebirg, a word denoting hills that contain mines. On the west of the river Eger, near its junction with the Elbe, stands the mountainous group of Milešou, near which is Donneberg, supposed to be the highest in the province; and on the north-east is the Sudetic chain, which branches from the Carpathian, and divides Bohemia and Moravia from Silesia and the Prussian dominions. This country was formerly remarkable for an extensive forest, a remain of the ancient *Hercynia Sylva*, which extended from the Rhine to Sarmatia, and from Cologne to Poland. The *Gabreta Sylva* lay on the south-west of the same country, where a chain of hills now divides it from Bavaria.

Bohemia, as we have already observed, derived its name from the Boii, who under their leader Segovefus, settled in that country about 590 years before the Christian era. The Boii were soon after expelled by the Marcomanni; and these, being weakened by their wars with the Romans under the conduct of Tiberius, were subdued by the Sclavi (see **SCLA-**

VONIANS), who, like the other Scythians, wandered from place to place with their families and cattle; and, as Strabo informs us, even in the time of Augustus Cæsar, lived promiscuously with the Thracians. Afterwards, spreading themselves westward, in a few centuries they possessed Illyricum, Poland, Moravia, and Bohemia. But retaining their ancient manners, they neglected to build cities; and inhabiting the country in detached hordes, they regarded only pasturage and the care of their flocks. The first ruler, or chief, mentioned by historians, was one Czechius, from whom the natives derived the appellation of Czechs, or Zechs, who, quitting Croatia, migrated first to Moravia, and from thence to Bohemia, about the middle of the sixth century, which he found covered with wood, and possessed rather by herds of wild cattle than by men. Here he settled his final colony, and taught the few inhabitants of the country to cultivate the lands, and to sow corn. After his death, the Bohemians remained for several years without a ruler or judge; but being now assembled in villages, they were anxious to obtain a more settled form of government than that which they had found effectual during their pastoral life. With this view they chose for their governor a young man whose name was Croc, distinguished by his prudence, who restored peace and order, and maintained the authority of the laws. He was succeeded by the youngest of his three daughters, Lybussa, who was respected for her skill in the art of divination; and who, about the close of the seventh century, married a country labourer of the name of Premislaus, who, being called from the plough to the dignity of governor, carried his cloak and shoes along with him, as memorials for his posterity, to prevent their being elated with the prosperity of their condition. This Premislaus is said to have founded the city of Prague, to have distributed the people into different ranks, and, after quelling some temporary insurrections, to have reigned peaceably till his death. He is said to have been the first duke, though others trace the origin of the duchy to an earlier period, and say that Czechius was the first who bore this title. The government seems afterwards to have continued hereditary in his family, though with some form of election; and a descendant, whose name was Borivorius, or Borzivori, embraced Christianity about the close of the ninth century, and, after some opposition, introduced it into his dominions. On this occasion several churches were built, and schools erected; but upon the death of his son Wratislaus I. in the beginning of the tenth century, his wife Drahomira, who assumed the government during the minority of her sons, manifested her hatred against the Christians, massacred about 300 of them in one night, burnt their temples, and ordered them to deliver up their arms. However, upon the accession of her son Wenceslaus II. A. D. 916. the Christian religion was again encouraged; and, in order to prevent disputes with his brother Boleslaus, who had been educated under his mother, he ceded to him that part of Bohemia, which lay beyond the Elbe. Wenceslaus, having obtained a victory in a duel, a challenge to which he accepted for the purpose of sparing the lives of his rebellious subjects, was invited by Otho the Great to the diet at Worms, where he offered him the title of king, which Wenceslaus declined accepting. In the year 932, Wenceslaus was murdered by his brother Boleslaus I. surnamed the Cruel, who, succeeding him, conducted his administration with great cruelty, persecuting the Christians, and expelling them the kingdom. His son and successor Boleslaus II. surnamed the Pious, founded and endowed 20 churches, and obtained leave from pope John IX. to create a bishop at Prague. His subjects formed a conspiracy against him, on account of some reforms which he attempted to introduce;

introduce;

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produce; and encamping on a mountain in the vicinity of Prague, they were expelled thence by the Christians, with the assistance of the Jews, and obliged to remain in peace. In recompence of this service, the Jews were allowed to build a synagogue at Prague. In the eleventh century, Bretislav, the son of Udalricus, having obtained the government of Moravia, kept possession of it by repulsing the Poles who invaded it; and, succeeding to the government of Bohemia, on the death of his father, A. D. 1043, he again defended it against Hungarian robbers, by whom it was ravaged, and having concluded a perpetual peace with Casimir, king of Poland, he died, leaving five sons, of whom the eldest inherited Bohemia; and Moravia was divided among the four youngest. Wratislav II. succeeded his brother, A. D. 1061; and, in 1086, was honoured with the regal title by the emperor Henry IV. who also invested him with the domains of Lusatia, Moravia, and Silesia. This dignity, however, was merely personal; and the constant title of king only commences with Premislav II. in 1199. He and his immediate successors, were styled Ottocari, or Othogari, on account of their attachment to the interest of the emperor Otho. Upon the death of Wenceslaus IV. A. D. 1255, his son Premislav Othogar succeeded him, and having settled his affairs in Bohemia, took possession of Austria, Stiria, part of Carinthia, and other provinces to the south, and carried his arms into Prussia for the defence of the Christians; and having defeated his opposers in several engagements, he prevailed on many of the people to abandon Paganism. After his return to Bohemia, in 1271, he is said disdainfully to have rejected the imperial crown, which was afterwards given to Rodolphus, count of Hapsburg; but Othogar refusing to do him homage, and to take from him the investiture of his states, alleging that he owed him nothing, and that he had paid him his wages, Rodolph having been great marshal of his court, was at length obliged to comply, and to deliver five standards to the emperor for the five sieges which he possessed. A reconciliation, however, afterwards took place, and Othogar received the investiture of Bohemia and Moravia, on condition of renouncing Austria, Carinthia, and Stiria. Wenceslaus V. succeeded his father in 1278, and was elected king of Poland; but refused the sceptre of Hungary, that was offered him in favour of his son. In 1310, the ancient lineage failed; and John, the son of the emperor Henry VII. of the family of Luxembourg, who had married the youngest sister of Wenceslaus VI., obtained possession of the kingdom of Bohemia. John, having resigned Bohemia to his son Charles, and procured for him the imperial dignity, proceeded with him to France, to the assistance of Philip against the English, and was slain in the famous battle of Crecy, in 1346. Charles IV. emperor, having succeeded his father, created his brother John marquis of Moravia, erected an university at Prague upon the plan of that at Paris, and engaged pope Clement VI. to erect the see of Prague into an archbishopric, with this privilege annexed to it, that the archbishop should have the honour of crowning the king of Bohemia. He enlarged and beautified his capital, by adding what is called the New City, in which he founded the college of Carlemin. With the assistance of several learned persons, he reduced the laws of the kingdom to writing, which are still extant under the name of "Caroline Constitutions." He greatly extended the boundaries of his hereditary dominions, and caused his son Wenceslaus to be crowned king, in the second year of his age. He also prevailed with the electors to chuse him king of the Romans, in the sixteenth year of his age; and having commenced the junction of the Moldaw with the Danube, he died before he had executed his design; and in 1378, was succeeded by his son Wenceslaus VII. In the reign of this

prince, who was notoriously dissolute, profligate, and savage, and who, by his licentiousness and cruelty, incurred the hatred of his subjects, John Huss and Jerome of Prague introduced the doctrines of the reformation into Bohemia. See HUSS, and JEROME. Wenceslaus died suddenly in 1419; and before his brother Sigismund, who succeeded him as king of Bohemia and emperor of Germany, could come from Hungary to take possession of the crown, the Hussites, under John Zisca, had acquired great strength, and, upon his approach to the kingdom, they sent deputies to him, desiring liberty of conscience; but, instead of granting their request, he only declared, that he intended to govern the kingdom as his father had done. A civil war ensued, in which the troops of Sigismund sustained several defeats; and which, after a continuance of sixteen years, occasioned by his treachery of faith to Huss and Jerome, terminated in several concessions, and in his admission into Prague with great solemnity and rejoicing. Upon the death of Sigismund, in 1438, Albert of Austria, who had married his daughter, received the crowns of Bohemia and Hungary. The succession was, however, afterwards disputed and infringed by George Podiebrad, a Hussite chief; by Uladslav, son of Casimir, king of Poland; and by Matthias, king of Hungary. Uladslav ultimately succeeded, being elected, in 1471, by the majority of the states, and soon after receiving the investiture from the emperor. Upon the death of Uladslav, in the 45th year of his reign over the Bohemians, and the 23d over the Hungarians, he was succeeded by his son Lewis in both the kingdoms of Bohemia and Hungary, A. D. 1516; but, in 1526, he engaged the Turks at Mohatz, and being utterly defeated, was drowned in the Danube, in his flight. After the death of Lewis, his dominions fell to Ferdinand, archduke of Austria, infant of Spain, and afterwards emperor, who had married Anne, the only daughter of Uladslav: and both the empire, and the kingdom of Bohemia, have ever since continued in the house of Austria. Ferdinand, at a diet of the states held in 1547, declared the kingdom hereditary and absolute; and when Ferdinand II., in 1620, had routed the army of his rival Frederick at the White Mountain near Prague, Bohemia was reduced fully to the condition of an hereditary kingdom; so that from that time the states had no concern with the right of succession. The crown, however, is conferred with some appearance of election, which right the states of that kingdom pretend to claim; although, by the treaty of Westphalia, Bohemia is declared hereditary in the house of Austria. The king of Bohemia is the first secular elector, and as such pays homage to the emperor and the empire for his states; and with this exception, he has a right to exercise, through all his dominions, the royal authority agreeably to the laws of the kingdom, which prohibit his raising contributions or taxes otherwise than at the time when the states are assembled, the appointment of which is entirely in their own power. He gives his opinion as elector, after the elector of Cologne, and formerly assisted at the assembly of the electors only at the election of an emperor, nor did he appear always at the diets of the empire. He is arch-butler, or arch-cup-bearer, of the holy Roman empire; and on this office his right to chuse a king of the Romans is said to depend. It has been alleged, that Bohemia has been of old time a genuine state of the German empire, without contributing to its taxes, which was a privilege conferred upon it by Frederick II. in 1212, who at the same time exempted it from the jurisdiction of the supreme judicatory of the empire. In 1708, it was acknowledged by the three colleges of the empire, at an act of the diet called "the admission," that the king and elector of Bohemia has an undoubted right of seat and voice in all its assemblies; in consequence of which the emperor pro-

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posed, that on account of his hereditary kingdom of Bohemia, and of the countries belonging to it, he will pay an electoral proportion of all taxes and imposts of the empire and circle, and also 300 florins yearly to the chamber-judicatory; the collective body of the empire engaging at the same time to take the kingdom of Bohemia, and the countries united with it, under its protection and defence.

Bohemia, ever since the time of Charles IV., has been divided into twelve circles, besides Prague, which is considered as a distinct territory. These are Kaurzimer (comprehending Great Prague), Pilsner, Leutmeritzer, Konigingratzer, Rakowitz (including Beraun), Chrudimer, Prachiner, Slaner (comprehending Little Prague), Bunzlauer, Saatzer, Czaflauer, and Bechiner. Each circle has two head-men, or captains, appointed annually, for the administration of the government, one from the state of lords, and the other from that of knights. The duchy of Silesia, the marquisate of Moravia, and that of Lusatia, formerly held of this crown, but at present only Moravia, which is incorporated with the kingdom of Bohemia, and is in possession of the house of Austria. In 1742, the county of Glatz was ceded to the king of Prussia, and by him added to Silesia. The government of Bohemia is managed by six different courts; *viz.* the council of the regency, or great royal council, in which presides the great judge or burgrave of Bohemia, who has under him 18 lieutenants of the king's and other assessors; the council, or superior chamber of justice, at which the great master of the kingdom is president; the chamber of fiefs; the new tribunal, to judge the appeals of the German vassals, with its president, vice-president and assessors; the royal chamber of finances, with a president, and vice-president; and the chancery, which always follows the court. The states, consisting of the clergy, nobility, and gentry, and representatives of the towns, meet at Prague, where a commissioner from the sovereign points out the necessity of granting such supplies as the court demands, which, however exorbitant, are granted without hesitation or examination, though not sometimes without subsequent complaint. The clergy are composed of the archbishop of Prague, several bishops, provosts, and abbots, besides the inferior clergy. The nobility consist of princes, counts, barons, and knights; the others are burghers, husbandmen, and peasants.

The established religion of Bohemia is popery; but there are many protestants among the inhabitants, who are now tolerated by the wise regulations of Joseph II. in the free exercise of their religion. The Jews at Prague are indulged also with a toleration. The archbishop of this city is born legate of the holy apostolic see of Rome, and crowns the king of Bohemia; he is also a prince of the holy Roman empire, primate of the kingdom, and perpetual chancellor of the university of Prague. His suffragans are the bishops of Leutmeritz and Konigingratz. The government of the church and clergy is vested in the archiepiscopal consistory, from which an appeal lies to the king or the pope.

The extent of Bohemia, and also its population, have been variously estimated. Its length is about 162 miles, and its breadth 142. Some centuries ago, the inhabitants were estimated at three millions; but in later times they have been very much diminished. It is said, that in the year 1622, and the three or four following years, no fewer than 30,000 families, and many other individuals quitted the country, among whom were many of the nobility, on account of the intestine religious wars, and the succeeding irruptions of the Swedes. In M. Hoeck's "Statistical View of the States of Germany, &c." 1801, the kingdom of Bohemia is stated to contain 962½ square miles, 250 cities, 308 market towns,

11,455 villages, 430,000 houses, 1,340,510 men, 1,466,433 women, and the total of the population 2,806,943. The number of Lutherans has been estimated at 9050, of the reformed at 25,110, and of Jews at 36,000. Some writers have stated the number of Protestants at 36,000, and that of the Jews at 40,000, of whom 8000 are settled at Prague. In their dispositions, habits, and manners, the Bohemians resemble the Germans; being indeed a mixture of Slavonians and Germans, the former of whom live in villages and are slaves. They have no middle rank of people; for every lord is a petty sovereign, and every tenant a slave. The Bohemian peasants, on the imperial demesnes, have been lately relieved from the state of villinage, in which they had been so long and so unjustly retained; and it is hoped, that the example of the emperor will be followed by that of the Bohemian nobility in general, so that their vassals may recover those rights of which they have been long deprived. The natives of this country are singularly robust and strong-built, handsome, except that their heads are somewhat too large, and active, shrewd, courageous, and sincere. The gentry are ingenuous, brave, and more inclined to arms than arts. Learning in Bohemia is in a low state: though the kingdom possesses one university, 12 gymnasia, 2,219 German schools, 200 schools of industry, and 33 ladies' schools.

The Bohemian language is a dialect of the Slavonic, but somewhat harsher than that of their neighbours, who speak the same language, and who change the consonants, and particularly the *l*, more into vowels. The Bohemians formerly used the same letters with the Russians; but in the time of Boleslaus the Pious, the Latin was introduced among them. Upon the first introduction of Christianity in this reign, the religious service was performed in the Latin tongue, a language unknown to the people; but in consequence of the representation of Methodius to pope Nicholas the Great, he allowed the prayers to be rehearsed in the vulgar tongue. But some years after, when a bishop was sent into Bohemia, the Latin tongue was again ordered to be introduced in all their churches. Persons of a superior class, from their intercourse with the court of Vienna, speak high Dutch or German, with which the language of the common people is also intermixed.

Bohemia is, upon the whole, one of the highest countries in Europe, and forms a large extended plain, surrounded, as we have observed, by high hills covered with wood. The vale in the middle, which is watered by the Elbe, the Moldaw, and the Egra, is protected from the wind, and it has neither lakes nor morasses which taint the air, which is dry and clear, with unwholesome vapours. The climate is therefore salubrious, and not liable to those sudden changes, which are so fatal to health in other places. The heat of summer, and the cold of winter are alike moderate. The soil is in general rich, though in some places it is sandy. It is fertile in corn, wine, fruits, pasture, saffron, ginger, hops, wool, flax, and timber. The Bohemian hops, which are much valued, are carried as far as the Rhine in great quantities. Bohemia produces a strong large breed of horses, many of which are purchased for the use of the French cavalry. Its mountains are the richest in Europe, in gold, silver, precious stones, copper, quicksilver, iron, lead, tin, sulphur, and saltpetre. The Bohemian tin is reckoned the best of any except the English. All kinds of marble are also found in this country, together with pit-coal, alum, muscovy-glass, excellent mineral waters, and hot baths. It also furnishes numerous herds of cattle, and abundance of game and wild fowl, and also bears, lynxes, wolves, foxes, badgers, martens, beavers, and otters. Its rivers and ponds afford a plentiful supply of fish, and such as are of the best quality and flavour.

According to the statement of M. Hoeck (ubi supra,) Bohemia had, in 1787,

	Acres.	Sq. Toises.
1. Of ploughed land, -	3,609,360	- 776
2. Ponds, - - -	69,115	- 1373
3. Fields, - - -	220,136	- 1393
4. Meadows, - - -	798,393	- 1066
5. Gardens, - - -	85,712	- 722
6. Marshy ground, -	65,515	- 970
7. Pastures and heaths, -	613,131	- 1209
8. Vineyards, - - -	4,482	- 672
9. Woods, - - -	2,319,811	- 557
Total	7,785,635	8738

The territorial produce of grain, forage, vines, woods, and rivers, amounted, in 1789, to 30,057,939 florins. Of cattle there were, in 1771, 9789 oxen, 2338 bulls, 9688 cows, 2723 calves, 8452 sheep, 16,738 hogs, 564 he-goats, 2758 she-goats, and 533 asses. The produce of grain amounted to two millions of minots (a minot being equal to three bushels) of wheat, ten millions of minots of grain, four millions of minots of barley, and eight millions of minots of oats. In the list of natural productions are also to be reckoned fruit-trees, hops, principally in the circle of Saaz, flax, tobacco, saffron, poultry, bees (of which, in 1791, there were 20,257 hives), tin (chiefly at Schlackenwalde, and there are ten mines of tin in the circle of Saaz, and two in that of Leutmeritz), cobalt, 10,000 quintals in the circle of Saaz, silver, alum, at Commothau, in 1788, 1,539 quintals. This author also states, that Bohemia had, in 1782, 95 manufactures, which employed 139,613 workmen. These manufactures are of linen, wool, cotton, silk, paper, glass, leather, &c. amounting in the whole to 35,645,447 florins, of which strangers take to the value of 11,840,757 florins. The articles of export, according to his enumeration, are alum, Epsom-salt, butter and grease, fish, flax, poultry, grain, mineral waters, hare-skins, wood, hops, cobalt, hides and skins, fruit, horses, pork, brimstone, vitriol, game, flax, tin, dimity, articles in iron, articles in glass, garnets, hats, liuens, brass, paper, pot-ash, aqua fortis, lace, cloth, and thread. The articles of import are cotton, lead, white lead, books, iron, and iron articles, colours, flax, jewellery, spicery, horned cattle from Hungary, coffee, cotton, stuffs, galls, merchandise of Lyons, liqueurs, silks, Hungarian cattle to the value of 800,000 florins, and wine to the value of 500,000 florins. The balance of trade is said to be in favour of the country. M. Hoeck also informs us, that the revenues of the state are fifteen or sixteen millions; but that the expences are so high, that out of this sum the surplus amounts only to 636,000 florins; that the contribution in 1789 was 3,646,017 florins, and the tax on the Jews 216,006 florins; and that the annual revenue from the domains of the crown was, during the life of Maria Theresa, 332,720 florins; these domains are now estimated at 177,774 acres. The number of soldiers to be furnished by Bohemia, in time of peace, is 54,964; and, in time of war, 76,896. The capital city of Bohemia is Prague; which see.

BOHEMIA, a broad navigable river of North America, 10 miles long, which runs W.N.W. into Elk river, in Maryland, 11 miles below Elkton.

BOHEMIAN, or MORAVIAN, BROTHERS, in Ecclesiastical History, is an appellation anciently given to the Protestants in Bohemia. By their adversaries they were called *Picards*, i. e. *Beghards*. They were descended from the better sort of Hussites, and were distinguished by several religious institutions of a singular nature, and well adapted to

guard the community against the reigning vices and corruptions of the times; and as soon as they heard of Luther's design of reforming the church, they sent deputies, in the year 1522, to recommend themselves to his friendship and good offices. In succeeding times, they continued to manifest the same zealous attachment to the Lutheran churches in Saxony, and also to those that were founded in other countries. Upon this their religious principles were examined, and nothing was found, either by Luther or his disciples, in their doctrine or discipline, that was liable to censure. Their confession of faith, though not altogether approved by this reformer, was regarded as an object of toleration and indulgence. Nevertheless, the death of Luther, and the expulsion of these brethren from their country, in 1547, changed their religious connections; and many of them, more especially of those who retired into Poland, embraced the religious sentiments and discipline of the reformed. Their attachment to the Lutherans seemed, however, to be revived by the convention of Sendomir in 1570; but as the articles of union, that were drawn up in that assembly, soon lost their authority, the Bohemians by degrees entered universally into the communion of the Swiss church. This union was at first formed on the express condition, that the two churches should continue to be governed by their respective laws and institutions, and should have separate places of public worship; but, in the following century, all remains of dissension were removed in the synods held at Aflrog, in 1620 and 1627, and the two congregations were formed into one, under the title of "The Church of the United Brethren." In this coalition the reconciled parties shewed to each other reciprocal marks of toleration and indulgence: for the external form of the church was modelled after the discipline of the Bohemian Brethren, and the articles of faith were taken from the creed of the Calvinists. See *UNITAS Fratrum*.

Lactius has a treatise *De Gestis Fratrum Bohemicorum*. Camerarius has also given the history of the Bohemian brethren, from whom ecclesiastical historians have derived a large train of sects, as the Hussites, Adamites, Taborites, Calixtins, &c. which see respectively.

BOHEMIAN *chatterer*, in *Ornithology*, a bird of the *Passerine* order, common in many parts of Europe, in Northern Asia, and America. It sometimes visits the southern parts of Britain in the winter. The common English name of Bohemian chatterer was imposed upon this bird by old writers, under the idea that it was peculiar to Bohemia. Later authors call it the *Waxen chatterer*, from the horny appendages at the extremity of the secondary quill-feathers, which are of a scarlet colour, and in appearance bear some resemblance to sealing-wax. This is called *Ampelis garrulus* by Linnæus. *Donov Brit. Birds, &c.*

BOHEMICUS, the name of a species of FALCON that inhabits the mountains of Bohemia. The legs of this kind are yellowish; body above cinereous, beneath hoary white; five exterior quill-feathers black on the outside; orbits of the eyes white. *Gmel. Falco Bohemicus. Maculæ habet, missyllance, Mayer.*

This bird is scarcely a foot in length; bill near the angle of the mouth yellowish; irides yellow; tail acute and long; legs thickish, and feathered below the knees; claws black and roundish. Feeds on mice.

BOHIO, in *Geography*, a river of Chili in South America.

BOHKAT, in *Ichthyology*, is the Arabic name of a sort of Ray that inhabits the Red sea, and is described by Forskal under the appellation of *Raja djiddensis*.

BOHME, in *Geography*, a river of Germany, which runs into

into the Ailer, 4 miles S.E. of Bethem, in the principality of Luneburg-zell.

BOHMISCHKRUTT, a town of Germany in the archduchy of Aultria, 5 miles S.S.W. of Feldsburg.

BOHN, JOHN, in *Biography*, was born at Leipzig the 20th of July 1640, where he received the rudiments of his education. At a proper age his father sent him to Jena, to be initiated into the study of medicine. In 1650, he returned to Leipzig, continuing his studies there, until 1663, when desirous of participating in the knowledge of the improvements making in his profession, in different parts of Europe, he went to Copenhagen, Holland, England, France, and Switzerland, every where attending the lectures of the most celebrated masters, but particularly attaching himself to Malpighi. Returning, at the end of two years, to Leipzig, he took his degree of doctor in medicine, and was in succession advanced to the rank of professor in anatomy, and in therapeutics. In 1691 he was appointed public physician to the city of Leipzig; and, in 1700, dean of the faculty of medicine, which offices he continued to hold with credit to the time of his death, in 1718.

Besides numerous dissertations on the different branches of medicine which had great merit, he published, in 1668, "Exercitationes physiologicæ xxvi." 4to. This work was afterwards considerably enlarged, and republished in 1680, under the title of "Circulus anatomico-physiologicus, sive œconomia corporis animalis," 4to. In this he examines, with accuracy and judgment, the different hypotheses then prevailing in medicine. He here first shewed the difference between the cystic and the hepatic bile. Finding the liquor amni coagulable, he supposed it contributed to the nourishment of the fœtus; which, however, later experience contradicts, as fœtuses born without heads, or where the passage through the œsophagus into the stomach has been closed, are found to attain, in utero, equal bulk and firmness, as those that are perfect. He supposed the heart to be excited to contraction by the stimulus of the blood; and shews the ossa pubis are not separated in parturition, to allow a free passage to the fœtus; which was in his time the prevailing doctrine. In his "De variolis, hæcenus in patria grassatis," published in 1679, he advises giving purgatives with calomel, on the first attack of the complaint, with the view of rendering the disease more mild; a practice of which later experience has proved the utility. In his "De Renunciacione vulnerum," 1689, 4to. Amsterdam, he shews what wounds are necessarily fatal. His treatise "De Officio medici duplici, clinico, et forensi," 4to. 1704, gives rules for the conduct of physicians, in attending their patients, and in giving evidence before a court of judicature. This is a work of great merit, and has scarcely been exceeded by any later production on the subject. These have all been frequently reprinted. Haller. Bib. Med. Eloy. Blumenbach.

BOHOL, in *Geography*, one of the Philippine islands between Maoula and Mindanao, about 16 leagues long from north to south, and 8 or 10 broad. The south coast towards Mindanao is the most populous; that is, from Lobag, the metropolis, to the little island or peninsula of Pangloo. The soil does not produce rice, but is said to be rich in gold mines, and to yield, in great abundance, cocoas, batatas, and several sorts of roots which serve instead of rice. In the mountains there are multitudes of cattle and fish in the sea, which the natives exchange with those of the neighbouring islands for cotton. N. lat. 10°. E. long. 122° 5'.

BOHONIZ, a town of Bohemia, in the circle of Bechin, 2 miles S.S.W. of Teia.

BOHRAN, a town of Silesia, in the principality of Breslaw, 16 miles south of Breslaw.

BOHRLITZ, a town of Moravia, in the circle of Brunn, 9 miles W.N.W. of Aufpitz.

BOHUS, or BAHUS, a fortified island of Sweden, in Gothland, encircled by two branches of the Gotha, about 9 miles north of Gotheborg. The fort stands on a rocky eminence, and was formerly celebrated in the history of Norway, as a place of considerable strength, and forming the frontier fortrefs during the constant wars between the Danes and Swedes. It was erected in 1309 by Haquin IV. king of Norway, and, before the invention of gun-powder, it was a wooden fortrefs; but in 1448 was built with stone by Christian I. The situation is strong, and it is garrisoned by 100 men. The summit affords a pleasing view of the Gotha, winding at the feet of barren rocks. Bohus gives name to a jurisdiction of which it is the capital. It formerly belonged to Denmark, but by the treaty of Roschild, in 1658, it was ceded to Sweden.

BOHUSLAW, a town of Poland, in the palatinate of Kioo, near the river Ros. N. lat. 49° 37'. E. long. 31° 11'.

BOJA, in *Antiquity*, a collar or chain fastened about the necks of criminals, to prevent their escape.

The word is also written *loga*, *bodja*, and *baga*.

BOIA, in *Ancient Geography*, an island in the Ægean sea. Anton. Itin.

BOJADOR, CAPE, or BAJADORE (which see), in *Geography*, lies on the western coast of North Africa, placed in the Tables of the Commissioners of Longitude, in N. lat. 26° 12' 30", W. long. 14° 27'. and, in Rennell's map, in N. lat. 26° 20', W. long. 14° 17'.—W. long. 14° 49', by M. Fleurieu, and 14° 28' Conn. de Temps. This cape was doubled by Gilianez and the Portuguese navigators, under the direction of prince Henry, and emboldened by their voyages to Madeira, which required their quitting the coast and venturing into the open sea, in the year 1433. For 20 years before this time, this cape had been the boundary of their navigation, and it had been deemed impassable. But this successful voyage, placed by the ignorance of the age on a level with the most famous exploits recorded in history, opened a new sphere to navigation, as it discovered the vast continent of Africa, still washed by the Atlantic ocean, and stretching towards the south. Of such consequence was the doubling of this cape, that the Portuguese soon after advanced within the tropics, and in the space of a few years discovered the river Senegal, and the whole coast extending from cape Blanco to cape de Verd.

BOIANO, a town of Naples, in the county of Molise, the see of a bishop, suffragan of Benevento, who resides at Campo-Basso, 9 miles south of Molise. See BOVIANUM.

BOIARDO, MATTEO-MARIA, in *Biography*, count of Scandiano, a person eminent for literature, was born at Fratta near Ferrara, about the year 1430, and educated at the university of that city, where he principally resided. Being highly esteemed by the dukes Borso and Hercules I., he was appointed by the latter governor of Reggio in the Modenese, where he died in 1494. He was well acquainted with the Greek and Latin languages; and translated into Italian, from the former, the history of Herodotus, and from the latter, the golden age of Apuleius, and the chronicle of Ricobaldo. His eclogues in Latin verse are reckoned among the most elegant productions of that age. He also wrote in Italian verse a comedy, entitled "Timon," taken from a dialogue in Lucian, and other pieces. But his greatest fame was derived from his "Orlando Innamorato," which combines with the ancient epic the extravagance of modern romance. His style was rude, and his versification stiff and harsh; but the fervour of his fancy and the liveliness of his imagery rendered this work, which he left unfinished, captivating and popular. It was continued by Niccolo Agostino, and

and recomposed and polished, about half a century afterwards, by Lud. Domenico and Fr. Berni. The work of the latter is so well executed, that it has almost superseded the original. The best edition of Boiardo's own performance is that of Venice in 1544. This work served as the model and groundwork of Ariosto's "Orlando Furioso;" which is properly a continuation of it with new adventures. Boiardo's sonnets bear the character of a much purer style than his Orlando. Moreti.

BOIARKI, in *Geography*, a town of Poland, in the palatinate of Kiow, 38 miles S. S. E. of Bialacerkiew.

BOICININGA, or, more properly, **BOICININGUA**, in *Zoology*, the Brazilian name of the most common kind of rattle-snake that is found in South America:—*Crotale boiguira* of Bosc.

BOICUAIBA, a kind of Peruvian serpent, supposed to belong to the *Boa* genus. It is described as being twenty feet long, black on the anterior part, the rest yellow.

BOIGA, the name of an American snake, called by Linæus *Coluber abastulla*.

BOIGUACU, the name of a sort of serpent, called also *iboiá*, and by the Portuguese *Cobra de veado*. The relations of those writers who speak of this extraordinary creature partake rather of the marvellous, inasmuch that we cannot but entertain considerable doubt as to the identity of the species; that it is of the *boa* tribe there can be no dispute. Perhaps it is no other than the *ibiboloca* and *boiguacu* of Seba, which Dr. Shaw describes under the name of *Boa regia*; a species somewhat allied to constrictor, and of which the history has probably been confounded with that of the latter kind. The *boiguacu* is represented as the largest of all the serpent tribe, in which it agrees with constrictor. It grows, we are told, to the length of four and twenty feet, and more. The middle of the body very thick, but becoming smaller at the head and tail. Down the middle of the back runs a chain of black spots, a hand's breadth distant from one another, each having a spot of white in its middle; and below these are two other rows of smaller black spots, towards the belly. Each jaw is said to be furnished with two rows of sharp teeth, white as pearl. The head very broad, with two protuberances over the eyes, and, in some of this species, two claws, like those of birds, behind the anus, towards the tail. The last particular of which must evidently be an absurd mistake, arising from the inattention of the describer.

We are further told, that the *boiguacu* is a terrible creature, one that preys upon the larger animals, and will seize upon a man. That it either lies in ambush in the thickets, or on the branches of large trees, from which it throws itself upon its prey. It has no venom in its bite; and its flesh is eaten and esteemed a delicacy. This sort is common in the Brazils. The size to which it attains sometimes is astonishing. Borritus preserved the skin of one (supposed to be the same) which had been killed by himself, that was twelve yards long; and he relates, that there was a serpent of this kind destroyed in Java, that measured thirteen yards and a half in length, and had, when killed, a boar in its belly. And de Laet relates, that in Rio de la Plata there are some of this kind of serpents so large, that they will swallow a whole stag, the horns not excepted. This is probably exaggerated. It is affirmed of the *boa constrictor*, by others, that when the enormous creature has gorged an animal of this kind, the horns remain sticking out of the mouth of the serpent, till the digestion of the flesh takes place, and the horns drop off. The *boiguacu* is eaten by the natives of Brazil.

BOII, in *Ancient Geography*, a people, who, according to Cæsar (lib. vi. c. 24.), were a Gaulish nation, but from Gaul passed into Germany, and, settling in the present Bohemia,

continued there till they were expelled by the Marcomanni. Strabo calls them at different times Celtes and Gauls; and M. Pelloutier is of opinion that they were a tribe of the Celts, who inhabited Thrace and Illyria. Some of these, he says, occupied the Hercynian forest on the other side of the Danube, and migrated into Bohemia; others were mixed among the inhabitants of Thrace; and others remained in Illyria, between the Danube and the Drave. Of these Boii there were, therefore, several distinct tribes. After Bellocus had made an irruption into Italy through the country of the Taurini, the Boii and Lingones entered it by the Penine Alps. These Boii occupied the more southern part of Gallia Cispadana, or Cisalpine Gaul, and were separated from Etruria by the Apennines, and from the Senones by the Rubico. Their principal city was Bononia. In the year of Rome 395, they advanced in Italy as far as the plain of Præneste, and were defeated there by the dictator C. Sulpicius. Pursued by the Romans, they retired over the Danube, and inhabited the confines of Pannonia and Illyria, along with the Taurisci and Scordisci. In this country they contended with Boerebitas, king of the Getæ, and were destroyed by his troops. Their country afterwards remained desert and uncultivated, and was called the "desert of the Boii." The Romans in process of time built here the towns of Scarabantia and Sabaria. Cæsar is supposed to have referred to these Boii, when he says, that the Boii who had remained on the other side of the Rhine, and who had descended from Noricia, where they laid siege to the town of Noreia, were summoned by the Helvetii to unite with them in an irruption into Gaul. Another body of the Boii having entered into Germany, settled on the north of the Danube, in an extensive country, almost wholly surrounded by mountains, and having on the western part the Hercynian mountains. This country was afterwards occupied by the Marcomanni, and is now called Bohemia. These Boii were blended by degrees with other nations; but retaining some kind of importance, they preserved an imperfect trace of their name in that of Boioarii, whence proceeded Bavaria. The Boii, who joined the Helvetii on their attack of the Gauls, were overpowered by Cæsar; but after their defeat, the Ædui prevailed with Cæsar to allow them a settlement, on account of their distinguished valour, in a small district of their territory. It is said that he built for them a small town called "Gergovica," of which no trace now remains. M. d'Anville places these Boii in a kind of peninsula, formed by the rivers Liger and Elaver, before their re-union. Another body of the Boii, denominated by Aufonius "Picci," occupied the western part of Gaul, comprehended in Novem-Populana, south-west of the Bituriges Vivisci, upon the sea-coast.

BOIL, or **FURUNCLE**, in *Surgery*, is a painful, circumscribed, and inflammatory tumour, seldom larger than a pigeon's egg, generally of a conical figure, seated in the subcutaneous adipose membrane, and proceeding from an internal cause. Its apex or central point is but slightly raised above the skin, and commonly tends to suppuration. No part of the surface of the body is exempt from the attacks of this disorder, but those parts are more liable to boils which abound with cellular substance. The purulent fluid they contain is usually inclosed in one or more cysts or lacculi, and is very slow in coming to a state of full maturation; so that it is requisite to aid the formation of matter, by warm stimulating applications, and at the same time to support the constitution by strengthening remedies, nutritious diet, and salubrious air.

Several boils will often appear at the same time, and after they have healed, new ones may arise; in which case, we may suspect the patient to be of an ill habit of body, and to re-

quire particular medical attention. But it is a very bad practice, though by no means uncommon, to administer frequent purges in such cases, which tend still more to diminish the tone of the patient, already too much exhausted. The state of the system must be remedied by such means as are indicated by the peculiar circumstances of the patient; for no general plan can be prescribed, which is proper in all cases.

Before a considerable boil appears, the patient sometimes feels himself indisposed, rather feverish, and is troubled with a number of slight complaints, which all disappear as soon as the tumour is formed; so that in this case it seems to have some similarity with a critical metastasis. Otherwise, boils, on account of the sense of tension and pain which they occasion, are more troublesome than dangerous.

The best common method of treating these tumours locally, is to bring them as soon as possible to suppuration, as this seems to be their natural tendency; and as the attempt to discuss them generally succeeds either very imperfectly or not at all, some few cases excepted. For discussing them are recommended the external applications of spirit of vitriol mixed with honey, strong wine-vinegar, camphorated oil, &c. In most cases, however, it is necessary that we should immediately endeavour to promote suppuration, which may be done by means of simple emollients; such as bread and milk poultices, linseed cataplasms, or a mixture of oatmeal and honey. If the pain be extremely great, we may add a small quantity of the extract of hemlock or poppies, and give a grain or two of opium internally. When the inflammation is moderate, but the hardness considerable, stimulant and calefacient remedies, such as roasted onions, white-lily roots, gum ammoniac, &c. must be combined with the emollients. Mr. Fielitz affirms that no remedy brings boils so easily and quickly to suppuration, as the leaves of the *ricinus communis* boiled in milk, and applied in the form of a poultice.

When the tumour does not burst spontaneously, which it generally does at its point, it is to be opened with a lancet. Besides the general rules, according to which such an abscess must be treated, it is necessary also that the core or membranous part of the boil should be extracted in due time, and that all the remaining hardness about the circumference of the fore should be discussed. For as long as this core remains in the cavity, the fore will not heal perfectly, neither can it be brought to heal unless the hardness be discussed, but either an ulcer or a fistula is produced, or the fore skins over, whilst an induration still remains behind, which gives rise, according to the part in which it is situated, to various troublesome symptoms, and after some time becomes again inflamed, nor does it disappear entirely till it is discussed by a complete suppuration.

We may indeed attempt to discuss such indurations by means of the usual deobstruents, such as the external applications of mercury, hemlock, soap, belladonna, &c. but they will generally fail of their effect, and we shall be obliged to wait till a new inflammation is produced. It is therefore best to support and promote the suppuration from the very commencement, and not to suffer the abscess to heal up till all remains of induration have disappeared; and when the suppuration does not proceed with sufficient vigour, it ought to be promoted by means of warm turpentine, and digestive ointment. If this do not produce the requisite effect, it should be mixed with red precipitate; and to the indurated parts we ought to apply externally hot fomentations, with other emollient and stimulant remedies, according to the general rules laid down under the article ABSCESS.

BOILS, *gum.* See GUM.

BOILEAU, NICHOLAS, named *Despreaux*, in *Biography*,

an eminent satirical poet and critic, was born either at Paris, or at Crone near that city, in 1636. Boileau himself, after having been truly ennobled by his writings, had the silly vanity to pique himself on the high antiquity of his lineage. He pretended that John Boileau, the ancestor of his family, was ennobled in 1371 by Charles V. king of France; and he boasted, in consequence of a suit instituted against his family, and occasioned by a severe scrutiny into the validity of titles assumed by the noblesse of the kingdom, under a commission of inquiry established by Lewis XIV. in 1695, that he had gained his cause with flying colours, and that he had a patent in his possession which allowed him a nobility of 400 years' antiquity. It is said, however, that the sentence passed in favour of Boileau's nobility was the result of his reputation as a poet, honoured with the protection of the king; that the titles produced had been fabricated; and that a writ had been found among the papers of the poet for 20 louis d'ors, paid by him for his share in the titles which had been forged by an obscure person of the name of Haudiquet. However this be, his own writings were unquestionably his best "lettres de noblesse." As a younger brother, he was harshly treated in his youth, more especially because his father regarded him as a heavy and stupid lad, destitute of that vivacity of temper and understanding for which his elder brothers were distinguished. We are informed also, that he underwent an operation for the stone at eight years of age. These circumstances probably induced him to declare, that if he could be restored to infancy, on the hard conditions he had experienced, he would not have accepted the grant; and hence he always disputed the common opinion that infancy is the happiest period of our lives. Despreaux, indeed, seems not to have thought the other parts of his life more happy than his infancy; to him all appeared equally miserable; youth tormented with passions, maturity with cares, and old age with infirmities; and he seemed to have adopted in some measure that philosopher's opinion, who, when he was asked "what was the happiest period of a man's life?" answered, "that which is past." "It would be difficult," says Despreaux, "to determine this question; we are sure, however, that it is hardly ever the present time." Boileau was intended by his father for the profession of an advocate; but his taste for polite literature, to the culture and gratification of which he devoted his leisure hours, disqualified him for this mode of life; and his repugnance to it was strongly indicated by his dropping asleep, while his brother-in-law, M. Dongois, a clerk of parliament was reading an arret, which he had taken great pains to compose. Upon this, he was sent home to his father as an invincible dunce, who would be nothing else but a simpleton during his life. Relieved from the embarrassment of pursuing a profession which he detested, his attention was next directed to scholastic divinity, from which he was equally averse. When his father found, that his views respecting him were altogether frustrated, he allowed him to indulge his own inclination, and to devote himself wholly to literature. At the age of thirty years, Boileau's true character, which had long been unknown to any but his intimate and confidential friends, was developed; and he appeared before the public as a "writer of satires." He began with ridiculing the numerous tribe of bad writers, and he thus excited a host of enemies. Among others the duke de Montausser reproached him on account of the severity of his personal satires as injurious to society; but he contrived to disarm his enmity by a single stroke of flattery, which verified, says D'Alembert, the lines of La Fontaine:

"Amuse the great with adulation,
Your praise to all their faults extend,

Whate'er

Whate'er their former indignation,
The bait goes down, and you're their friend."

Twelve of his satires were published; one of these was his satire against women, the most bitter and outrageous of all, which is said to have been occasioned by his having been in early life jilted by a young person to whom he was going to be married, and who ran away with a musquetaire. Racine the younger, one of his particular friends, however, says, that he never had a mistress, nor ever thought of marrying. On the publication of this satire he was attacked from all quarters; but his friend Racine consoled him as well as he could: "Courage," says he, "you have attacked a numerous corps, which is all tongue; but the storm will blow over." The best of his satires was that entitled "A son Esprit;" a piece of irony, abounding with the most keen and polished ridicule. Whatever reproach Boileau incurred for the personality of his satires, it is mentioned to his honour, that he always distinguished between folly and vice; and that he never attacked bad taste and dunces with any other arms than ridicule, while vice and profligacy were treated by him with just indignation.

The satires of Boileau were followed by his "Art of Poetry," which is reckoned the best of all the poetical works of criticism existing, equally admirable for the good sense of its maxims, and the appropriate beauties of language by which his precepts are exemplified. This was succeeded by his "Epistles," formed after the model of Horace, and rendered peculiarly pleasing by the union of morality with criticism, and description with sentiment; interspersed with characteristic traits and anecdotes of himself. In one of these, addressed to the king, he artfully, at the instigation of Colbert, endeavoured to divert the sovereign's mind from the schemes of conquest to the glory of promoting the welfare of his subjects by plans of utility and beneficence. Lewis was gratified by the delicate praise with which this advice was accompanied, and applauded the epistles; but went to war with Holland. In 1674, he published his "Lutrin," a mock-heroic kind of composition, founded on a trifling dispute between the treasurer and chanter of the holy chapel, and ranking among the first productions of this class. Boileau had now acquired a degree of reputation which recommended him to favour and patronage at court; and the king honoured him with a pension, an exclusive privilege for printing his own works, and the office, conjointly with his friend Racine, of royal historiographer. In this latter capacity, neither he nor his associate had an opportunity of appearing before the public. Boileau, indeed, published his "Ode on the taking of Namur," which is more an historical than a poetical effort. At this time he attended frequently at court; and yet he maintained a freedom and frankness of speech, more especially on topics of literature, which are not common among courtiers. When Lewis asked his opinion of some verses which he had written, he replied; "Nothing, sire, is impossible to your majesty; you wished to make bad verses, and you have succeeded." He also took part with the persecuted members of the Port-royal; and when one of the courtiers declared, that the king was making diligent search after the celebrated Arnauld, in order to put him in the Bastille, Boileau observed, "His majesty is too fortunate; he will not find him;" and when the king asked him, what was the reason why the whole world was running after a preacher, named le Tourneux, a disciple of Arnauld, "Your majesty," he replied, "knows how fond people are of novelty;—this is a minister who preaches the gospel." Boileau appears, from various circumstances, to have been no great friend to the Jesuits, whom he offended by his "Epistle on

the Love of God," and by many free speeches. By royal favour, he was admitted unanimously, in 1684, into the French academy, with which he had made very free in his epigrams; and he was also associated to the new Academy of Inscriptions and Belles Lettres, of which he appeared to be a fit member by his "Translation of Longinus on the Sublime." To science, with which he had little acquaintance, he rendered, however, important service by his burlesque "Arret in favour of the University, against an unknown personage called Reason," which was the means of preventing the establishment of a plan of intolerance in matters of philosophy. His attachment to the ancients, as the true models of literary taste and excellence, occasioned a controversy between him and Perrault concerning the comparative merit of the ancients and moderns, which was prosecuted for some time by epigrams and mutual reproaches, till at length the public began to be tired with their disputes, and a reconciliation was effected by the good offices of their common friends. This controversy laid the foundation of a lasting enmity between Boileau and Fontenelle, who inclined to the party of Perrault. Boileau, however, did not maintain his opinion with the pedantic extravagance of the Dacier; but he happily exercised his wit on the misrepresentations of the noted characters of antiquity, by the fashionable romances of the time, in his dialogue entitled "The Heroes of Romance," composed in the manner of Lucian. In opposition to the absurd opinion of father Hardouin, that most of the classical productions of ancient Rome had been written by the monks of the 13th century, Boileau pleasantly remarks, "I know nothing of all that; but though I am not very partial to the monks, I should not have been sorry to have lived with friar Tibullus, friar Juvenal, Dom Virgil, Dom Cicero, and such kind of folk." After the death of Racine, Boileau very much retired from court; induced partly by his love of liberty and independence, and partly by his dislike of that adulation which was expected, and for which the close of Lewis's reign afforded more scanty materials than its commencement. Separated in a great degree from society, he indulged that austere and misanthropical disposition, from which he was never wholly exempt. His conversation, however, was more mild and gentle than his writings; and, as he used to say of himself, without "nails or claws," it was enlivened by occasional sallies of pleasantry, and rendered instructive by judicious opinions of authors and their works. He was religious without bigotry; and he abhorred fanaticism and hypocrisy. His circumstances were easy; and his prudent economy has been charged by some with degenerating into avarice. Instances, however, occur of his liberality and beneficence. At the death of Colbert, the pension which he had given to the poet Corneille was suppressed, though he was poor, old, infirm, and dying. Boileau interceded with the king for the restoration of it, and offered to transfer his own to Corneille, telling the monarch, that he should be ashamed to receive his bounty while such a man was in want of it. He also bought, at an advanced price, the library of Patru, reduced in his circumstances, and left him in the possession of it till his death. He gave to the poor all the revenues he had received for eight years from a benefice he had enjoyed, without performing the duties of it. To indigent men of letters his purse was always open; and at his death he bequeathed almost all his possessions to the poor. Upon the whole, his temper, though naturally austere, was, on many occasions, kind and benevolent, so that it has been said of him, that he was "cruel only in verse;" and his general character was distinguished by worth and integrity, with some alloys of literary jealousy and injustice.

justice. He died of a dropfy in the breast in 1711, at the age of 75, and bequeathed the greater part of his property to charitable uses. His funeral was attended by a very considerable number of persons of rank and literature. How came this man (exclaimed a woman in the street) to have so many friends? They say he never spoke well of any body in his life.

As a poetical writer, he has been denominated the "poet of good sense," correct in his versification, choice and pure in his language, just and rational in his sentiments, always guided by judgment and taste, observing the limits of decorum, and never betrayed by wit or fancy into extravagancies. Few, if any writer, ever composed so much, with so little occasion for erasement or alteration. Voltaire, who often denied the equity of his decisions in matters of criticism, says of him, in a letter to Helvetius; "I agree with you that Boileau is not a sublime poet; but he executed admirably whatever he undertook. He is clear, easy, happy in his expression; he seldom rises very high, but he never sinks. Besides, the subjects of which he treats are not of a kind to require great elevation.—I shall, therefore, always warmly recommend that kind of writing which he has so well taught, that respect for language, that quick succession of ideas, the art and facility with which he conducts his reader from one subject to another; and above all, his simplicity, which is the true fruit of genius." Boileau, was the first writer who formed the national taste of France, and by his translations and imitations gave his countrymen a true relish for the epistles and satires of Horace, which before his time used to be much less esteemed than his odes. The great defect of Boileau, according to D'Alembert, is want of sensibility; and if enthusiasm, which is incompatible with that coldness of heart that distinguished his character, is essential to a true poet, his claim to this honourable appellation must be disallowed. Nevertheless, his works may be justly regarded as master-pieces of their kind, and can never die, as long as the language in which they are written exists. Having taken great pains in the composition of them, he was not insensible of their peculiar and characteristic excellence; accordingly, in some lines written by himself, and intended to be placed under his portrait, he makes no hesitation in affirming that he had united the merits of Persius, Juvenal, and Horace. Boileau and Pope have been thought much to resemble one another, as to both the kind and discriminating character of their writings; but, says a very competent judge, "Boileau, with a nearly equal portion of wit, has much more delicacy and correctness; while Pope as much surpasses him in force and fancy. Both abound in good sense, and each has enriched his language with nervous lines that have passed into proverbial sentences." In another place the same writer observes, that after we have rendered to Boileau Despreaux all due homage as a great poet, and as the legislator of taste, his faults as a satirist indicate an acrimonious and unfeeling character, a high conceit of his own powers and consequence, and an unpardonable disregard of the happiness and reputation of others. "If the English poet had as much causticity as the French, and more peevish irritability, he seems to have had a more feeling heart, and a nicer sense of justice." We may remark, that personal satire soon loses its salt and poignancy: and that the satires of Boileau, as well as the Dunciad of Pope, are less read now than any of their other works.

Besides the works of Boileau, already mentioned, there are several smaller pieces both in prose and verse. Of the whole there have been various editions, with explanatory notes; and of these the principal are that of Geneva, 2 vols. 4to. 1716,

with illustrations, by Brofette; that of the Hague, with Picart's figures and notes, 2 vols. fol. 1718, and 4 vols. 12 mo. 1722; that by Allix, with Cochin's figures, 2 vols. 4to. 1740; and that of Durand with illustrations, by St. Marc, 5 vols. 8vo. 1747.

Boileau had several brothers of very singular characters. *James*, a doctor of the Sorbonne, was born in 1635, studied in the university of Paris, took his degree of doctor in theology in 1662, was appointed dean of Sens, and vicar of the archbishop Gondoin, in 1667; and in 1694, was presented by the king with a canonry in the holy chapel of Paris. He died dean of the faculty of theology in 1716. He is well known by a number of works in a peculiar style, some of which were not remarkable for decency; but these he wrote in Latin, "lest the bishops," he said "should condemn them." He was not more a friend to the Jesuits than his brother; and he described them as "Men who lengthened the creed, and shortened the commandments." As dean of the chapter of Sens, he was appointed to harangue the celebrated prince of Condé, when he passed through the city. This great commander took particular pleasure on these occasions in disconcerting his panegyrist; but the doctor, perceiving his intention, counteracted great confusion, and addressed him in the following manner: "Your highness will not be surpris'd, I trust, at seeing me tremble in your presence at the head of a company of peaceful priests; I should tremble still more, if I was at the head of 30,000 soldiers." He manifested a contempt of fanaticism, as well as of decorum, by his "*Historia Flagellantium, &c.*" or, an account of the extravagant, and often indecent, practice of discipline by flagellation, in the Christian church. It was translated into French; and not many years ago (viz. 1777, 4to. and again in 1782, 8vo.) by M. de Lolme, into English. In his treatise "*De antiquo jure presbyterorum in regimine ecclesiastico,*" he discovers the greatest freedom of sentiment, endeavouring to shew, that in the primitive times the priests participated with the bishops in the government of the church. He was also the author of several other publications, displaying much curious learning and a satirical turn, which are now consign'd to oblivion.

Gilles, the eldest brother of Boileau Despreaux, was born in 1631, and had a place in the king's household. He was a man of wit and learning, and published a translation of Arrian's *Epicætetus*, with a life of the philosopher, Paris, 1655, 8vo. He also published a translation of *Diogenes Laertius*, in 2 vols. 12mo. 1668; and two dissertations against Menage and Costar. His "*Posthumous Works*" were published in 1670. He also wrote verses, in no high estimation; and his poetical pretensions excited a jealousy of his brother's rising fame, which produced an open variance between them. He was a member of the French academy; and died in 1669. *Gen. Dict. Nouv. Dict. Hist. D'Alembert's Hist. des Membres de l'Acad. Franc. 1787, and Eloges, &c. 1779,*—translated by Aikin in 2 vols. 8vo. 1799.

BOILED, or **BOYLED silks**, those which have been put, while in the balls, into hot water, to make them wind the better.

In which sense boiled silk stands opposed to raw.

BOILER, or **BOYLER**, a large copper vessel, wherein things are exposed over the fire to be boiled.

The boiler, in the alum-works, is a vessel, in which the liquor is evaporated to a consistence, and is made of lead. The general size is about eight feet square, and they contain about twelve tons each.

They make them in this manner: first, they lay long pieces of cast-iron, twelve inches square, as long as the breadth

breadth of the boiler, and at about twelve inches distance from one another. These are placed twenty-four inches above the surface of the fire. On these maffy bars of iron they lay, cross-wise, the common flat bars of iron, as close as they can lie together, and then make up the sides with brick-work. In the middle of the bottom of this boiler is laid a trough of lead, wherein they put at first about a hundred pound weight of the rock. They use Newcastle coals in the boiling; and if they find the liquor not strong enough, they add more of the rock at times, as it boils. Phil. Trans. N^o 142.

The boiler for making colours, &c. must be made of pewter; because iron and copper will be corroded by the saline substances used in the manufacture of them.

Count Rumford (see his *Essays*, vol. i. p. 220.) recommends double bottoms to boilers, and also to saucepans and kettles of all kinds, used for culinary purposes; which contrivance, he says, will, in all cases, most effectually prevent what is called by the cooks, "burning-to." The heat is so much obstructed in its passage through the thin sheet of air which, notwithstanding all the care that is taken to bring the two bottoms into actual contact, will still remain between them, that the second has time to give its heat as fast as it receives it to the fluid in the boiler; and consequently it never acquires a degree of heat sufficient for burning any thing that may be upon it. He suggests that it will probably be best to double copper saucepans and small kettles throughout: and as this may and ought to be done with a very thin sheet of metal, it would not cost much, even if the lining were to be made of silver. When the two sheets of metal that form the double bottoms of boilers are made to touch each other throughout, by hammering them together, after the false bottom has been fixed in its place, they may be tacked together, by a few small rivets placed here and there, at considerable distances from each other, and when this is done, the boiler may be tinned. In this operation, if proper care be taken, the edge of the false bottom may be soldered by the tin to the sides of the boiler, and thus the water or other liquids, put into the boiler, will be prevented from getting between the two bottoms. The Count adds, that this invention of double bottoms might be used with great success by distillers, to prevent their liquor, when it is thick, from burning to the bottom of their stills. (See *STILL*.) Having found in the course of his experiments, (See *Phil. Trans.* 1792. Part I.) that confined air is the best barrier that can be opposed to heat for the purpose of confining it, he proposed to confine the heat in the boilers of his construction, and to prevent its escape into the atmosphere, by means of double covers. These covers were made of tin, or rather of thin iron plates tinned, in the form of a hollow-cone; the height of the cone being equal to about one-third of its diameter; and thus the air which it contained was entirely shut up, the bottom of the cone being closed by a circular plate or thin sheet of tinned iron. The bottom of the cone was accurately fitted to the top of the boiler, which it completely closed by means of a rim about two inches wide, which entered the boiler; which rim was soldered to the flat sheet of tinned iron that formed the bottom of the cover. The steam, generated by the boiling liquid, was carried off by a tube about half an inch in diameter, which passed through the hollow conical cover, and which was attached to the cover, both above and below, with solder, in such a manner that the air with which the hollow cone was filled remained completely confined, and cut off from all communication with the external air of the atmosphere, as well as with the steam it generated in the boiler. For his various contrivances in the most advan-

tageous construction of boilers for the saving of fuel, and for producing the desired effect, we refer to his *Essays*, vol. ii. p. 18, &c.

BOILERY, or **BOYLARY**, in the *Salt Works*, denotes a salt-house, pit, or other place, where salt is made.

BOILING OF MEAT, in *Cookery*, is the exposing of meat to the heat of boiling water, while it is immersed in it for a certain time. By this joint application of heat and moisture, the texture is rendered more tender and more soluble in the stomach; and it is only in this way, that the firmer parts, as the tendinous, ligamentous, and membranous parts can be duly softened, and their gelatinous substance duly extracted. A moderate boiling renders the texture of animal flesh more tender, without much diminution of its nutritious quality; but if the boiling is extended to extract every thing soluble, the substance remaining becomes less soluble in the stomach, and at the same time much less nutritious. But as boiling extracts in the first place the more soluble, and therefore the saline parts; so the remainder, after boiling, is in proportion to the continuance of the operation less alkalescent, and less heating to the system.

Boiling is commonly practised in open vessels, or in vessels not closely covered; but it may be performed in digesters, or vessels accurately and tightly closed; and in such vessels the effects are very different from those that take place in open vessels. As we can hardly employ any other degree of heat than that of boiling water, the water in the digester is never made to boil, so there is no exhalation of volatile parts; and, although the solution is made with great success, and may be to any degree required, yet if it be not carried very far, the meat may be rendered very tender, while it still retains its most sapid parts; and this kind of cookery will always give the most desirable state of boiled meat. Boiling, in the ordinary way, is different, according to the proportion of water that is applied. If a small quantity be applied, and the heat in a moderate degree is continued for a long time, this is called "stewing," and has the effect of rendering the texture more tender, without extracting much of the soluble parts; and of course it leaves the meat more sapid, and sufficiently nourishing. *Cullen's Mat. Med.* vol. i. p. 400, &c.

BOILING, *ebullition*, in *Physics*, is the internal commotion excited in a mass of water or other liquefied substance, by the successive conversion of the lower portions of the fluid into vapour, and their violent effort under this expansive and elastic form to make their escape. It is usually, though not necessarily, produced by the application of heat. The circumstances which precede or accompany the phenomenon of boiling, are best observed in a thin transparent flask nearly filled with water, and suspended over a lamp or a charcoal fire. Numerous minute globules are seen collecting from all points towards the sides and rising in a stream to the surface; occasioned evidently by the discharge of air, which is always in some proportion combined with water. As the heat increases, the liquid particles near the bottom of the flask suddenly burst into steam, and shoot upwards; but in ascending through the colder mass, they again collapse, stop their progress, and seem loit. Such alternate expansions and contractions; by throwing the fluid into a gentle tremor, frequently causes a peculiar sort of singing noise, which is rightly supposed to betoken the approach of actual boiling. This singing is more likely to happen in the case where heat is applied partially; for instance, if a tea-kettle be placed at the side of the fire, since the heat is then more slowly and unequally diffused through the body of the water. But after the whole contents being fully penetrated, are warmed up to the requisite degree of intensity, the steam, as fast as it is formed,

BOILING.

formed, ascends continually and escapes unimpair'd through the fluid, which it, therefore, heaves with violent agitation.

The same appearance almost is produced by removing or even diminishing the atmospheric pressure. Thus, if a tumbler holding warm water be introduced under the receiver of an air-pump, as the exhaustion proceeds, or the incumbent weight is gradually withdrawn, the latent portion of air is discharged in a rapid flow of expanded bubbles. But this process, at some certain point of rarefaction, is succeeded by the vehement commotion which constitutes boiling; and the water, assuming its invisible form, fills the imperfect void with vapour, which betrays its existence by condensing against the sides of the receiver in copious dew. Nor is heat positively necessary towards vaporization, for it only conspires in accomplishing that effect, and supplies the want or the imperfection of our means of producing exhaustion. By help of an air-pump of the best construction, the coldest water may be made to boil, nay, ice itself could be changed into invisible steam. Hence the utter impossibility of ever obtaining a perfect vacuum, because the restraining influence of pressure being entirely removed, the liquid matter unavoidably presented would always diffuse a thin vapour.

The opposite influence of heat and pressure on the constitution of fluids is well exhibited by a very simple yet striking experiment. Take a large thin phial, and having warmed it gradually to avoid the risk of cracking the glass, fill it completely with boiling water, cork it tight, and expose it to a current of cold air. As the water cools, it necessarily contracts its volume, and leaving an imperfect vacuum below the neck of the phial, it hence becomes to a considerable degree relieved from the load of atmospheric pressure. It therefore soon begins again to boil, nay, it will boil more briskly the faster it cools; and this singular appearance, so contrary to our usual notions, may continue perhaps for the space of half an hour, till the water has grown as cold almost as the temperature of the human body. On the same principle depends the construction of what is called the *pulse glass*: this consists of two balls connected by a pretty long tube; one of these balls is filled with coloured water or spirits of wine, which having been made to boil and expel the air by its vapour, at the same instant the point projecting from the other ball is hermetically sealed. As that vapour condenses with cold, it will leave the included liquid then in a sort of vacuum, and the heat of the hand is then sufficient to cause it to boil and to flow from one ball into the other.

If a vessel containing water be placed over a steady fire, the water will grow continually hotter till it reaches the limit of boiling, after which the regular accessions of heat are wholly spent in converting it into steam. The water therefore remains at the same pitch of temperature, however fiercely it boils. The only difference is that, with a strong fire, it sooner comes to boil, and more quickly boils away. Hence the reason why a vessel full of water, and plunged into the centre of a larger one, which is likewise filled with that fluid, barely acquires the boiling heat, but will never actually boil.

The formation of steam occasions a prodigious consumption of heat; for if the time be noted in which water, by the action of a strong fire, is raised from the limit of freezing to that of boiling, it will be found to require more than five times longer a space to boil entirely away. Thus, a portion of heat corresponding to above 900 degrees by Fahrenheit's scale, is always consumed in the act of boiling, or rather it is transferred and enters into the composition of steam, the gaseous product. This absorbed heat is as constantly evolved when steam condenses and returns to its liquid form.

Hence in distillation a very large refrigeratory is required for condensing a comparatively small quantity of aqueous or spirituous vapour. Hence too the explication of the familiar remark that steam scalds more cruelly than boiling water.

The heat of boiling water, being subject to the influence of the atmospheric pressure, is thus not absolutely fixed. It varies with the variation of the barometer, and decreases as the mercury descends. The extent of this fluctuation may in our changeable climate amount to five degrees by Fahrenheit's scale, the successive difference of a degree corresponding nearly to each twentieth part of the remaining incumbent weight. On the tops of lofty mountains water will boil much sooner than in the plains below. This curious fact has been noticed by several travellers, and was particularly observed by Saussure on the summit of Mont Blanc. A still greater variation would be experienced on the peak of Chimboraco, the highest point of the Andes, where water would boil with a heat scarcely superior to that which is commonly assigned for the boiling of spirits of wine.

It is therefore evident that, under an augmented pressure, all liquids will more slowly reach the crisis of ebullition and will then have acquired a more intense heat. Thus water may be heated up many degrees above the mean point of boiling, if it be subjected to the action either of condensed air or of confined steam. Such is the principle of *Papin's Digester*; which, being nearly filled with water, is shut perfectly close, and set on a good fire. As the steam so formed is prevented from escaping, it necessarily concentrates, and exerting accumulated energy, it by its prodigious compression enables the water continually to receive additional heat. Nor would this progress at all stop, till the elasticity of the imprisoned vapour comes to surmount every obstacle, and bursts the vessel with terrible explosion. Accidents of that sort are extremely dangerous, and the experiment has consequently never been pushed to its utmost practicable limits. When the fracture takes place, not only the confined steam is liberated, but the pressure being now removed, the excess of heat instantaneously converts a part or the whole of the water likewise into steam, which augments the general effect. This we may perceive in the bursting of a glass cracker; for the little base is shivered into atoms, and the water which it contained is entirely dispersed, beating down flat the wick of the candle by the violence of the sudden expansive blast.

Hence the boiling heat of a deep cauldron is always rather greater than that of a shallow pan. This excess we might estimate at nearly one degree of Fahrenheit, for each foot of depth. The heat of ebullition must also rise somewhat higher, if the steam be not allowed to escape as fast as it is generated; for which reason there may be a slight difference of energy between rapid and slow boiling. Hence by the combined operation of both these causes, water deeply lodged in the bowels of the earth, or concealed under the dark bed of the ocean, is capable of acquiring the most intense heat from the action of subterranean fires; a principle of which Dr. Hutton has ingeniously availed himself in framing his Theory of the Earth.

But the position of the boiling point is likewise modified by the influence of chemical attraction. Thus sugar, common salt, and other saline substances, have all of them a tendency to fix water and retard the crisis of its conversion into elastic vapour. Strong brine will not boil until it is heated up several degrees above the ordinary limit. Hence a vessel containing fresh water, and immersed in another which is filled with brine, will gently boil, while the surrounding fluid only simmers. On the other hand, the addition

tion of alcohol renders water more volatile. In the distillation of spirits, the fermented liquor in the copper boils always at a lower temperature, or at some intermediate point between the ebullition of water and that of alcohol. The spirituous fumes which rise carry along with them a portion of evaporated water. Hence the necessity of rectification, or repeated distillations, to procure alcohol in its purest state; for the boiling heat is lowered, and consequently the proportion of aqueous admixture is diminished, at each successive process. See DIGESTER, EBULLITION, FIRE, FLUID, HEAT, PRESSURE, STEAM, VAPOUR.

BOILING of silk with soap, is the first preparation in order to dyeing it. Thread is also boiled in a strong *lixivium* of ashes, to prepare it for dyeing.

Boiling is also a part of the process for bleaching warp linen.

BOILING to death, *caldarius decoquere*, in the *Middle Age*, a kind of punishment inflicted on false coiners, thieves, and some other criminals.

This punishment was inflicted on those who were guilty of murder by poison, 22 Hen. VIII. cap. 19. but this act was repealed by 1 Edw. VI. cap. 12.

BOILING is also a method of trying or assaying the goodness or fullness of a colour of a dye, by boiling the stuff in water with certain drugs, different according to the kind or quality of the colour, to try whether or no it will discharge, and give a tincture to the water.

With this intention, red crimson silks are boiled with alum, and scarlets with soap, in quantity equal to the weight of the silk.

BOILING waters, in *Natural History*. See SPRING, and WATER.

BOINITZ, in *Geography*, a town of Hungary, eleven miles W. N. W. of Kremnitz.

BOIOBI, in *Zoology*, the Brazilian name of the *Linnæan* *ba carina*.

BOIODURUM, in *Ancient Geography*, a town of Vinjelicia, situate on the Danube, according to Ptolemy; the Itinerary of Antonine places it on the route from Ovilabis to Augusta Vindelicium, between Stanacum and Quintiana.

BOIOHEMUM, or BOIUM, the country of the Boii, answering to the present *Bohemia*, which see. On the south of it lay the "Gabreta Sylva," and to the south, west, and north, the "Herevni montes." The interior of it was penetrated with difficulty, and was little known.

BOJOWKA, in *Geography*, a town of Poland, in the palatinate of Braclaw, forty-eight miles east of Braclaw.

BOIQUIRA, in *Zoology*, a name by which the natives, in some parts of America, call the *rattle snake*. Supposed to be the *Crotalus horridus*, of Naturalists.

BOIREL, ANTHONY, in *Biography*, born at Argentan, in Normandy, about the year 1625, applied himself to the practice of surgery, in which he acquired considerable reputation. In 1677 he published "Traité de plaies de tête," 8vo. extracted principally from the works of Hippocrates, Galen, and of Ambrose Paré, which he appears to have studied diligently. He has added some improvements to their practice.

Nicholas Boirel his brother, physician at Argentan, published, in 1702, "Nouvelles observations sur les maladies veneriennes," 12mo. Paris, which was reprinted 1711, but contains little new on the subject. Haller Bib. Eloy. D. 3. Hist.

BOIS, CARDINAL DU. See DUBOIS.

BOIS, GERRARD DU, a member of the congregation of the Oratory, and a Latin professor in it, was born at Orleans, in 1620. Having succeeded father Le Comte, in his place of librarian to St. Honoré, and having possession of his pa-

pers, he finished for the press his eighth and last volume of the "Ecclesiastical Annals of France," which was printed in 1683; and in consequence of it he obtained a pension from the French clergy. He afterwards undertook to write the history of the Parisian church; and, in 1690, published the first volume in folio. The second, which he did not live to finish, appeared after his death, which happened in 1696. This work is written in pure elegant Latin, and contains a variety of interesting facts relating to civil as well as ecclesiastical history. Nouv. Dict. Hill.

BOIS, BOYS, or BOYSE, JOHN, an eminent divine, and one of the translators of the bible in the reign of James I. was born at Nettlestead in Suffolk, in 1560, and made such early proficiency under the instructions of his father, that at the age of five years he read the bible in Hebrew, and at six, wrote that language in a fair and elegant character. At the age of 14 he was admitted into St. John's college, Cambridge, and by his great skill in the Greek language obtained a scholarship before he had been half a year at college, and afterwards a fellowship. Declining the profession of physic, for which he was intended, he devoted himself to the study of divinity, and was ordained in 1583. He officiated for 10 years in his college as principal Greek lecturer; and as an instance of his assiduous application, and of the early hours of study at that period, it is mentioned, that he voluntarily read a Greek lecture at four in the morning, which was attended by most of the fellows. On the death of his father he succeeded him in the rectory of West-Stowe, near Bury, in Suffolk; but in 1596, he married the daughter of Mr. Holt, rector of Boxworth, in Cambridgeshire, and having before resigned West-Stowe, took possession of this living. In this situation the neglect of domestic economy involved him so much in debt, that he was under a necessity of selling his choice collection of books. Afterwards, however, he retrieved his affairs by keeping a boarding-school; and was appointed one of the Cambridge translators of the bible. (See BIBLE.) The part that fell to the lot of that class of divines, with whom he was connected, was the Apocrypha; and this he completed in four years, without deriving any advantage from it besides his commons. He was afterwards appointed one of the six delegates who met at Stationers' hall in London, for the purpose of revising the translation, and who were employed for nine months in this business, with an allowance from the Stationers' company of 30s. a-week each. For the assistance which he gave to sir Henry Saville, in the publication of St. Chrysostom's works, to which he devoted the labour of many years, he received the very inadequate recompence of a single copy of the work. However, such was his reputation, that he obtained, without solicitation, from Dr. Andrews, bishop of Ely, a prebend in his cathedral, in 1615; and he was thus enabled to spend the last 28 years of his life in tranquil retirement. Although he was always a hard student, he published nothing; but left behind him many MSS. particularly a commentary on the greatest part of the N. T. A work of which few copies were printed, and, therefore, little known, appeared after his death, under the following title "Johannis Boisii veteris Interpretis cum Beza aliisque recentioribus collatio in IV. Evangeliiis, et Actis Apostolorum," London, 1655, 8vo. He sustained the character of an excellent Latin writer, a profound scholar, a loyal subject, a strict churchman, and a plain practical preacher. It was his practice to attend the public service of the church twice, if not thrice a day; and his charity was as extensive as his devotion was regular and constant. Although he devoted eight hours a day to study even in his old age, he preserved his health by the exercise of walking, to which he had accustomed himself from his youth, by confining himself to two meals a day, dinner and supper, by sitting or walking an hour after dinner before he went into his study, by occasional fasting, sometime twice in a week,

and sometimes once in three weeks, and by not studying after supper, particularly towards the close of life, but diverting himself with cheerful conversation for two hours among his friends. When he was a young student at Cambridge, he received from the learned Dr. Whitaker these three rules for avoiding those distempers which usually attend a sedentary life, to which he adhered with equal constancy and success. The first was to study always standing; the second never to study in a window; and the third never to go to bed with his feet cold. Accordingly he attained the age of 84 years, and died in 1643. *Biog. Brit.*

Bois, Du, Lake, in *Geography*, lies in North America, to the north-west of lake Superior, and receives the river de la Pluie, in N. lat. 49°. It was formerly famous for the richness of its banks and waters, which abounded with all the necessaries of a savage life. The French had formerly several settlements in and about it; but it has since declined, though it is now recovering its pristine state. The few Indians who inhabit it might live very comfortably, if they were not so immoderately fond of spirituous liquors. This lake is rendered remarkable by its having been named on the part of the Americans, as the spot from which a line of boundary between them and British America was to run west till it struck the Mississippi, which, however, as Mr. Mackenzie observes, can never happen, because the N. W. part of the lake du Bois is in N. lat. 49° 37'. and W. long. 94° 31'. and the northernmost branch of the source of the Mississippi is in N. lat. 47° 38' and W. long. 95° 6'. ascertained by Mr. Thomson, astronomer to the North-west company, who was sent expressly for that purpose in the spring of 1793. He, in the same year, determined the northern bend of the Missouri to be in N. lat. 47° 32'. and W. long. 101° 25'. and according to the Indian accounts, it runs to the south of west, so that if the Missouri were even to be considered as the Mississippi, no western line could strike it. It does not appear, says Mackenzie, to be clearly determined what course the line is to take, or from what part of lake Superior it strikes through the country to the lake du Bois; if it were to follow the principal waters to their source, it ought to keep through lake Superior to the river St. Louis, and follow that river to its source; close to which is the source of the waters falling into the river of lake la Pluie, which is a common route of the Indians to the lake du Bois; the St. Louis passes within a short distance of a branch of the Mississippi, where it becomes navigable for canoes; and if the navigation of the Mississippi is considered as of any consequence by this country, from that part of the globe, such is the nearest way to get at it. The lake du Bois is nearly round, and the canoe course lies through the centre of it, among a cluster of islands, some of which are so extensive that they may be taken for the main land. The reduced course would be nearly north and south. But, according to the navigating course, the distance is 75 miles, though in a direct line it would not be so long. At about two-thirds of it there is a small carrying place where the water is low. The carrying place out of the lake is on an island, and named Portage du Rat, in N. lat. 49° 37'. and W. long. 94° 25'. and is about 50 paces long. The lake discharges itself at both ends of this island, and forms the river Winipic, which see. Mackenzie's voyage, &c. through the Continent of North America. *Introd. p. 59.*

Bois-belle, or Henrichemont, a small sovereignty of France before the revolution, situate in Berry, between Bourges and Sancerre, about 10 leagues in circuit, containing about 6300 inhabitants; its principal towns are Bois-belle and Henrichemont, which see.

Bois-belle, a town of France, in the department of the Cher, 15 miles N. E. of Bourges.

Bois Blancs island, situated in Upper Canada, lies in the

strait between lake Erie and lake St. Clair, containing from 150 to 200 acres of good land, covered with wood; the common channel, which is narrow, lies between it and the east shore, and forms the best harbour in this country. This island commands the Detroit river from lake Erie. A wider ship-channel, though less frequented, lies on the west of the island.

Bois-commun, a town of France, and principal place of a district in the department of the Loiret, containing about 1600 inhabitants; 7 leagues N. E. of Orleans, and 5 W. of Montargis.

Bois, Glacier des, one of the lower Glaciers of the Alpine mountains adjoining to Mont Blanc, and the valley of Chamouny in Swisserland, from the thawed ice of which flows the river Arveron. This glacier is more than 15 miles long, and above three in its greatest breadth. The general thickness of the ice was found by M. Sauffure to be from 80 to 100 feet.

Bois-le-duc, or the *Duke's wood*, a city of Dutch Brabant, seated on the river Dommel, where it receives the waters of the Aa; so called from its situation in a woody country, to which the dukes of Brabant were accustomed to resort for the purpose of hunting. The woods were cut down by order of Godfrey III. duke of Brabant; and he laid the foundation of a city in 1184, which was finished in 1196, by his son duke Henry I. and much enlarged in 1352, 1453, and 1559. The city is encompassed by the Dommel and Aa, by the waters of which it may be easily inundated; and it is sometimes inaccessible except by boats. The principal forts that defend it are those of Crevecoeur, near the Meuse; another called Isabella; and a small fort called St. Antoine, towards Brabant. It has also a castle, built by order of the States General, in the 17th century, as a check on the Roman catholics then more numerous than the reformed. It has four gates; and its walls are flanked with bastions; the approach to it by land is on canieways, and by water at three gates or avenues. The cathedral, erected in 1366, and dedicated to St. John the Evangelist, is one of the most beautiful structures in the Low Countries. Its wooden tower which was very lofty and supported by four stone pillars, was destroyed by lightning in 1584. It has had several other churches and monasteries. This city suffered very much in the 16th century, during the religious wars; but at length the Dutch made themselves masters of it in 1629. Pope Paul IV. founded a bishopric at Bois-le-duc in 1559, having jurisdiction over ten cities and 189 villages; the chief revenue of which arose from the abbey of Tongerlo. The district of Bois-le-duc, called "Mayerey," is situated between Holland and Guelderland, having Holland to the N., Upper Guelderland and the duchy of Cleves to the E., the quarter of Antwerp to the W., and the bishopric of Liege to the S. It is divided into five small districts, and comprehends 102 villages, and three cities, Bois-le-duc, Helmont, and Eyndhoven. On the 14th of September 1794, an engagement took place near this town between the British army and the French, in which the latter were victorious; and on the 9th of October, in the same year, the town was taken by the French. It is 18 miles E. N. E. of Breda, and 42 S. S. E. of Amsterdam. N. lat. 51° 42'. E. long. 4° 59'.

Bois, St. Marie, le, a town of France, in the department of the Saone and Loire, and chief place of a canton, in the district of Charolles, 7 miles S. E. of Charolles.

Bois d'Oingt, a town of France, in the department of the Rhone, and chief place of a canton, in the district of Villefranche, 4½ leagues N. W. of Lyons. The place contains 900, and the canton 13,501 inhabitants; the territory comprehends 192½ kilometres, and 18 communes.

BOISEAU, in *Commerce*, a measure of two bushels and half of a peck at Bourdeaux in France.

BOISMONT, NICHOLAS THEINEL DE, in *Biography*, abbot of Grestain, preacher in ordinary to the king, doctor in theology, and member of the French academy, was born in 1715, and obtained great reputation for eloquence, particularly in the composition of funeral orations. His principal works are, a panegyric of St. Lewis, and funeral orations on the Dauphin, on the queen of Lewis XV. and on that king himself. These pieces are distinguished by great fertility of ideas, a rapid and animated style, lively and noble imagery, and philosophical reflection. On sterile subjects, the orator exercises too much art in decoration, and is too fond of antitheses. He is reckoned, however, the most eloquent of French orators in this department, and M. D'Almbert has alluded to him in a strain of high applause in his eulogy of Flechier. *Nouv. Dict. Hist.*

BOISROBERT, FRANCIS LE METEL DE, a man of wit and pleasantry, much favoured by cardinal Richelieu, was born at Caen in 1592, and contributed much to the establishment of the French academy, of which he was a member. He wrote poems, comedies, tragedies, tales, letters, romances, &c. which succeeded for a time, but are now almost forgotten. He was the amusing companion of Richelieu, and gained by his buffooneries the abbacy of Châtillon-sur-Seine, though his habits were far from being clerical. He was generous and beneficent, and took pleasure in serving men of letters. He died in 1661. *Nouv. Dict. Hist.*

BOISSARD, JOHN JAMES, an eminent antiquary, was born at Befançon in 1528, and travelled for the purpose of collecting antiquities, into Italy, the isles of Corfu, Cephalonia, and Zante, and the Morea. After his return home, he was made governor to the sons of the baron de Clerveut, and travelled with them into France, Germany, and Italy. Having lost a great part of his valuable collection at Montbelliard, when the Lorrainers ravaged Franche Comté, he took pains in repairing his loss, and published his great work, much valued by antiquaries, and now scarce, entitled "De Romanæ urbis topographia et antiquitate," in 4 vols. fol. 1597—1602, enriched with many engravings by Theodore de Bry, and his sons. He also published a work, entitled "Theatrum vitæ humanæ," 1597—1599, 4to. consisting of the lives of 198 illustrious persons with their portraits. His "Book of Emblems" was published, with figures, by Theodore de Bry, in 1593, 4to. His Latin verses were inserted by Gruter, in the "Deliciæ Poetarum Gallorum;" and after his death was printed his work "De Divinatione et magicis prestigiis," fol. He finally settled at Metz, and died there in 1602. *Gen. Dict. Nouv. Dict. Hist.*

BOISSEAUUX, in *Geography*, a town of France, in the department of the Loiret, 4 leagues N. of Neuvill.

BOISSEZON d'Aumontel, a town of France, in the department of the Tarr, and chief place of a canton in the district of Castres, 2½ leagues E.S.E. of Castres.

BOISSIERE, LA, a town of France, in the department of the Somme, and chief place of a canton, in the district of Montdidier, 2 leagues E.N.E. of Montdidier.

BOISSIEU, BARTHOLOMIW, CAMILLUS DE, son of a physician at Lyons, was born in the year 1734. His father dying when he was only six years of age, his mother is said to have taken on herself the care of his education, until he was sufficiently advanced to be fit to be sent to Montpellier. Passing through the usual stage, in 1756 he was admitted doctor in medicine, and went thence to Paris, where he continued his studios for twelve months longer. He here became acquainted with Sauvage, with whom he afterwards kept up an epistolary correspondence. He now returned to Lyons, and was admitted of the college of

physicians, and attained to considerable practice. His career was however short, for he died in 1770, aged only 36 years. He was author of two dissertations, the one on the power of antiseptic medicines, the other containing a comparative view of the cordial or heating, and the cooling or antiphlogistic, mode of treating fevers, and gives the preference to the latter. He received for each of them a medal from the academy at Dijon. They were published in the years 1770, and 1772. *Eloy. Dict. Hist.*

BOISSY, LOUIS DE, a dramatic writer of France, was born at Vic, in Auvergne, in 1694, and, though originally destined for the church, indulged his more prevalent inclination to the theatre. His first performance was a tragedy, which failed of success; but he was more prosperous in comedy. His best pieces are "L'Impatient," "Le François à Londres," "Les Dehors Trompeurs," "Le Babilard," "La Surprise de la Haine," "Le Compte de Neuilly," and "La Pièce sans Titre." Boissy's distinguishing merit consisted in availing himself of the ridicule of the day. His verses are often ingenious, but his plots are defective. He became a member of the French academy in 1751: and had the honour of reviving the credit of a periodical publication, called the French Mercury. He died in 1758. His dramatic works have been collected in 9 volumes, 8vo. *Nouv. Dict. Hist.*

BOISSY, St. Ager, in *Geography*, a town of France, in the department of the Seine-et-Oise, and principal place of a canton, in the district of Corbeil; the place contains 47, and the canton 14,224 inhabitants; the territory comprehends 177½ kilonnetres, and 26 communes.

BOISZKY, a town of Poland, in the palatinate of Bielsk, 12 miles S.W. of Bielsk.

BOITIAPO, in *Zoology*, a sort of serpent that inhabits Brazil, and is called by the Portuguese *cobra de cipo*. This is an ambiguous species. It is described as being seven or eight feet long, as thick as a man's arm, round, and pointed towards the tail, like a shoemaker's awl. The body covered with fine sub-triangular scales, the colour olive and yellowish. It lives on frogs, and must be of the poisonous kinds, since its bite is represented dangerous.

BOITMANZDORF, or BOESDORF, in *Geography*, a town of Silesia, in the principality of Neysf, 5 miles N.N.E. of Neysf.

BOITZENBURG, a town of Germany, in the circle of Upper Saxony, and Ucker Marck of Brandenburg, 8 miles S.W. of Prenzlau.

BOITZENBURG, or BOTZENBURG, a town of Germany, in the circle of Lower Saxony, and duchy of Mecklenburg, at the conflux of the Boitze and the Elbe. It was surrounded with walls in the 14th century; at this town, vessels that pass the river pay a toll, producing annually 40,000 dollars, of which the duke of Mecklenburg-Strelitz is entitled to 9000; 3 leagues E. of Lauenburg.

BOIVIN, LOUIS, in *Biography*, a distinguished scholar and pensionary of the academy of belles lettres, was born at Mentreuil l'Argillé in Upper Normandy, and educated, first under the Jesuits at Rouen, and afterwards at Paris, where he settled. His acquirements in literature were various and extensive; but his temper, according to his own account, was intractable and unfocial, enterprising, vain, and versatile. He was employed by several eminent magistrates as the associate and director of their private studies; but the litigiousness of his disposition involved himself in great trouble and expence. He published some learned dissertations on historical subjects, in the "Memoirs of the Academy of Belles Lettres;" and made great progress towards a new edition of Josephus. He died in 1724, aged 75 years.

BOIVIN, JOHN, a younger brother of the preceding, was born in 1612, and instructed by his brother, established his reputation as a man of letters at Paris, at the age of 18 years. His disposition was a counterpart to that of his brother, and he was much esteemed for his amiable temper and manners. The abbé de Louvois assigned him a considerable pension, and in 1714 procured for him the place of under-keeper of the king's library. In 1721, he was admitted member of the French Academy, and became pensionary of that of belles lettres in 1724, on the death of his brother. He excelled in the Greek language, of which he was professor in the royal college. His printed works are "An apology for Homer, and the shield of Achilles," 12mo: a French translation of "Homer's Batrachomyomachia;" a French translation of the "Oedipus of Sophocles, and the birds of Aristophanes;" "Greek Poems," much admired for their anaacreontic delicacy; an edition of the "Mathematici Veteres," 1693, fol.; a Latin "Life of Claude Pelletier;" a Latin translation of the "Byzantine History of Nicephorus Gregoras, with notes," 1702, which is esteemed faithful, learned and elegant. He also published several dissertations on historical and literary topics in the "Memoirs of the Academy of Belles Lettres." He died in 1726. *Nouv. Dict. Hist.*

BOIUM, in *Ancient Geography*, one of the four principal cities of the Doride country in Greece. It was seated on the river Pindus, to the east of Erineus.

BOKEA, in *Botany*, (*Aubl. Guian. Sup.* 38. t. 391.) fructification unknown.

Species. *B. pronacensis*. A tree sixty feet high, three feet and a half in diameter. *Trunk* with a greyish, smooth bark, throwing out at its summit a great number of branches, some upright, others inclining, and almost horizontal, which spread in all directions. *Leaves* alternate, oval lanceolate, entire, terminated by a long, tender point, smooth, firm, green, on short petioles; two caducous stipules at the base of each petiole; the exterior part of the wood is white, the interior brown, intermixed with yellowish green. The latter is very firm and compact. It is a native of Guiana. See *La Marek. Eye. Method.*

BOKELMAN, JOHN FREDERIC, in *Biography*, published the beginning of the last century at Leyden, "*Medicus Romanus servus, sexaginta solidis aestimatus.*" On this subject, a most interesting controversy was carried on some years after, between Drs. Mead and Middleton, in which many of the literati took part; and this dissertation, originally written to convey a censure on Drelincourt, was republished. The subject will be noticed again in the life of Dr Mead. *Haller Bib. Med.*

BOKENEM, in *Geography*, a town of Germany, in the circle of Lower Saxony, and bishopric of Hildesheim, 16 miles S.S.E. of Hildesheim.

BOKET, a town of Germany, in the circle of Franconia, and bishopric of Wurtzburg, 4 miles N. of Kissingen.

BOKHARA, BUCHARIA, or BOGAR, a famous city of Great Bucharia (see *BUCHARIA*), seated on the river Sogd, in that district, lying N.E. of the river Jihon, or Oxus, called Sogdiana, or Al Sogd. It is situated very advantageously for trade, in a delightful and fertile country, and has repeatedly contested the metropolitan dignity with Samarcand. Besides its own wall, which was very strong, it had an outward inclosure, comprehending not only the suburbs, but a district about four leagues in extent on each side, which contained several villages and farms, watered by the river Sogd. The Sogd, which is the valley or plain of Samarcand on the east, and the mountain called Vorka on the north, were the boundaries of this territory; although its jurisdiction ex-

tended to several towns which were situated beyond its great wall. Mirkhond, in his history of the posterity of Japhet, affirms, that Bokhara was the capital of Turquestan, in the time of Oguz Khan, one of the most ancient kings of the Moguls, or Tartars, and reckoned by the Mahomeddan Tartars the eighth in descent from Japhet; and enumerates several towns which were dependent upon it. Bokhara afterwards became the capital of the state of the Samanides founded by Ismael, the great grandson of Saman, in the year of the Hegira, 297, or of Christ 909, under the caliph Motadhed. After the fall of the empire of the Samanides, the Moguls of Cathai made themselves masters of this city; but it was retaken by Mohammed, king of Karafin, in the year of the Hegira 594, or A.D. 1197. This conquest of the Karafinians alarmed the nations of the north, and drew towards Jihon very powerful armies of Moguls and Tartars, who desolated some of the finest provinces of Asia. In the year of the Hegira 617, or A.D. 1220, Jenghiz Khan, after a siege of some continuance, took this city, and ordered it to be set on fire; so that nothing of it remained, except the sultan's palace, called "Ark," constructed of stone, and some few private houses built of stone, all the rest having been wooden edifices. He then caused a search to be made in the palace and houses, and commanded all the soldiers, who had concealed themselves, to be put to death. Bokhara continued for some years in this desolate state; but at length the Khan ordered it to be rebuilt, not long before his death. In the year of the Hegira 772, A.D. 1370, Tamerlane took this city from sultan Hassain, who was the last prince of the house of Jenghiz Khan; and the Timurides, or descendants of Tamerlane, retained possession of it till about the year of the Hegira 904, A.D. 1498; when Babur was despoiled of all his territories in Transfoxana and Khorasan by Schaibek Khan, who obliged him to fly to India; and from that time Bokhara has always belonged to the Usbeks, who have maintained it by frequent wars with the Persians. *Herbelot Bib. Or.* p. 190.

Bokhara was eminently distinguished in former times by the arts and sciences which flourished in it, and by its famous university, to which students resorted from all parts, and in which the celebrated Avicenna was educated. As an emporium of commerce, it was also no less famous. To this place merchants repaired from all parts of India, from the different countries inhabited by the Tartars, from Persia, and even from the dominions of the grand signior on one side, and from Russia and Poland on the other; so that in the warehouses and markets of this city might be seen a great variety of oriental and European merchandize. About the middle of the 16th century it was visited by Anthony Jenkins, an Englishman, whose curious and interesting account of the mart of this city has been translated into several languages, and copied by the best writers. See *Hackluyt's Collection*, p. 355. At that period, indeed, it sustained some injury from the vicinity of Samarcand; but since it became the seat of the khan of the Usbek Tartars, who is master also of Samarcand, which he visits only in the summer season, its commerce has revived, to which the convenience of its situation in no small degree contributes. When it was visited by the English agents in 1741, (see *Hanway's Travels*, i. 242.) it was large and populous, subject to its khan; standing on a rising ground, with a slender wall of earth; the houses of clay, but the numerous mosques of brick. The citizens manufactured soap and calico; and the chief products were cotton, rice, and cattle. From the Kalmuks they received rhubarb and musk; and from Badakshan, they used to receive lapis lazuli, and other precious stones; that city being computed at 16 days' journey from Bokhara.

Bokhara. There was gold and copper coin; and after Nadir took this city, the Persian and Indian silver became common. The inhabitants were civilized, but perfidious. In the 10th century it was distinguished by the manufacture of fine linen. N. lat. 29° 24'. E. long. 62°.

BOKI, a river of Africa, which rises in the country called Jalionkadov, between the heads of the Senegal and Johba, and joins the Barching, or an arm of the Senegal, in the district of Brooko, in N. lat. 13° 11'. W. long. 8° 31'.

BOKIRA, a river of India, which runs into the sea, 50 miles W. of Junagur.

BOKSAN, a town of Hungary, 10 miles south of Lugos.

BOL, FERDINAND, in *Biography*, a painter of history and portrait, was born at Dort in 1611, educated at Amsterdam, and placed as a disciple in the school of Rembrandt. He was chiefly distinguished by his portraits, which he painted in a free, bold manner, but not with that clearness of flesh, and remarkable relieve, for which his master was famous. His colouring was too much tinged with brown in the carnations; but with this exception, his portraits had a great appearance of life and nature. As a painter of history, he manifested a good taste of composition, as well as a tolerable expression in some of his figures; but he was deficient in grace and elegance. His "Appointment of the 70 elders in the camp of the Israelites," and "Moses breaking the tables of stone," in the council chamber of Dort, are well designed and executed. In the chamber of the burgo-masters there is an historical picture of "Fabricius in the camp of Pyrrhus," which is exceedingly admired. The etchings of this artist are bold and free. The following, from his own compositions, are generally much esteemed; viz. "Abraham's Sacrifice," "St. Jerom, seated in a cavern, holding a crucifix," and a "Philosopher, holding a book." Bol died in 1681. Pilkington and Strutt.

BOL, JOHN, a painter of landscapes, history, and animals, was born at Mechlin in 1534, and completed his studies at Heidelberg. His subjects were views of several cities and towns in the Low Countries, and different prospects of Amsterdam; and in his pictures the vessels, with the reflections of them from the water, are admirably executed. His invention and composition were very pleasing; his colouring possesses great harmony and union; and his manner of sketching and pencilling is broad and free. Van Mander highly commends one of the paintings of Bol, in distemper, the story of which is "Dædalus and Icarus." This artist etched a set of landscapes, which are "views in Holland," in the style of a master. He died in 1593. Pilkington and Strutt.

BOLA, in *Ancient Geography*, a town of Italy, the capital of the country of the Æqui, situate, according to Plutarch, 30 miles from Rome. Pliny places it in Latium. See ÆQUI.

BOLABOLA, more usually pronounced BORABORA, in *Geography*, one of the Society islands in the southern Pacific ocean, situate four leagues N. W. of Otaha, and inferior to it in extent, being about seven leagues in circumference. The reef that surrounds it is nearly full of islets, much larger than those that are scattered among the rocks, enclosing Otaha and Ulietea. It differs from those islands, and from Huaheine, in having only one harbour on its coast; whereas the shores of the others, being strongly indented, form, like the coasts of Eimeo, numerous places of shelter for shipping. It is also distinguished by a very lofty, double-peaked mountain in its centre, and is more rude and craggy than the other Society isles. Its eastern side appears barren; the western is more fertile; a low border, which surrounds

the whole, and also the islands on the reef, are productive and populous. Its earliest inhabitants are said to have been malefactors banished from the neighbouring islands. As their number rapidly increased, and their military prowess gained reputation, they established their authority in Ulietea and Otaha, and also in Maurōva and Toobāe. Their conquests acquired so much respect, that the supposed tutelary divinity of Bolabola, named Oorā, or Oraa, had been adopted by the people of Teiarraboo, in preference to two imaginary deities whom they formerly worshipped. The Bolabolan warriors are punctured in a different manner from those of the more eastern islands. Bolabola was discovered by captain Cook, together with the group called by him the "Society islands," in July 1769; but though he took possession of it in the king's name, he did not land upon it either in his first or second voyage. But in 1777, he landed on this island, notwithstanding the account which he had received of its inhabitants, and was introduced to Opoone, who had been represented as a very formidable chief, but whom he found old and feeble, though still much esteemed and feared. Opoone was succeeded in his government of this and the neighbouring islands by his daughter, who, in 1774, at the age of 12 years, had been betrothed to a chief named Boba, who governed Otaha under Opoone, and was designed to succeed him in the sovereignty. In 1791, when captain Edwards visited Bolabola, a man named Tatahoo, had the chief authority. S. lat. 16° 32' 30". W. long. 151° 52'. Missionary Voyage. Intro. p. 41.

BOLACA, in *Ancient Geography*, a town of Peiopponefus in Triphylia, a country of Elis. Polybius.

BOLAVOSANSKA, in *Geography*, a town of Siberia, in the government of Irkutzk, 80 miles N. W. of Ilimsk.

BOLBACH, a river of Germany, in the duchy of Stiria, which rises in a lake, 10 miles S. W. of Voitzberg, and runs into the Sulm, near Wipplepach.

BOLBÆ, in *Ancient Geography*, a town of Asia Minor, in Caria, called also Heraclea.

BOLBE, a marsh of Macedonia, near the Ionian sea, before Apollonia, according to Scylax.

BOLBEC, or BOLLEBEC, in *Geography*, a town of France, in the department of the Lower Seine, and chief place of a canton, in the district of Havre; the place contains 4921, and the canton 14,171 inhabitants; the territory comprehends 105 kilometres, and 18 communes.

BOLBENA, in *Ancient Geography*, the name of a country in Asia, in the greater Armenia. Ptolemy.

BOLBITINA, a town of Egypt, situate near the second mouth of the Nile, adjoining to the spot where Rosetta now stands.

BOLBITINUM *Ossium*, a name given by Ptolemy and Pliny to the second mouth of the Nile, from that of the town, Bolbitina, seated near the canal called "Tuli." The Bolbitine branch is now called that of Rosetta, Rosetta, or Raschid, which see. Strabo informs us (l. 17. tom. ii. p. 1153.) that under the reign of Ptolemy, the Milesians, with 30 vessels, landed at the Bolbitine, or Bolbitic branch, and there fortified themselves.

BOLBONACH, in *Botany*. See LUNARIA.

BOLBULÆ, in *Ancient Geography*, a name given by Pliny to an island of Asia Minor, situate on the coast of Ionia.

BOLCA, in *Geography*, a branch of the Tyrolese Alps, situate 50 miles N. W. of Venice, and noted for fossil salt, in argillaceous schist.

BOLCHERETSKOI, a town of Kamshatka. N. lat. 52° 54' 30". E. long. 156° 37' 30".

BOLCHOF, or **BOLKOF**, a town and district of Russia, in the government of Orel, seated on the river Nugra, falling into the Oeca; 32 miles N.N.W. of Orel.

BOLD SHORE, in *Sea Language*, a steep coast or shore, so that ships may approach close to it.

BOLDSON, an island of Sweden, in the province of Hallingland, having a good harbour.

BOLE, in *Mineralogy*, *Bol*, Germ. *Bol*. Fr. *Argilla bolus*, Werner. The colour of bole is generally an obscure fabella yellow, or reddish, or whitish brown; it is also sometimes, though rarely, met with of a greyish yellow, or fleshed; its surface is often marked with black spots and dendritic figures. It occurs generally massive, seldom disseminated. Internally it exhibits a slight glimmering lustre. Its fracture is perfectly conchoidal. It flies, when broken, into irregular, sharp-edged fragments. The dark coloured varieties are opaque, the lighter coloured are more or less translucent. It has a greasy feel; adheres strongly to the tongue; gives a shining streak; is very soft, and easily frangible. Sp. gr. 1.4 to 2.

When put into water it absorbs a portion with great eagerness, and then breaks down into small fragments, with a very sensible crackling noise; but is not reduced to an impalpable powder. When finely pulverized, and diffused through boiling water, it remains suspended in this fluid a much less time than any of the plastic clays, and is entirely separable by the filter.

Before the blow pipe it turns black, and melts without addition, though with some difficulty, into a porous, greenish, grey slag.

According to a somewhat inaccurate analysis of Bergman, the Lemnian bole contains

Siliceous Powder	-	47.
Carbonated lime	•	5.4
Carbonated magnesia	-	6.2
Alumine	-	21.
Oxyd of iron	-	5.4
Moisture and volatile matter		17.

102.0

Bole occurs in beds of wakke at Strigau in Silesia, and in basalt at Scheibenberg in Saxony; it is found also in Tuscany and Sienna in Italy, and in the island Lemnos in the Archipelago.

The only use of bole, at present, is as a coarse red pigment; for which purpose it is calcined and levigated, and is vended in Germany under the names of Berlin and English red. Anciently, however, a very high rank was assigned to bole among the articles of the *Materia Medica*; it was considered as a powerful astringent, sudorific, and alexipharmic, that from Armenia and Lemnos being particularly esteemed. The Lemnian bole, in the time of Dioscorides, was dug up in the presence of the priests of Venus, and after being mixed by them with goats' blood, was moulded into cakes, which were impressed with the figure of a goat, in order to authenticate them; hence it was called *Σφραγίς αιγός*, *sigillum caprinum*: It still continued to be a consecrated remedy even in the 15th century; according to Beson, the vein was opened annually on the 6th of August, and after prayers said by the priests, as much of the earth was taken out as was thought sufficient for the ensuing year; the entrance to the vein was then closed, and the severest punishments were denounced against any one who should open it without permission. Part of the earth was sent to Constantinople, where it was made up into small cakes, and received the seal of the emperor; the

remainder was prepared in the island itself, and was impressed with the seal of the governor. The profits of this manufacture were too considerable not to be encroached upon, and the solar earths, and even the clayey marls of Italy, France, and Germany, obtained a place in the *Materia Medica*, under the general name of *Terra sigillata*, from which, however, they, together with the Lemnian earth, have, been at length deservedly excluded.

BOLE is also used for the body or trunk of a tree; and hence boring trees are those whose heads and branches are cut off.

BOLEMOW, in *Geography*, a small town of Poland, in the palatinate of Rawa.

BOLENA, a town of the Morea, in the duchy of Clarence, 5 leagues from the gulf of Lepanto; the see of a bishop, suffragan of the archbishop of Patras.

BOLENBERG, a small town of the duchy of Mecklenburg, on the Baltic.

BOLENE, or **BOLLENE**, a town of France, in the department of Vaucluse, and chief place of a canton in the district of Orange, 3 leagues north of Orange. The town contains 4064, and the canton 10,852, inhabitants; the territory comprehends 132½ kilometres, and 7 communes.

BOLENIÆ, or **ΒΟΡÆ**, in *Natural History*, a name given by ancient writers to a sort of stone of a roundish figure, and marked with several ridges and lines. They are supposed to be the same with those called *Brontia* and *Ombria*, both being imagined to fall from the clouds in time of thunderstorms; but they are really no other than a common species of *Echinita*.

BOLERA, in *Geography*, a town of Spain in Arragon, 4 leagues from Huesca.

BOLERAZ, a small town of Lower Hungary, in the upper outward district of the county of Presburg.

BOLESKO, a town of Hungary, 28 miles north of Topoltzan.

BOLESLAW, or **BUNTZLAW**, a circle of Bohemia, on the confines of Lusatia and Silesia, from which it is separated by mountains. The capital is Buntzlaw.

BOLESLAWIEC, a town of Poland, in the palatinate of Siradia, 24 miles S.S.W. of Siradia.

BOLETUS, in *Botany* (Gr. *βωλίτη*; from its globular form), a genus of the class *cryptogamia*, and of the order *fungi*, formed by Linnæus, and distinguished from the agarics by having what is generally the lower surface composed of tubes instead of gills. The name was given by the Romans to a species of esculent fungus, esteemed by them a great delicacy, and celebrated by their historians and poets for being the vehicle of the poison administered to Claudius Cæsar, by his wife the younger Agrippina. This has been generally supposed by modern botanists to be the *Agaricus xerampelinus*, thence called by Scheffer *Cæsareus*; but Withering thinks it was the *deliciosus* of Linnæus. See *AGARIC*.

Among the moderns it was first adopted as a generic name by Tournefort, who applied it to the common morel, the fungus faviginosus of some of the older botanists, afterwards referred by Linnæus to his genus phallus. La Marck, displeased with Linnæus for altering Tournefort's names, has restored the name boletus to the morel, and has separated it from phallus on account of its not being perforated at its summit. He has, in consequence, divided Linnæus's genus boletus into two; calling those that are sessile and woody, agaricus, and those that are pedicelled and soft, fuillus. The Linnæan agaricus he has named amanita, as Dillierius and Haller had done before him. Jussieu and Poiret concur with him in these alterations. But this, as Boiss well observes (Nouveau

BOLETUS.

Dictionary, sub voce Boletus), is to increase a confusion already too great, and to overturn a nomenclature which has been generally adopted in Europe since the publication of the sexual system. For, however Linnæus may in some cases have capriciously changed ancient names, and however it may be wished that, in the present instance, he had called his boletus, agaricus, which would have preserved to the official agaric its customary generic denomination, it is better to let things remain as they are, than again to unsettle the language of the science, and thereby to impede its farther advancement. We shall, therefore, go on as we have begun, in adhering strictly to the Linnæan nomenclature, where we are not induced to depart from it by weighty scientific reasons.

Linnæus has enumerated only fourteen species, and Reichard has made no addition to the number. Gmelin has extended them to a hundred and seven; but there is reason to suspect, that he has sometimes given the same species more than once under a different name. The settling of synonyms is in every part of botany an intricate and often unsatisfactory business, but peculiarly so in the class *cryptogamia*. Withering, in the third edition of his Arrangement of British plants, has described fifty-one species, many of which have several varieties. In this number are included eight of the Linnæan species. He disposes them under three grand divisions, as they have central, lateral, or no stems; and subdivides them according to the colour of their tubes. None of them being cultivated, we shall confine ourselves to those which are of British growth.

Stem Central.

* *Tubes white*. 1. *B. pellucidus*. "Tubes decurrent, very short; pores minute, angular; pileus concave, rich brown, scaly; stem whitish, thick, short." 2. *B. subfuscus*. "Tubes very short; pileus light brown, smooth, clothy to the touch, regularly convex; flesh very white; stem pale brown, covered with a beautiful white net-work over its whole surface; root conical; resembles the elephantinus in habit." 3. *B. cyanescens*. "Tubes brownish with age, not decurrent; pileus brown, convex, very fleshy; flesh white, changing to a fine blue when exposed to the air; stem brown, rounded at the base." 4. *B. polyporus*. "Tubes very short; pores circular, extremely minute; pileus brown, irregular; flesh very thin; stem brown, varying from perfectly central to perfectly lateral, tough, thickening upwards." 5. *B. leptocephalus*. "Tubes very short; pileus tawny bay, flat, thin, leather-like; stem brownish, thick as a crow-quill." First observed in Britain by Mr. Dickson, growing on rotten sticks. 6. *B. aurantiacus*. "Tubes not decurrent, readily parting from the pileus; pileus convex, full orange-red, viscid, thin at the edge, and without tubes for about one-tenth of an inch; stem whitish, rough, with coloured pimples, spongy, filken." It is eaten in France when young. * *Tubes brown*. 7. *B. bovinus*, Linn. "Tubes not touching the stem, unequal in length; pileus thin at the edge, brown or olive, clammy, large; flesh spongy, white; stem dirty white, with reddish stains, from three to seven inches high, and about an inch in diameter." It varies in the colour of its tubes and pileus, and in the smoothness or roughness of its stem. 8. *B. subsquamosus*. "Tubes decurrent, oblong; pileus yellowish brown, with red brown, scurfy, scales, the centre hollowed; flesh solid, pure white; stem brownish, tapering downwards." 9. *B. perennis*, Linn. "Tubes decurrent, not separating from the pileus, very short; pileus flattish, hollow in the centre, striated with hairs, marked with alternate circles of brown and tawny, leathery; stem red brown, often excentric, short, wiry, frequently coming up so thick that the piles run into one another." There

is a variety of a cinnamon colour, within and without, the *B. cinnamomeus* of Jacquin, first found in this kingdom by Mr. Dickson. 10. *B. fulmentosus*, Linn. "Tubes rather angular, of different shapes; pileus yellow, convex, fleshy, somewhat woolly; stem yellow." 11. *B. rubecularius*. "Tubes olive-colour, fixed to the stem; pores rich red brown, mostly oval; pileus red cinnamon, convex, soft to the touch, rather clammy; flesh thick, spongy, buff-colour, instantly turning blue when wounded; stem red cinnamon, spongy within, and rich yellow, but instantly changing to a blue." 12. *B. piperatus*. "Tubes decurrent, deep orange, or earthy red; pores browner, open, irregular; pileus yellow, smooth, nearly flat, thin at the edge; stem greenish yellow." Its pungency on the tongue and throat is like that of a capficum. First found in England by Mr. Sowerby, in Hainault forest, Essex. * *Tubes buff*. 13. *B. nummularius*. "Tubes loose from the stem, very short; pores angular; pileus colour of brown horn, with a black circle at the edge, convex, dimpled, leathery, smooth, very thin, about an inch in diameter; stem colour of brown horn, black at the base, smooth." Chiefly found on rotten branches of hazle. 14. *B. nigripes*. "Tubes decurrent, very short; pileus whitish, the size of a sixpence; stem black at the bottom." * *Tubes yellow*. 15. *B. elephantinus*. "Tubes short, adhering firmly to the pileus; pileus dead white, convex, but very irregular; stem yellow, thick and short." 16. *B. edulis*. "Tubes not fixed to the stem, readily parting from the pileus; pores circular, small; pileus brown, with rust-coloured patches, nearly globular, seven or eight inches across when fully expanded; flesh white, greenish when wounded; stem light brownish yellow, tapering upwards." Bulliard reckons it a variety of *bovinus*. 17. *B. gregarius*. "Tubes short; pores oblong, unequal; pileus chestnut, smooth, thin, flattish; flesh white, about three inches over; stem pale chestnut, pinky below, insensibly swelling into the pileus. 18. *B. luteus*. "Tubes readily separating from the pileus; pores round, small; pileus deep bay, rather conical, striated, viscid; flesh white, not changing; stem dirty white, cylindrical, widening at top; ring permanent." 19. *B. olivaceus*. "Tubes instantly turning blue when wounded; pores bright yellow, round or oval; pileus olive-brown; flesh bright yellow, turning blue when exposed to the air; stem brown below, yellow or crimson above." 20. *B. sanguineus*. "Tubes a little decurrent, unequal in length, changing to deep blue; pores lemon-yellow, angular; pileus crimson, changing to rich red brown, semi-globular; flesh white, changing slowly to a bluish cast when wounded; stem yellow, with broad crimson streaks, apparently twisted." Found by Dr. Withering, near Birmingham, but only in one place. 21. *B. chrysenteron*. "Tubes decurrent; pileus gently convex, pinky-red; stem yellow below, pinky upwards, swelling in the middle." 22. *B. flavus*. "Tubes a little decurrent; pores irregular in shape and size; pileus convex, deep orange when young, shining with a viscid varnish; stem yellow, cylindrical; curtain white, leaving a ring." 23. *B. lactifluis*. "Tubes in contact with the stem; pores very minute; pileus reddish-buff, very convex, viscid; stem bright yellow." The plant abounds with a mild milky juice. Its flavour is like that of the agaricus campestris. 24. *B. substrictus*. "Tubes short; pores minute; pileus yellow, brown, olive, convex, thin, smooth, leathery; flesh thin, white; stem dirty yellow, hard, tough, sometimes excentric.

Stem lateral.

* *Tubes white*. 25. *B. albidus*. "Tubes decurrent, not perpendicular to the pileus; pores angular, very irregular in shape; pileus white, lobed; stem solid, sometimes only a knob." The whole plant white, with a cottony substance,

which

which is easily rubbed off. 26. *B. rugosus* (*lucidus*, Curtis). "Pores very small; pileus chestnut coloured, shining, flat, marked with concentric grooves; edge thick, wrinkled; stem chestnut coloured, hard, uneven, shining." 27. *B. frondosus*. "Tubes decurrent; pores very small, sometimes confluent; pileus brown, lobed, tiled, leathery; stem black at the base, very irregular and misshapen; sometimes nearly two feet across." 28. *B. betulinus*. "Tubes very short; pileus pinky-brown, smooth, oblong, convex, thin, curled in at the edge; flesh white; stem black; whole plant leathery." 29. *B. cristatus*. "Tubes short, not separating; pores irregular; pileus golden yellow, variously shaped, jagged, curled; stem brown, woody, distorted, thick, porous." 30. *B. squamosus*. "Tubes short, slanting; pores large, angular; pileus pale buff, pencilled with feather-like scales; flesh firm, white, elastic; stem dark coloured, white within." * *Tubes yellowish*. 31. *B. rangiferinus*. "Tubes decurrent, ragged at the extremity; pileus an expansion of the stem, dirty yellow; stem dark brown, with one or more lateral branches, splitting at the end into several horn-shaped branches, either expanding into the pileus, or barren with yellow tops." The whole plant resembles the palmated branches of some of the larger species of deer. 32. *B. calcicolus*. "Tubes decurrent; pores small, unequal; pileus deep buff to chestnut, of a substance like cork, hollowed in the middle, thin, and waved at the edge; stem tough, white, conical." 33. *B. lateralis*. "Tubes very short; pores very minute; pileus yellow, smooth, flat, very thin leathery; stem yellow, spreading out at the top to form the pileus."

Stemless.

* *Tubes white*. 34. *B. suberosus*. "Tubes pointed; pores irregular; pileus white, convex, thin, downy when young, smooth when old, perfectly resembling cork." 35. *B. medullipanis*. "Wholly white, crustaceous, spreading; pores small, on the upper surface only." On decayed wood and branches of trees. 36. *B. salicinus*. "Tubes very short; pileus semicircular, whitish, smooth, thin, soft, leathery." 37. *B. suaveolens* (*discoideus*, Dickson). "Tubes very long, changing first to straw-colour, then to tawny; pores irregular; pileus smooth, semi-circular, white or tawny; flesh yellow brown." 38. *B. spongiosus*. "Pores fringed, angular; pileus often very large, brown, woolly, turning quite black when old." 39. *B. lachrymans*. "Pileus orange coloured, wrinkled, reticulated, with a broad, white, arched border; pores chiefly on the upper surface of the white border." Frequent in damp cellars. 40. *B. variegatus*. "Tubes short, minute; pileus thin, velvety, striped with concentric circles of various colours." * *Tubes brown*. 41. *B. cuticularis*. "Tubes long; pores minute, rich yellow brown; pileus rich dark red brown, semicircular, very uneven, with concentric ridges." 42. *B. cryptarum*. "Tubes very long; pores minute; pileus leathery, thin, supine, becoming woody when old." 43. *B. labyrinthiformis*. "Tubes long; pores sinuous; pileus rugged, zoned, woody; lobes many from one root." 44. *B. unicolor*. "Tubes short; pores labyrinthiformed; pileus leathery, woolly, with different shades of the same colour." * *Tubes red*. 45. *B. laciniatus*. "Tubes very short; pileus brownish, arched, warty, thin, fringed at the edge." 46. *B. alietinus*. "Pores angular; pileus thin, gently convex, wrinkled, woolly, greyish, whiter at the edge." 47. *B. bispidus*. "Tubes fringed; pileus bright red brown, in old age black, rough with bristly hairs." Possibly a variety of the *velutinus*. * *Tubes yellow*. 48. *B. sulphureus*. "Tubes short; pores minute, irregular; pileus bright aurora, streaked." 49. *B. velutinus*. "Pores angular, irregular; pileus large, very irregular in shape, covered with a dense pile of a silvery grey colour." * *Tubes green*.

50. *B. igniarius*. "Tubes very slender; pores very fine, yellowish, changing to red brown; pileus shaped like a horse's hoof, smooth, red brown to blackish." It is the official agaric, the *agaric amadouvier* of La Marek. For the domestic and surgical uses to which it is applied, in different parts of the continent of Europe, and the manner in which it is prepared, see the article AGARIC, in *Pharmacy*. 51. *B. foenicarius*. "Pores circular, equal; pileus white, convex, thick at the edge, uneven."

To these La Marek adds the *agaricus quercinus* of Linnaeus, and observes, that it properly belongs to this species; for though it has the appearance of gills, they are really tubes with large misshapen pores, which near the edge of the pileus have a more regular form. Bulliard and Woodward incline to the same opinion; and we ourselves have already suggested that it seems to connect the agarici with the boleti. See AGARICUS.

BOLETUS (Haller). See HELVELLA MITRA.

BOLETUS (Tournefort). See CLATHRUS CANCELLATUS.

BOLETUS (Tourn. Michel. and Haller). See PHALLUS ESCULENTUS.

BOLETUS (Gled.). See HYDNUM REPANDUM and AURISCALPIUM.

BOLI, or BOLLI, in *Geography*, a town of Asiatic Turkey, in the province of Natolia, 140 miles east of Constantinople, and 74 N.W. of Angora. This town is situated on a small river, which discharges itself into the Black sea. It is the capital of a maritime canton, called by the Turks "Bolivialicti," and in the interior part of its extent very mountainous. N. lat. 40° 45' E. long. 31° 26'.

BOLIDES, in *Meteorology*. See FIRE-BALLS.

BOLINA, in *Ancient Geography*, a sea-port town of the Peloponnesus, in Achaia, near Argyra.

BOLINÆUS, a river of the Peloponnesus, which watered the towns of Argyra and Bolina, according to Pausanias. It discharged itself into the small gulf of Panormus.

BOLINAO, in *Geography*, a sea-port town on the island of Luçon, or Manilla.

BOLINBROKE, a town of America, in Talbot county, on the eastern shore of Maryland, 5 miles E. of Oxford. It lies on the N.W. point of Choptank river.

BOLINGÆ, in *Ancient Geography*, a people of India, near the Indus, mentioned by Pliny, Ptolemy, and Steph. Byz.

BOLINGBROKE, in *Geography*, a small town of Lincolnshire, England, is seated in a valley between the river Witham and the sea-coast. Here was formerly a very considerable castle, which was nearly demolished by Oliver Cromwell and his partizans, who also laid other parts of the town, with the church, in ruins. In the times of feudal vassalage, the castle at Bolingbroke was distinguished among the pompous mansions of the nobles. Here the celebrated John of Gaunt, duke of Lancaster, occasionally held his court, and it was the birth-place of his fourth son, who was afterwards crowned king of England. He was the fourth Henry who sat on the English throne, and from the place of his birth was known by the name of Henry of Bolingbroke. The St. John family also derive the title of viscount from this town. The only manufacture of the place is earthenware, and that is very inconsiderable. In the parish are 72 houses, and 283 inhabitants.

BOLINTHOS, in *Natural History*, a name given by Aristotle, and some of the other ancient Greeks, to the *monops* of Ælian, that is, the BONASUS.

BOLIPLEIKA, in *Geography*, a town of Russia, in the government of Saratof, on the west side of the Volga; 124 miles south of Saratof.

BOLISSUS, in *Ancient Geography*, a town of Asia, in Aolia, near Chio, according to Herodotus. Thucydides (l. 8.) mentions a victory gained by the Athenians over the inhabitants of Chio near this town.

BOLKOF, in *Geography*. See *Волкоф*.

BOLKOWITZ, a town of Silesia, 20 miles south of Glogaw.

BOLLANDISTS, in *Literary History*, a denomination given to certain Jesuits of Antwerp, who were a considerable time employed in collecting the lives and acts of the saints.—Thus called from J. Bollandus, one of the first and chief of the association.

BOLLANDUS, JOHN, in *Biography*, a famous ecclesiastical historian, was born at Tillemont in the Low Countries, in 1596, and educated among the Jesuits, by whom he was employed in collecting memorials of the church-saints, under the title of "Acta Sanctorum." The plan of the work was formed by father Rosweide, and it was to be arranged according to the order of celebrating their memories in the calendar. Bollandus, in 1643, published "The Lives of the Saints of the Month of January," in 2 vols. fol.; followed in 1658, by those of February, in 3 vols. fol. He had begun those of March, when he died in 1665. This work was continued by Henschenius, Papebroch, and others, on a scale of such extent, that the commencement of October reaches the 47th volume folio. *Nouv. Dict. Hist.*

BOLLARDS, large posts set in the ground on each side of a dock. On docking or undocking ships, large blocks are lashed to them; and through these blocks are reeved the transporting haulers to be brought to the capstans.

BOLLEN, in *Geography*, a town of Germany, in the circle of Aultria, and duchy of Carinthia, 7 miles east of Mellitat.

BOLLENZ. See *BREGNO*.

BOLLIN, a river of England, which runs into the Mersey, 4 miles E. N. E. of Warrington.

BOLLITO, in the *Glass Works*, a name by which the Italians called a sea-green colour, or artificial crystal.

To prepare this colour you must have in the furnace a pot filled with forty pounds of good crystal, first carefully skimmed, boiled, and purified, without any manganese; you must then have twelve ounces of the powder of small leaves of copper, thrice calcined, and half an ounce of zaffer powder; mix them together, and put them at four times into the pot, that they may the better mix with the glass; stirring them well at each time of putting in the powder, lest they should swell too much and run over.

BOLLOS, in the mines of Peru, a denomination given to the ingots or bars of silver procured there from the ore by the operation of the fire, and the use of aqua fortis.

BOLM, in *Geography*. See *BULAM*.

BOLNEST, EDWARD, in *Biography*, practised medicine in London in the beginning of the 17th century. He published, in 1605, "Chemia Medicina illustrata," or the true grounds and principles of the art of physic, 8vo. London, and the following year a translation of it into Latin "De lineatio fundamenti art. med.;" also "Auroa chemica seu naturalis methodus preparandi animalia, vegetabilia, et mineralia," 1675, 8vo. An edition of this work was published in English, in 1672. "A rational way of preparing animals, vegetables, and minerals, for physical uses." Haller. *Bib. Med.*

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BOLNKI, in *Geography*, a town of Lithuania, in the province of Wilna, 14 miles E. S. E. of Wilcomirz.

BOLOGNA, or *BONONIA*, a city of Italy, the capital of the Bolognese duchy, is, next to Rome, the largest, finest, and richest city in the Ecclesiastical State. Its ancient name was *Felina*, derived from Felinus, a Tuscan king, who is supposed to have built it 25 years before the foundation of Rome. The name of Bononia is traced by some to a successor of Felinus, called Boius; but others deduce it from the Boii. Its circuit is between five and six Italian miles, and the number of its inhabitants is estimated at 80,000; but the whole district, which includes 308 cities, towns, and villages, is said to contain 300,000 persons. Its figure is oblong, the length of it much exceeding the breadth; and viewed at a distance, it bears some resemblance of a ship, the tower of Asinelli, which is 371 feet high, being the mast. It is surrounded by a solid and lofty brick wall, well built, and adorned with piazzas, which extend through the streets, and under which passengers may walk without being incommoded by the sun or rain. The houses in general have lofty porticoes, which would have a better effect if the streets were not so narrow; but in this particular, magnificence is sacrificed to convenience, for, in Italy, shade is considered as a luxury. This city is seated at the foot of the Apennines, in an extensive, fertile plain, which liberally supplies the inhabitants with its rich produce. The river Savona washes its walls, and the rivulet Reno passes through it, parting into several small streams; and the latter, by means of a canal, communicates with the Po, and affords great advantage to the city.

The public edifices of various kinds are numerous and magnificent. In the centre of the city stands a high tower, called *Degli Asinelli*, from Gerardo Asinelli, who built it at his own charge in 1109; near it is the leaning tower, called *Garisenda*, which by a fall of part of it is now reduced to the height of 130 feet, and which inclines, so that a plumb-line let down from the top deviates seven feet from the wall at the bottom. Of the palaces in Bologna, that which is denominated the Public Palace is much the most spacious, though not the most elegant. In this the cardinal legate is lodged; and it has also apartments for the Gonfalonier, as well as halls, or chambers, for some of the courts of justice. This edifice contains some very magnificent apartments, and a few good pictures, of which the most esteemed are, a large one, by Guido, of the Virgin, and the infant Jesus, seated on a rainbow; a Sampson, also by Guido, refreshing himself with the water which issues from the jaw-bone, with which he has just defeated the Philistines; and a St. John the Baptist, by Raphael. The first object which strikes the eye of a stranger on his arrival at this town, is a noble marble fountain in the area before the Palazzo Publico. The principal figure is a statue of Neptune, 11 feet high, with one hand stretched out, and the other holding the trident. The body and limbs are finely proportioned, the anatomy perfect, and the character of the countenance severe and majestic. This figure of Neptune, as well as all the others of boys, dolphins, and sirens, which surround it, are in bronze. The whole is the workmanship of Giovanni di Bologna, and is highly esteemed; and yet there seems to be an impropriety in making water flow from the breasts of the sea nymphs or sirens. Over the entrance of this palace is a bronze statue of pope Gregory XIII., weighing 11,300 pounds, and executed by Minganti. Near it is another statue of pope Boniface VIII. The interview between the emperor Charles V. and pope Clement VII. in 1529, when that prince submitted to be crowned by the pope, is recorded by an inscription on a copper-plate. In the Sampieri palace

are several pieces by the three Caraccis; one of the best ever done by Albano, representing Cupid kissing his mother Venus, and, with an air of triumph, pointing at the rape of Proserpine by Pluto; and another, more admired than all the rest, and considered by the judges as the master-piece of Guido, the subject of which is the "Repentance of St. Peter," and consisting of two figures, that of the faint who weeps, and a young apostle who endeavours to comfort him. Although the nobility of Bologna are not now very rich, many of their palaces are furnished in a magnificent taste, and contain paintings, particularly those of the celebrated masters which this city had the honour of producing, that are their chief ornaments, and are held in high estimation. The palaces were built, and ornamented, when the proprietors were richer, and when the finest works of architecture, sculpture, and painting, could be procured on easier terms than at present. The galleries and apartments are spacious and magnificent; and yet there are circumstances in the most splendid, that must hurt the eyes of those who are accustomed to that perfect exactness in finishing, which prevails in English houses. The glass of the windows of some palaces is divided into little square panes, which are joined together by lead; and the floors of all are so indifferently laid, that you often feel a loose brick shaking under your feet, as you walk through the finest apartments.

Bologna is also embellished with a great number of churches and convents, which are enriched with a variety of paintings, sculptures, &c. Of the churches, of which there are said to be 200, that of St. Petronius is the largest. In this church the emperor Charles V. was crowned in 1530; and on the pavement of it, Cassini drew his meridian line, consisting of pieces of red and white marble inlaid, of a hand's breadth; those in which the signs of the zodiac are cut, are a foot square. This line is half the length of the church, which is 360 feet; and at its commencement is a Latin inscription, expressing that "the whole length of this meridian line, distinguished by the signs, &c. is the six hundred thousandth part of the circumference of the terraqueous globe." On the pavement, at the end of the line, is an inscription in white marble, denoting "the meridian line from the zenith to the tropic of Capricorn." Opposite to the vertical point, is the date MDCLII. A small round aperture has been made in the roof of the church, towards the south, through which the rays of the sun form a circular luminous spot, about eight inches in diameter, on the pavement, which shews the proper meridional point on the line every day. The church of the Dominicans is one of the most magnificent in Bologna. The chapel, dedicated to the honour of St. Dominic, who is said to have died at Bologna in 1221, is much admired. It consists of a curious dome, in which the glittering of gold appears throughout, adorned with the most capital paintings, representing the history of his life. His monument is of white marble, ornamented with beautiful basso-relievos, by Michael Angelo; and the altar, together with the large candlesticks that stand upon it, are of silver. The pavement and the walls are inlaid with marble of different colours. In the vestry is deposited, amidst jewels and various treasures, a manuscript of the Old Testament, or at least of the Pentateuch, pretended to have been written by Ezra himself. See BIBLE. It is a large folio, carefully preserved in a glass case, and was presented to the convent by the Jews, when they removed thither from Rome, and were allowed to erect a noble synagogue about the close of the 14th century. The other principal churches are the Franciscan, in which are paintings by Facini, Luigi, Caracci, Brizio, Guido, and Tiarini; that of St. Agnes, containing, over the high altar, the martyrdom of the saint,

by Domenichino; St. Bartholomew, before which stands a marble statue of St. Petronius, by Brunelli, and in which are an announcement, the nativity, and the flight into Egypt, by Albano; the church of the Capuchins, in the vestry of which is a crucifixion, by Guido; that of S. Giovanni in Monte, famous for an admirable picture of St. Cecilia, by Raphael, which is much extolled by Addison, and reckoned one of Raphael's capital pieces, &c. &c. The convents also are enriched with valuable paintings and other ornaments, as well as the palaces and churches. A Dominican convent, seated on the top of a hill, about three miles from the city, is in possession of a portrait of the virgin Mary, said to have been painted by St. Luke. Sigoni says, that it was brought from the church of Sancta Sophia at Constantinople in 1160; and it is thought to have wrought many miracles in favour of the inhabitants of Bologna. A curious gallery, open to the south and closed by a wall to the north, is built all the way from the city to the convent; on the open side it is supported by a long row of pillars; and was erected by voluntary contribution in honour of the virgin, and for the convenience of pilgrims. This long colonnade is about twelve feet in breadth, from the pillars to the wall, and about fifteen feet high; all the communities of the town walk, once a year in solemn procession, to the convent, and bring the holy picture to visit the city. It is carried through the principal streets, attended by every inhabitant who can afford to purchase a wax taper. During this procession, the bells continue ringing, the cannon are fired, and the troops under arms practise the same ceremonies when the picture passes, as if it were commander in chief of the forces. In the library of the convent, belonging to the church di S. Salvatore, are many curious MSS.; particularly one of the history of queen Esther, written on yellow coarse leather in large Hebrew characters, and done up in a roll or volume, according to the original signification of the word. The canons pretend that this was written by Ezra. Here is also shewn a Hebrew MS. of the O. T. written on vellum, in 3 vols. fol. said to have been written in 953; it has, however, points or vowels. Among other MSS. amounting to about 300 in number, are the N. T. called the "Codex Bononiensis," said to be of the 11th century, containing the whole N. T. except the apocalypse, abounding with abbreviations; and a Greek version of the minor prophets and Daniel, supposed to be of the 10th century; and among the printed books are Manutius's edition of Cicero's works, 4 vols. fol. published at Milan in 1498, and a Latin bible in folio, which, by a printed advertisement annexed to it, appears to have been completed at Mentz by John Fust and Peter Schoiffer in 1462.

The university of Bologna is one of the most ancient and most celebrated seats of literature in Europe; it was founded, as some say, by the emperor Theodosius in 433, but others, with greater probability, attribute it to Charles the Great. For an account of the academy of sciences, see ACADEMY. Over the gate of the magnificent edifice appropriated to that academy, is the following liberal inscription: "Bononiense Scientiarum atque artium institutum ad publicum totius orbis usum." Here are an observatory, with the necessary instruments for astronomical observations; a very valuable library, in three spacious rooms, where any person may study and have the use of the books four hours every day; also, apartments for the students of sculpture, painting, architecture, chemistry, anatomy, astronomy, and every branch of natural philosophy. They are all ornamented with designs, models, instruments, and every kind of apparatus requisite for illustrating those sciences. There are also professors who regularly read lectures. There is a hall full of models,

models in architecture and fortification, a valuable collection of medals, and another of natural curiosities, as animals, earths, ores, minerals; and a complete collection, to assist the study of the *materia medica*, and every part of natural history. There is also a gallery of statues, consisting of a few originals, and very fine casts of the best statues in Italy. Honorary premiums are distributed every year among the artists, for the best designs in painting, sculpture, and architecture.

The anatomical theatre is adorned with statues of celebrated physicians; and the museum belonging to it supplies an abundance of anatomical preparations, and a complete suite of anatomical figures in wax: a man and woman are exhibited in the natural state; the same with the skin and cellular membrane removed, so that the external muscles of the whole body and limbs appear. In the subsequent figures the more external muscles are gradually removed, till nothing but the simple skeleton remains. These figures are very well formed, preserving the natural appearance and situation of the muscles and blood-vessels with as great exactness as could be expected in a work of this nature. There are also models in wax, of particular parts, and of several of the viscera of the human body separately.

The inhabitants of Bologna carry on a very considerable trade in silks and velvets, and leather bottles, which are manufactured here in great perfection. The country produces immense quantities of oil, wine, honey, wax, flax, and hemp; and furnishes all Europe with hams, dried tongues, sausages, macaroni, sweetmeat, olive, perfumes, wash-balls, liqueurs, and essences. The people are industrious, and allowed to enjoy the fruits of their labour; the nuns are very ingenious in making artificial flowers, and imitating fruits of various kinds; and very beautiful works are also made of walnut-tree and rock-crystal. The markets are plentifully supplied with provisions; fruit is had in great variety, and of excellent quality; and the common wine of the country is a light white wine of an agreeable taste, which is preferred by strangers to any of the French or German wines that may be had there. The inhabitants, in general, are facetious and polite to strangers, who may receive at Bologna every kind of accommodation that may suit their taste.

Bologna long retained the name of a republic, sent an ambassador to the pope's court, and the word "Libertas" was inscribed on the arms and coin of the state, with the flattering capitals S. P. Q. R. The civil government and police of the town were allowed to remain in the hands of the magistrates, who were chosen by the senate, which formerly consisted of 40 members; but since this republic came under the protection, as it is called, of the pope, he thought proper to add ten more; but the whole 50 still retain the name of the "Quaranta." One of the senators presided in the senate, and was called the "Gonfalonier," from his carrying the standard (Gonfalone) of the republic. He was the chief magistrate, was attended by guards, and was constantly at the palace, or near it, to be ready on any emergency; but he remained only two months in office, and the senators took it by turns. In the midst of all this appearance of independence, a cardinal legate from Rome governed this republic; he was appointed by the pope, with a vice-legate, and other assistants. The orders which the legate issued, were supposed to be with the approbation of the senate; or at least, they never disputed the office, which was of higher dignity than any other in the gift of the court of Rome, and continued for three years; at the expiration of that time, his holiness either appointed a new legate, or confirmed the old one in the office for three years longer. This ecclesiastical vicerey lived in great magnificence, and had a numerous suite of pages, equerries, and hal-

berdiers, who attended him in the city. When he went into the country, he was accompanied by guards on horseback. The gonfalonier and magistrates regulated all the usual matters which regarded the police, and decided, in common causes, according to the laws and ancient forms of the republic; but in affairs of great importance, and, indeed, as often as he chose to interfere, the cardinal legate without doubt influenced all decisions. This must be mortifying to the senators and noble families; but was less felt by the people in general, who exhibited every appearance of living under a mild and beneficent government. Bologna was the see of an archbishop; who had for his suffragans the bishops of Crema, Borgo, St. Domino, Modena, Parma, Piacenza, and Reggio. Bologna is 23 miles S.W. of Modena, and 145 N. W. of Rome. N. lat. 44° 29' 36". E. long. 11° 21' 15". Keyser's Travels, vol. iii. p. 247. Moore's View of Society, &c. in Italy, vol. i. p. 252. See BOLOGNESE.

BOLOGNA bottles. See UNANNEALED Bottles.

BOLOGNA stone. See BONONIAN Stone, and PHOSPHORUS.

BOLOGNE, in Geography, a town of France, in the department of the Upper Marne, and chief place of a canton in the district of Chaumont, 6 miles north of Chaumont.

BOLOGNESE, FRANCISCO, in Biography, an eminent painter of landscape and history, whose original name was *Francisco Grimaldi*, was born at Bologna in 1606, and educated in the school of Annibal Caracci. He completed his studies at Rome; and his improvement was such, as to attract the attention of pope Innocent X. by whom he was employed both in the gallery of his palace at Monte Cavallo, and in the Vatican. Among his numerous admirers and friends were the prince Pamfili, the pope's nephew, and many of the principal nobility at Rome; Lewis XIV. and cardinal Mazarin at Paris, who procured for him a large pension; and employed him in decorating the Louvre; and after his return to Italy, the popes Alexander VII. and Clement IX. He was peculiarly happy in his execution of landscape: and was distinguished by his fresh and bold colouring, light and fine touch, and an elegant mode of composition. His landscapes in the manner of Caracci are models of the style of that school, though the colouring of them is thought to be somewhat too green. He understood architecture, and also etched, with great freedom, taste, and spirit, a great number of landscapes, partly from his own designs, and five after Titian. His agreeable manners and amiable disposition attached universal esteem. His benevolence was singularly manifested towards a Sicilian gentleman and his daughter, who had retired to Rome from the troubles of his country. They lodged near him, and were known to be so poor as to want bread. As soon as Bolognese was apprized of their situation, he repeatedly knocked at their door in the morning, threw in some money, and withdrew undiscovered. The Sicilian at length detected him in one of his acts of beneficence, and in token of gratitude fell at his feet. The painter raised and embraced him, and they continued mutual friends through life. Bolognese died at Rome in 1680, and bequeathed considerable property to his six children. His principal works are at Rome, and consist of large landscapes, and historical pieces in fresco. The pictures of his best time are very rare, and afford large prices. His son *Alexander* was a good painter in the style and taste of his father, though much inferior. Among his engravings are the "Brazen Serpent," from a composition of his own, which, though slight, is a spirited, free etching, in the style of a painter. Pilkington and Strutt.

BOLOGNESE, or the *duchy of Bologna*, in Geography, a territory

ritory of Italy, in the ecclesiastical state, bounded on the north by the Ferrarese, on the east by Romagna, on the south by Tuscany, and on the west by Modena; anciently inhabited by the Boii and Ligures. It was formerly a republic, under the protection of the emperor of Germany; but, in 1278, it became subject to pope Nicholas III. After many vicissitudes, pope Julius II. in 1513, annexed the city of Bologna, and all its dependencies, to the papal dominions; and in consequence of its voluntary submission to the see of Rome, it was indulged in several privileges, which it continued long to enjoy without molestation. But after the city of Bologna was taken by the French in the campaign of 1796, the legations of Bologna, Ferrara, Modena, and Reggio, entered into a treaty to form a republic, under the name of the "Republica Cispadana," or "Cisalpine Republic;" which was confirmed by the eighth article of the treaty of Campo Formio, October 17, 1797.

The soil of this territory is rich and fertile, and in the vicinity of Bologna it is so much improved by cultivation, that it appears like one continued garden. The vineyards are not divided by hedges, but by rows of elms and mulberry trees; and the vines hang in a very beautiful picturesque manner, in festoons from one tree to another. The country is not only fertile in vines, but likewise in corn, olives, and pasturage, and has, not without reason, acquired the name of "Bologna la Grassa." The Bolognese affirm, that their cheese is not inferior to that of Parma, and they sell a great quantity of it under the name of Parmesan cheese. See **Bologna**.

BOLOGNETTI, POMPEY, in *Biography*, was born at Bologna, in Italy, about the year 1616, where he received his education, and attaching himself to the practice of physic, was admitted doctor, and then professor in medicine, at the university there, in which capacity he was much admired, his lectures being numerously attended. His works are "Concilium de precautionibus occasione mercium, ab insultibus imminentes contagii," Bono. 1630, folio; which, perhaps, gave birth to Dr. Mead's work on that subject, or suggested the idea of it. "Remora senectutis," 1650, 4to. Haller. Bib. Med. Eloy. Dict. Hist.

BOLOGNINI, ANGELUS, a celebrated professor of medicine and surgery, who flourished in the beginning of the 16th century, was born in the neighbourhood of Padua, but practised and taught medicine at Bologna. At the earnest intreaty of his pupils, he says, he published, in 1508, "De cura ulcerum interiorum, et de unguentis communibus in solutione continui," 4to. which has been frequently re-printed. He was of the school of Avicenna, on whose works he commented in his lectures. He gives forms for preparing ointments with mercury, which he highly extols, and says, they cure the lues, though the salivary glands should not be affected, which, however, he admits to be desirable. The latter part of his life was spent in retirement at Padua. Astruc. de Morb. Gal. Hall. Bib. Med.

BOLOTOVA, in *Geography*, a town of Siberia, 24 miles N.E. of Nertschink.

BOLSCHAJA, a town of Siberia, on the Irtysh, 240 miles E.S.E. of Tobolsk.

BOLSCHAKINA, a town of Siberia, 68 miles south of Orlenga.

BOLSEC, JEROM, in *Biography*, a carmelite of Paris in the 16th century, who deserted his order on account of some free opinions, and became a refugee at Ferrara. There he commenced the profession of physic, and being acquainted with Calvin, removed to Geneva. In this city he divulged some opinions concerning predestination, which excited the resentment of the Genevan reformer, and which induced the magistrates of Geneva, probably at his instigation, first to

imprison him, and finally to banish him, as one convicted of sedition and Pelagianism. He was afterwards expelled from the canton of Bern, whither he had retired; and failing in his endeavours to ingratiate himself with the Protestants of Paris and Orleans, he returned to the bosom of the Catholic church. He then revenged himself by writing a very slanderous account of the life of Calvin in 1577, and another of that of Beza in 1582, the falsities of which sober Catholics are ashamed to quote. He also wrote against Calvin's institution, and his arguments were afterwards made use of by Cardinal de Richelieu. Bolsec practised physic at Autun, and at Lyons, in which latter city he died, a few years after he had written Beza's life. Gen. Dict.

BOLSENA, in *Geography*, a town of Italy, in the ecclesiastical state, and patrimony of St. Peter, delightfully situated on a lake that is of the same name, which is about 35 Italian miles in circumference. In this lake are two islands, namely, Bisentina and Martana, with a church in each island; in the former the unfortunate Amalafunta, daughter of Theodorice, king of the Ostrogoths, is said to have been put to death in 534, by order of the ungrateful Theodatus, her cousin, whom she had admitted to a share in the government. We learn from Pliny, (Hist. Nat. l. ii. c. 95,) that in his time these two islands were floating. He calls this lake Tarquinian, a name which it derived from Tarquinium, one of the principal 12 Etrurian cities, whose territories anciently extended to this lake; but it has been doubted, whether Pliny refers to the islands of this lake. Bolsena is environed with mountains, covered with trees, forming a kind of august amphitheatre. On an eminence near it may be seen the ruins of the ancient "Vulturnum." It is 7 miles S. of Orvieto.

BOLSOVER, a considerable market town of Derbyshire, England, has been noted for its manufactories of buckles, spurs, bridle-bits, stirrup-irons, and other similar articles; but the greater part of them is now made in Birmingham, and its vicinity. The town is governed by a constable, and two head boroughs; and a copy-hold court is held here every three weeks. Here was formerly a castle, which, according to the Doom-day book, was possessed, at the Norman conquest of England, by William Peverel. It was of considerable extent, and from its remaining fortifications was evidently of great strength. Its fortrefs is mentioned by Leland, as being in ruins when he visited this part of England, in the time of Henry the Eighth. A modern mansion, still called the castle, occupies the site of the ancient buildings, and was erected by sir Charles Cavendish in 1613. It is of square shape, and assumes the castellated character by towers at the four corners, and an embattled parapet. In this mansion, a superb entertainment was given by William Duke of Newcastle, to Charles the First and his queen in the year 1633. Upon this occasion, all the neighbouring gentry were invited to partake of the festival, which was conducted upon so magnificent a scale, that the expenses were estimated as amounting to 15,000*l*. Grand pageants, &c. were represented before the royal guests, and the fancy and taste of Ben Jonson were employed in preparing speeches and scenery upon the occasion. It now belongs to the duke of Portland, whose family obtained it by marriage with a daughter of the earl of Oxford. In the parish church is a magnificent monument to the memory of the above-named sir Charles Cavendish, many of whose family are also interred here. Bolsover has a weekly market on Fridays, one annual fair, and a statute fair for hiring servants, &c. It is 8 miles from Mansfield, and 145 N.W. from London. In the parish are 435 houses, and 1091 inhabitants.

At *Elmton*, a small village three miles N. E. of *Bolfover*, was born *Jedediah Buxton*, a man who, though only a poor labourer, acquired extraordinary celebrity, for his retentive memory, and recondite powers of calculation.

Three miles north of *Bolfover* are the great coal works, called *Norbrig's Colliery*. These belong to the Duke of *Portland*, and are let out to a company of persons who send great quantities by the canal to *Workop*, *Redford*, *Stockwith*, &c. *Bibliotheca Topographica*, No. 32.

BOLSTER, among *Surgeons*, a soft yielding substance either laid under the head or a broken limb.

BOLSTER is also used for a stuffing, intending to fill out or raise a flat, sinking, or hollow part. In which sense bolsters are contrived for crooked, bunched, and other distorted backs, shoulders, &c.

BOLSTERS of a *saddle*, in the *Manege*, those parts which are raised on the bows, both before and behind, to rest the rider's thighs, and keep him in a posture of withstanding the disorders which the horse may occasion. Common saddles have no bolsters behind or even before.

BOLSTERS, in *Sea Language*, small cushions or bags, filled with tarred canvas or rope yarn, &c. and placed under the shrouds and stays, to prevent their chafing against the trestle-trees, by the motion of the mast, when the ship rocks at sea.

BOLSTERS are also pieces of fir fayed upon the upper side of the trestle-trees, and against the thwart-ship sides of the mast-head. They must be sufficiently long to clear the sid-hole and after cross-tree, and broad enough to project one inch and a half, or more, without the trestle-trees, and the same in depth, and rounded from the upper to the lower edge on the outside, and nailed to the trestle-trees at each end. Their use is to prevent the shrouds chafing by the motion of the masts.

BOLSTERS of an anchor are cylindrical pieces of iron, with a hole through the middle, used when holes are to be punched, or opened with pins.

BOLSWAERT, **BOLSWERD**, or **BOLSWERT**, in *Geography*, a town of *Friesland*, in the United Netherlands, said to have been built in 713 by *Bolswine*, son of *Radbode*, king of *Friesland*, from whom it took its name. It was almost burnt down in 1475, and again in 1515, when it was rebuilt and encompassed with a rampart of earth. About a league from this town is a port, which, though much obstructed by sand, is very useful to the inhabitants. *Bolswaert* is about two miles in circumference, and was formerly one of the *Hanse* towns; and a great part of the *Friesland* baize, which formed a considerable article of exportation, was wove in this place. It is distant 13 miles S. W. of *Leewarden*, and 7 S. S. E. of *Harlingen*. N. lat. 53° 2'. E. long. 5° 24'.

BOLSWERT, or **BOLSWERD**, **BOETIUS ADAM A**, in *Biography*, an engraver and printseller of *Antwerp*, derived his name from *Bolswaert* in *Friesland*, where his family resided, and flourished about the year 1620. He worked only with the graver, and successfully imitated the free, open style of the *Bloemarts*, in whose school he probably perfected himself in his art. When he worked from *Rubens*, he altered that stile, and his plates are neater, fuller of colour, and more highly finished. His plates from *Bloemart* are a set of "Twenty landscapes," "The forest of the hermits and hermitesses of *Egypt* and *Palestine*," and "The Nativity of *Christ*:" and those from *Rubens*, in a more finished stile, are the "Resurrection of *Lazarus*," and its companion "The Last Supper," which is a very beautiful engraving. *Strutt*.

BOLSWERT, or **BOLSWERD**, **SOBELTIUS A**, brother of

the preceding, flourished about 1626, and worked entirely with the graver. His general character, as an artist, is thus described by *Bassan*: "We have a large number of prints, which are held in great esteem, by this artist, from various masters, but especially from *Rubens*, whose pictures he has copied with all possible knowledge, taste, and great effect. The freedom with which this excellent artist handled the graver, the picturesque roughness of etching, which he could imitate without any other assisting instrument, and the ability he possessed of distinguishing the different masses of colours, have always been admired by the connoisseurs, and give him a place in the number of those celebrated engravers, who are desirous of rendering their works as useful as they are agreeable, and of acquiring a reputation, as lasting as it is justly merited." His prints are the exact transcripts of the pictures from which he engraved them; and his last works, though not equally neat or finished, are always beautiful and indicate the hand of a master. His boldest engravings are from *Rubens*; and his neatest from *Vandyck* and *Jordans*. Some of this master's works have been carefully copied, so as easily to deceive the unskilful. Amongst the estimable engravings of this artist the following are mentioned: viz. the "Brazen Serpent," from *Rubens*, "Abraham offering his son *Isaac*," from *Theodore Rombout*, the "Education of the *Virgin*, by *St. Anne*," the "Marriage of the *Virgin*," the "Nativity of *Christ*," the "Adoration of the *Wise Men*," the "Feast of *Herod*," in which the daughter of *Herodias* is exhibited, presenting the head of *John the Baptist* to her mother, and the "Miraculous Draught of *Fishes*," all from *Rubens*; "Christ crowned with thorns," from *Vandyck*, and a "Crucifixion," from the same, in which a figure appears presenting the sponge to *Christ*; *St. John* and the *Virgin* are seen standing at the foot of the cross, and *Mary Magdalene* reclining towards it. This is one of his most beautiful engravings. The first impressions, in which the left hand of *St. John* is not seen, are very scarce; in the second, the hand appears upon the shoulder of the *Virgin*; but in subsequent impressions, the hand was again erased. *Strutt*.

BOLT, in *Building*, an iron fastening for a door, moved with the hand, and catching in a staple or notch made to receive it. Bolts are chiefly of three kinds: *plate*, *round*, and *spring-bolts*.

BOLT of a lock is the piece of iron which, entering the staple, fastens the door; being the part which is moved backwards and forwards by turning the key.

Of these there are two sorts; one shuts of itself by only putting to the door, and is called a *spring-bolt*; the other, which only moves when the key opens or shuts it, is called a *dormant-bolt*.

BOLT is also used for a large iron pin, having a round head at one end, and at the other a key-hole or slit, wherein to put a pin or fastening, serving to make fast the bar of a door, window-shutter, or the like.

This is more particularly called a *round-bolt*, or *window bolt*.

BOLTS, in the *Artillery*, are of several sorts; those which go betwixt the cheeks of a carriage to strengthen the trunnions are called *trunnion-bolts*. The large iron bolts or knobs on the cheeks of a carriage, keep the handspike from sliding, when it is passing up the breech of the piece. The two short bolts that being put one in each end of an English mortar-carriage, serve to traverse her, are called *traverse-bolts*. The bolts that go through the cheeks of a mortar, and, by the help of quoins, keep her fixed at the elevation given her, are called *bracket-bolts*. And the four bolts that fasten the bracket or cheeks of a mortar to the bed, are called

called *bed-bolts*. Besides these there are *bolster*, *eye*, *breeching*, *garnish*, *joint*, *stool-bed*, and *axletree bolts*. See *CARRIAGE*.

BOLTS, in *Carpentry*, denote pieces of wood cleft with wedges, in order to be split into laths.

BOLTS, or iron pins, in a *Ship*, are of several sorts, of which the most common have small round heads, and are used to unite two or more pieces together. Some have round flat heads, called *faucet-heads*, with a mortise in the other end, or point, and are used to fasten moveable pieces to those that are fixed; others have an eye at one end, for lashing or hooking blocks, &c. and are driven in *malt-heads*, *yards*, *caps*, &c. Some have a square part left at the back of the eye, that they may not be driven on the eye, and endanger splitting. Bolts are frequently distinguished according to the places where they are used; as, *ebain-bolts*, *bolts for carriages*, &c.; *ring-bolts*, serving for the bringing-to of the planks, &c. *drive-bolts*, used to drive out others; *set-bolts*, employed for forcing the planks, and other works, and bringing them close to one another; *rag-bolts*, on each side full of jags or barbs, to keep them from flying out of their holes; *clench-bolts*, those which are clenched or fastened at the ends where they come through; *fore-lock-bolts*, made like locks with an eye at each end, whereunto a fore-lock of iron is driven to prevent starting out; *fend*, or *fender-bolts*, made with long and thick heads, struck into the outermost bends or wales of a ship, to save her sides from bruises and hurts. The following machine for drawing bolts in and out of ships was invented by Captain Bolton of the Navy, and obtained from the Society of Arts their prize of the gold medal. A model of it is preserved in the repository of the society for the use of the public. The description of it (See *Transactions of the Society*, vol. xvi.) is as follows:

AAAAAA (*Plate of ships*) is the frame of the machine. B, a cylindrical tube, having a female screw in the inside. C, a wheel with teeth attached to the cylinder B. D, an endless screw adapted to the wheel C. E, handle of the winch. F, the bolt drawing out. GG, blocks to support the frame. H, a hollow piece of steel, having on its outside a male screw, whose threads work within the female screw in the cylinder B. To this piece of steel the bolt is to be rivetted. I, a semicircular piece of steel, which is to be introduced into the notches on H, when a similar notch has been cut in the head of the copper bolt, which by this means is prevented from turning in H, while drawing. K, the bolt, as prepared to receive the machine. L, a steel bar, somewhat smaller than the bolt to be drawn, having at one end a male screw, A, and at the other end another male screw that fits into the female screw in B. M, a section of a male screw, having a square hole larger than the bolt. N, a bolt with a male screw at one end ready to be drawn in.

The machine, of which a plate is annexed, consists of a frame supporting a cylindrical female screw tube. On this tube is mounted a wheel with teeth adapted to an endless screw fitted to the frame, and worked by a handle.

To draw the bolt out.

The head of the bolt must be cut off, and a hole made in the timber big enough to receive the male screw H, which is put over the bolt: a slit is then to be made, either by a saw or cold chisel, in the head of the bolt, to receive the key I, and which corresponds to the slit in H; the bolt head is then to be rivetted as firmly as possible upon H; the cylindrical tube, B, is then to be screwed on, turning the whole machine round till it can be done no longer, when the endless screw is to be used. If the machine is of a pro-

per strength, and the rivetting well done, the power is such as to extract the bolt or break it, but generally it will be drawn out uninjured. See *DRAWING*, &c.

To draw bolts into ships.

It will be necessary to have a bar, L, which is recommended to be made of steel, long enough to pass from the inside to the outside of the ship, and somewhat smaller than the copper bolt intended to be drawn in. This may be called a conductor. On one end should be a male screw, a; the bolt to be drawn in should be tapped at one end to receive the male screw, a, on the conductor; and at the other end should be another male screw that fits into the female screw in B; after which the operation is the same as drawing a bolt out, and the machine should be applied accordingly. When the bolt arrives at its destined place, it may be secured on the inside by a nut, which is as good a way of fastening as clinching, and much more expeditious.

This machine though only of the height of eighteen inches, will draw bolts in or out of any length; for, after the bolt has risen to the top of the tube, it will only be necessary to screw the machine back, and follow up the work with blocks of timber, as represented in the drawing.

Note. If the upper part of the hole in H be made square, larger than the round hole as shewn at M, and the head of the bolt rivetted into it, it will do away the necessity of the key, I, render the machine less complicated, and save much time and trouble.

BOLTS of an Anchor, are cylindrical iron pins for fastening the two parts of the flock together.

BOLTS for whirls, in *Rope-making*, are large iron pins with round heads, driven in the board over the crank-wheel for the whirls to run on.

BOLT is also used for a measure or certain quantity of canvas, amounting to twenty-eight ells.

BOLT of silk or stuff denotes a long narrow piece, of indefinite measure.

BOLT, pease, in *Essex*, denotes the pease-straw, when the grain is threshed out of it.

BOLT, thunder. See *THUNDER-bolt*.

BOLT-rope, in *Sea Language*, is a rope sewed to the edges of a sail, to prevent it from rending by the force of the wind, or any other cause.

A bolt rope should be made of fine yarn spun from the best hemp, and sewed neatly on with good twine. To avoid stretching, the rope must be kept well twisted while sewing on, and care taken that neither too much nor too little slack is taken in: that part of the rope at the leech of the sail is to be cross stitched at every foot in length, at every seam, and in the middle of every cloth at the foot, with three cross stitches: four cross stitches should be taken at all the beginnings and fastenings off; the first stitch given twice, and the last three times. Small sails have two cross stitches at every seam, and three at every fastening off.

BOLTED flour, that which has passed through the **BOLTERS**.

BOLTTEL, in *Building*, any prominence or jutting out, as of a piece of timber, end of a beam, or the like, advancing beyond the naked of the wall.

BOLTERS, or **BOULTERS**, a kind of sieves for meal, having the buttons made of woollen, hair, or even wire. The word seems derived from the German, *beutel*, a sieve; whence also *beutel*, to bolt. The bakers use bolters, which are worked by the hand; millers have a large sort, wrought by the motion of the mill.

BOLT-HEAD, a vessel used by the chemists, the same as *matras*; which see.

BOLT-HEAD, in *Geography*, a promontory of England, on the

the south-coast of the county of Devon, 19 miles S.E. of Plymouth. N. lat. 50° 9'. W. long. 30° 47'. The promontory 4½ miles W.N.W. of this is called *bolt-tail*.

BOLT and **TUN**, in *Heraldry*, is a bird bolt in pale piercing through a ton.

BOLTING, or **BOULTING**, the act of separating the flour from the bran, by means of a sieve or bolter.

BOLTING-cloth, or **BOLTER-cloth**, sometimes also called *lulling cloth*, denotes a linen or hair-cloth for sifting of meal or flour.

That kind of bolting-cloth which is used for sifting of meal, and also for a variety of needle work, for young ladies' samplers, and for filling up the frames of window-screens, &c. is wove after the manner of gauze of fine spun woollen-yarn. The wool necessary for making this cloth must be long, well-washed, and spun to a fine equal thread, which, before it is scowered, must be scalded in hot water, to prevent it from shrinking. The web must be stiffened; and in the manufacture of it the English have the advantage of the Germans, whose cloth of this kind is much cheaper, but much inferior in value to that of England. The bolting-cloth of this country is stiffer, as well as smoother, and the flour passes through it much better than through that of the Germans, which is either very little or not at all stiffened. A manufactory of this cloth was established at Ostra, near Dresden, by one Daniel Kratt, about the end of the 17th century; and at Hartau near Zittau, it was introduced by one Plefsky, who learned the art of making it in Hungary. The cloth which is sent from hence for sale, not only every where round the country, but also to Bohemia, Moravia, and Silesia, is wove in pieces, containing each from 64 to 65 Leipick ells; the narrowest being 10, and the widest 14 inches in breadth. Large quantities of it are also made by a company in the duchy of Wurtemberg. Bolting-cloth is also made at Gera, as well as at Potsdam and Berlin; at the latter of which places there is a manufactory of it carried on by the Jews.

BOLTING-mill, a versatile engine for sifting with more ease and expedition. The cloth round this is called the bolter.

The method of applying a sieve in the form of an extended bag to the works of the mill, that the meal might fall into it as it came from the stones, and of causing it to be turned and shaken by the machinery, was first made known in the beginning of the 16th century, as we are expressly told in several ancient chronicles.

BOLTING, or **BOULTING**, among *Sportsmen*, signifies rousing or dislodging a fox, rabbit, or badger, from its resting place.

BOLTING, in *Law*, a method of pleading, or arguing, formerly in use in the inns of court; inferior to mooting. The case is argued first by three students, then by two barristers; an ancient, and two barristers sitting as judges.

The word comes from the Saxon *bolt*, a *house*; because done privately within doors, for instruction.

BOLTON, **EDMUND**, in *Biography*, an English antiquarian writer of the 17th century. By religious profession he was a Roman Catholic, and probably enjoyed some office under Villiers duke of Buckingham. He was diligent in his researches into subjects of history and antiquities, and was the author of several works, of which the principal are the following; viz. "A Life of Henry II.," "Elements of Armories," Lond. 4to, 1610; "A translation of Florus," "Nero Cæsar, or Monarchy depraved," Lond. fol. 1624, in which he attempts to establish the improbable opinion, that Stonehenge was a monument to the memory of queen Boadicea. His "Vindiciæ Britannicæ," left in

MS., was designed to prove the great antiquity and early importance of London. From all his performances, Bolton appears to have possessed the credulity, nationality, and love of trifles, often attendant on antiquarian studies, when they are not directed by taste and judgment. The time of his death is not known. *Biog. Brit.*

BOLTON, in *Geography*, a village of Yorkshire, in England, had a very considerable monastery of canons regular, of the order of St. Austin, founded in 1120 by Robert de Romeli, and this had afterwards other benefactors, and at the dissolution its annual revenues were valued at 212*l*. Part of the religious house still remains, and one room is appropriated to a free school, which was founded by Robert Boyle, esq. This village is rendered remarkable from being the birth-place and residence of Henry Jenkins, who was born in the year 1500, and lived to the great age of 169 years. He enjoyed a constant state of good health, and possessed his faculties to the last year of his life. See **LONGEVITY**.

BOLTON-le-Moors, is an ancient manufacturing town of considerable consequence in Lancashire, in England. It may be considered as the original seat of the cotton trade in this country, and for the manufacture of ornamental and fancy good is still particularly celebrated. Leland, in his Itinerary, notices the cottons (then a species of woollen) and coarse yarns which were brought to this town in his time, and observes, that many villages in the vicinity were engaged in this manufacture. Coal-pits were also worked at that time, and coals are still obtained in abundance from pits in the neighbourhood. The making of fustians was introduced into this town, at a very early period, and still continues a prominent object of trade. During the civil wars in the reign of Charles I., Bolton was besieged by prince Rupert in 1644, and many of the inhabitants were killed. The town is well built, and has rapidly increased in size and population. It is seated in a flat district, as its name partly implies. The advantage of canal conveyance to Manchester and Bury, has proved highly important to the town, whose manufactories are thereby greatly promoted. Bolton has a free school, of which Ainsworth, the author of the Latin dictionary, was once a master. The prosperity of Bolton may be partly estimated from the following comparative state of its population. In the year 1773, there were 5339 inhabitants in this town and Little Bolton. These were augmented to 11,739 persons in 1789; and in 1801, when the population of the country was estimated by order of the house of Commons, there were found to be 3476 houses, and 17,413 inhabitants in the township and chapelry of Great and Little Bolton. The principal mart for the sale of goods made at this place is Manchester, where the manufacturers resort on Tuesdays, Thursdays, and Saturdays. "The neighbourhood of Bolton," observes the judicious Dr. Aikin, "has been distinguished for producing men of great talents in mechanical invention, who have generally been wholly uneducated, and indebted only to native powers, and the habit of observation. The most celebrated of these was sir Richard Arkwright, of whom false pride and prejudice alone can think it derogatory to say, that he passed a great part of his life in the humble station of a barber in the town of Bolton. His mind was so ardently engaged in the improvement of the mechanism used in the manufactures, that he could scarcely keep above want by the exercise of his proper profession; but his perseverance and ingenuity were at length rewarded with a measure of opulence, which nothing but the tide of prosperity in a commercial nation could bestow." See **ARKWRIGHT**.

At *Smithels*, an old hall, or mansion, north of Bolton, formerly belonging to the Fauconberg family, is a curious old

old wainscotted room, the pannels of which are adorned with upwards of 50 heads, cut in wood. This hall is shewn and visited as a curiosity, from a superstitious prevalent opinion that an impression of a foot may be seen in the stone floor made by one Marth a martyr, in the reign of queen Mary.

Rivington, in the parish of Bolton, is a conspicuous hill, crowned with a building called Rivington-pike. Some veins of lead and calamine have been worked in this neighbourhood, but have not hitherto proved very fortunate to the adventurers.

Bolton is 11 miles from Manchester, and 197 miles N.W. of London. It has a market on Mondays, and two fairs annually. Aikin's Description of the Country round Manchester, 4to. 1795.

BOLTON, a township of America, in Chittenden county, Vermont, seated on Onion river, about 104 miles N.N.E. from Bennington, containing 88 inhabitants.—Also, a township in Tolland county, Connecticut, incorporated in 1720, and settled from Weathersfield, Hartford, and Windsor, 14 miles E. from Hartford.—Also, a township in Worcester county, Massachusetts, 18 miles N. E. from Worcester, and 34 W. from Bolton; containing 945 inhabitants, and a good bed of limestone.—Also a township in Washington county, New York, between Scroon lake and lake George, distant 10 or 12 miles S.E. of Ticonderoga, and containing 959 inhabitants.

BOLTONIA, in *Botany*, (named by L'Heretier, in honour of James Bolton, late of Halifax, in Yorkshire, a self-taught naturalist and artist in a humble sphere of life, author of the "History of British Singing Birds," 2 vols. 4to. of "British Ferns," 4to. and of "Funguses growing about Halifax," 4 vols. 4to. with figures of the species, all drawn, etched, and coloured by himself.) L'Heret. Sert. Angl. p. 35, 36. Schreb. 1309. Jussieu 450. Bosc. Nov. Dict. Clais, *Syngenesia Polygamia Superflua*. Nat. Ord. *Composita radiata*.—*Corymbifera*. Juss.

Gen. Char. *Cal.* common; imbricate, with nearly equal linear, acute scales. *Cor.* compound, radiate; florets of the disk tubular, funnel-shaped, five-cleft, numerous; of the ray many, linear, entire, pistiferous. (Schreb.) three-toothed. (Bosc.) *Pist.* germ oblong; style filiform; stigmas two, those of the ray revolute. *Pericarp.* none; calyx unchanged. *Seed* solitary, compressed, slightly toothed, two-horned; receptacle naked, honey-combed, hemispheric.

Ess. Char. *Cal.* common, imbricate, with linear scales. *Cor.* radiate. *Germ*s compressed, vertical. *Seed* obscurely toothed, two-horned. *Recept.* honey-combed.

Species, 1. *B. asferoides*, (matricaria alt. Linn. Mant. 116.) "Leaves quite entire." Stem upright, two feet high, even, scarcely angular, slightly streaked; leaves alternate, remote, sessile, lanceolate, even, bent down at the base, ragged about the edge; panicle thin, stiffish, with one-flowered peduncles; disk yellow; ray pale flesh-colour. 2. *B. glaberrima*. "Lower leaves serrate." Five or six feet high. Both species are natives of South America, flower late in the autumn, and were cultivated by Mr. Miller in 1758.

BOLTSACKEN, or BOLTSACK, in *Geography*, rocks at the N. entrance of the Great Belt, 5 miles S. E. from the island of Samsoe. N. lat. 55° 48'. E. long. 10° 40'.

BOLTY, in *Ichthyology*, a fish of the *LABRUS* genus. (*Labrus niloticus* of Linnæus), that is found in the Nile. It is figured and described by Sonnini, in his "Voyage en Egypte." This, it is observed, is one among the small number of fishes that inhabit the river Nile, the flesh of which is delicate, and of a good flavour. Daubenton, in the French Encyclopædia, calls the species *Nébuloux*, on account of the obscure spots with which the fins are marked.

BOLTZNITZ, in *Geography*, a river of Germany, which runs into the Elster near Elsterwerda, in the margraviate of Meissen.

BOLU, a mountain of Asia, in Armenia, 144 miles S.E. of Erivan.

BOLUADIN, a town of Asiatic Turkey, in the province of Natolia, 28 miles N. of Kara-hissar.

BOLUCBASSI, in the *Turkish Affairs*, denotes the chief of a company; or a captain who has the command of an hundred janizaries.

BOLURUS, in *Ancient Geography*, a town of Greece, in Thesprotia.—Also a town of Illyria, which belonged to the Trallians. Steph. Byz.

BOLUS, in *Pharmacy*, is a very useful form of extemporaneous prescription adapted to a variety of cases in which a more solid or a more liquid form would not answer the purpose. The consistence of a bolus is the same as that of an electuary, that is, about as soft as dough, so as easily to slip down the throat without falling to pieces. As it must in some degree be tasted while swallowed, it generally consists of the medicine in powder, worked up to the proper tenacity by means of some grateful syrup, soft extract of liquorice, or a palatable conserve; or, if the medicine be an oil, balsam, or other liquid, dry sugar, with flour, almond-paste, and the like, are added to bring it to the due consistence. It is intended to be only a single dose.

The substances most proper to be exhibited in this form are those that are very heavy, and scarcely to be suspended in any liquid so as to be drank off, such as calomel, tin-powder, steel filings, æthiops mineral, or those that are too bulky to be made into a convenient number of pills, and are nauseated by the patient in a liquid form, such as cinchona, chamomile, burnt-sponge, Dover's powder, valerian root; or some of the stronger acids and aromatics, as guaiacum, camphor, musk, castor, ammonia: or those that are little soluble in the stomach, unless previously mixed with some easily soluble matter, and yet do not readily combine with liquid sufficient to be drank off, as oil of turpentine, the balsams and the like, mixed with sugar and flour. Bolusses differ from troches in this, that the latter are made firmer, though equally soluble, and being intended for slow solution in the mouth; they consist only of insipid, or not unpalatable ingredients. Substances that readily become very moist, such as the kali preparatum, should not be used in this form, unless the bolus is intended to be taken immediately: but on this head less caution is required than in compounding electuaries.

This form of medicine should be avoided where the patient is in a state in which the power of swallowing is with difficulty exercised, as in apoplexy, and other comatose disorders; in some spasmodic and painful affections of the throat; or where the œsophagus is naturally very narrow. Alarming accidents have sometimes arisen from a neglect of these precautions. It is likewise difficult to get very young children to swallow them, unless made extremely thin. These minutæ will not appear trifling to those who are in the habit of personally witnessing the trouble and difficulty which daily attend the exhibition of medicines, and are so liable to defeat the most judicious plans of the prescriber.

In hospitals and dispensaries this form is very commonly adopted, as it is prepared with little trouble, and is economical in the more expensive drugs; no more of them being employed than the immediate wants of the patient require.

BOLUS-HEAD, in *Geography*, a cape of Ireland, on the south-west coast of the county of Kerry, 38 miles S. W. of Killarney. N. lat. 51° 44'. W. long. 10° 12'.

BOLWICK,

BOLWYCK, a town of Norway, 40 miles W. of Tonsberg.

BOLZANI, **URBANO VALERIANO**, in *Biography*, one of the revivers of literature in the 15th century, was born at Belluno about the year 1440. Having entered, when young, into the order of the Minorites, he travelled through Egypt, Palestine, Syria, Arabia, Greece, and Thrace, observing whatever was curious either in nature or art. In the course of his perambulations, he twice ascended the summit of *Ætna*, and surveyed its crater. As a strict observer of his vows, he declined accepting the honours and dignities which were offered him. His fixed abode was at Venice, where he taught the Greek language, and, among other scholars, instructed the learned Gen. Antonio Flaminio, and John d'Medici, afterwards pope Leo X. He was the first who facilitated the attainment of the Greek, by composing a grammar in that language; of which the first edition was printed in 1497, and a second, much enlarged, in 1512. He died in 1524.

BOLZANO, or **BOLZEN**, in *Geography*, a town of Germany, in the Tyrol, seated on the river *Eysac*, near its confluence with the *Adige*, famous for its four annual fairs, each of which continues a fortnight, which are much resorted to by Italian and German merchants; 6 leagues S. W. of Brixen, and 9 N. of Trent. It was taken by the French in March, 1797. N. lat. 46° 28'. E. long. 11° 14'.

BOLZANO, a town of Italy, in the Vicentin, belonging to the state of Venice, 2 leagues E. of Vicenza.

BOM, in *Zoology*, the name of an American serpent of the *Boa* genus, called likewise *bome*, and *boma*. It is said to grow to a vast size, and to be perfectly harmless; but the latter assertion is improbable; it is not certainly of the poisonous race of serpents. This is called the *bom*, because it emits a remarkable noise resembling the sound of that word, when pronounced with a deep hollow voice.

BOMAL, or **BOHEMAL**, in *Geography*, a town of Germany, in the duchy of Luxemburg, seated on the Ourte, 7 miles S. W. of Spa, and 53 N. W. of Luxemburg.

BOMANGOY, a town of Africa, in the kingdom of Angoy, or *Gov* (which see), situate on the north bank of the river *Zaire*. S. lat. 5° 36'. W. long. 13°.

BOMARZO, a town of Italy, in the ecclesiastical state, and patrimony of St. Peter, once episcopal; 14 miles from *Civita Castellana*.

BOMB, in the *Military Art*, a hollow iron ball, or shell, furnished with a vent, by which it is filled with gun-powder, and which is fitted with a fusee, or hollow plug, by which it gives fire, when thrown out of a mortar.

In the English artillery, bombs are now commonly called shells.

The word *bomb* comes from the Latin *bombus*, *crepitus*, or *fibilus ani*: by reason of the noise it makes.

The method of preparing a bomb is as follows: a hollow iron globe *A B* (*Plate Gunnery*), is cast pretty thick, having a round aperture *A*, by which it may be filled and lighted; and circular *anse* *C*, *D*, of hammered iron fixed in the mould when they are cast, for the commodious putting it into the mortar, as well as for carrying it from one place to another. In France, the handles are cast iron: but they are thus rendered more clumsy, and liable to break sooner than the others.

It has been usual to make the lower part of the bomb the thickest, that it may fall on that side, and never on the fusee, and that it may also better resist the shock, or impression of the powder by which it is discharged from the mortar; but Mr. Muller thinks that neither of these considerations is

of any great importance, and recommends rather to make them every where equally thick, because they would thus burst into a greater number of pieces. *Artillery*, p. 151. in his System, &c. vol. v.

After the shells have been gauged and examined as to their dimensions and weight, they must be well searched within and without by means of a copper grater, to ascertain whether there be any holes or cavities in them; and the iron pin or spike at the bottom of the inside, which supports the corp when they are cast, should be beat down or broken off. They are then to be hammered all over, to knock off the scales, and discover flaws; and no hole, in the large shells, is allowed, of more than $\frac{1}{2}$ of an inch deep. An empty fusee is then driven into the fusee hole; and the shell is suspended in a tub of water, so that the water may cover it, without running into the fusee; in this situation the nose of a pair of bellows is introduced into the fusee hole, and several strong puffs given with the bellows; and if no bubbles rise in the water, it is concluded that there are no holes in the shell, but that it is found and fit for service.

When the shell has been thus proved, and is found to be dry within, gun-powder is introduced into its cavity, by means of a funnel; but it is not quite filled. Artillerists, though they agree that shells should not be quite full, have not ascertained the precise quantity which would serve for their bursting into the greatest number of pieces. Captain *Defaguilliers*, after having made several experiments, apprehends, that the most proper quantity of powder is two thirds of the weight which would fill the cavity. A little space or liberty is left, that when a fusee or wooden tube *a*, *c*, of the figure of a truncated cone, is driven through the aperture, the powder may not be bruised. This fusee is pressed in at first by the hand as far as it will go, and then drove with a mallet as hard as possible, taking care, however, not to split it; for if the least crack were in it, the composition would give fire to the powder, and the shell would burst either in the mortar, or in the air, and thus do no execution. For the method of preparing and filling the fusee, see *FUSEE*.

This fusee is set on fire, and burns slowly till it reaches the gun-powder, which goes off at once, bursting the shell to pieces with incredible violence; whence the use of bombs in besieging towns. Special care, however, must be taken, that the fusee be so proportioned, as that the gun-powder do not take fire before the shell arrives at the destined place; to prevent which, the fusee is frequently wound round with a wet clammy thread.

The fusees are driven into the shell, so as that only about an inch and a half come out beyond the fusee-hole; and then the shell is said to be fixed. They are charged long before there is occasion to use them; and in order to secure the composition with which they are filled, the two ends are covered with a mixture of two parts of pitch, one of rosin, and three of bees-wax, which will guard the composition within from the access of air; and it will thus keep as long as you please. When the fusee is to be put into the shell, the little end is opened or cut off; but the great end is never opened till the mortar is to be fired.

Bombs or shells are made of different magnitudes, from that of 17 or 18 inches diameter downwards; the very large ones are not used by the English, that of 13 inches diameter being the largest size now employed by them. The following table shews the weight, dimensions, &c. of English and French shells.

B O M B.

SHELLS.—Their Dimensions, Weight, &c.

Nature.	Weight.				Diameter.	Powder contained in Shells.		Powder for Bursting.		Diameter of Fusée Hole.		Thickness of Metal.
										Outside.	Inside.	
	Ct.	Qr.	lbs.	oz.	Inches.	lbs.	oz.	lbs.	oz.	Inches.	Inches.	Inches.
13 Inch	1	3	2		$12\frac{3}{4}$	10	4	6	12	1.837	1.696	2.05
10 —	0	3	9		$9\frac{1}{4}$	4	5	2	10	1.57	1.45	1.575
8 —	0	1	$11\frac{1}{2}$		$7\frac{1}{4}$	2	12	1	14	1.219	1.127	1.2
$5\frac{1}{2}$ —	0	0	$15\frac{1}{4}$		$5\frac{1}{4}$	1	0	0	12	.894	.826	0.822
$4\frac{1}{2}$ —	0	0	8		$4\frac{1}{2}$	0	7	0	5	.832	.769	0.653
H. Gren. {	0	0	3	11	3.49							
	0	0	1	13	2.77			0	$1\frac{1}{2}$			

French Shells, in French Weights and Measures.

Inches.	lbs.					Lines Po.	Lines Po.	Lines.			
12-Inch	150	12	17	0	5	0	15	9	15	0	16
10 —	100	10	10	0	3	0	15	9	15	0	16
8 —	43	8	4	1	1	0	12	0	11	0	10
6 —	23	6	2	8	0	12	11	0	10	6	10

Mr. Muller gives the following proportions, from the 13 inch bombs, now commonly used, and observes that they may be easily adjusted to any other calibre, by making the diameter of the shell to 30, as any part expressed in inches, to the same part expressed in parts of the diameter divided into 30 equal parts.

Diameter of the bore	-	-	-	-	30
Diameter of the shell	-	-	-	-	29.5
Diameter of the hollow sphere	-	-	-	-	21
Thickness of the metal at the fusée-hole	-	-	-	-	3.5
Thickness at the opposite part	-	-	-	-	5
Diameter of the fusée-hole	-	-	-	-	4

Weight of the shell unloaded,	—
	11.7
	<i>d</i>

Weight of the powder contained in the shell —————
236.5

N. B. The letter *d* denotes the cube of the diameter of the bore.

But shells have also been lately made with the metal every where of the same thickness, and are found to burst into a greater number of pieces by this construction. The Germans do not name their shells from the diameter of the bore which receives them, but from the weight of a stone-ball that fits the same bore as the shell. Thus a 7lb. howitzer admits a stone-ball of that weight; the shell for this weighs 15lbs. and corresponds to the English $5\frac{1}{2}$ inch. The 30lbs. howitzer shell weighs 60lbs., and is rather more than 8 inches in diameter. At the siege of Gibraltar, small shells, as $4\frac{1}{2}$ inches, and hand-granades, were quilted into grape for 13-inch mortars. The fuses were turned inwards next the iron-tampion, and leaders of quick-match for communicating fire to the fuses were introduced through holes made in the wood-bottom, and placed as near the fuses as possible in the centre of the grape. These answered very well for short ranges. In general, the windage, or difference between the diameter of the shell and mortar, is $\frac{1}{60}$ th of the latter; and the diameter of the hollow part of the shell is $\frac{7}{10}$ ths of the same. For finding the weight of an iron-shell, the following rule has been given. Take $\frac{6}{34}$ of the difference of the cubes of the external and internal diameters, and this will be its weight.

In order to find how much powder will fill a shell; divide the cube of the internal diameter of the shell in inches by 57.3, which will be the number of pounds of powder. To find the size of a shell for containing a given weight of powder; multiply the number of pounds of powder by 57.3, and the cube root of the product will be the diameter in inches.

Bombs only differ from granades, in that the latter are much less; and instead of mortars are thrown out of the hand. Bombs are thrown not only out of mortars and howitzers, but out of cannon. The following shells may be fired from guns; viz. hand-granades from 6-pounders; $4\frac{1}{2}$ shells from 12-pounders; $5\frac{1}{2}$ shells from 24-pounders; and 8-inch shells from 68-pr-carronades. Shells may be also thrown from guns to short distances, in case of necessity, though the bore be not of a diameter sufficient to admit the shell. For this purpose the gun may be elevated to any degree that will retain the shell upon its muzzle, which may be assisted by a small line passing from the lugs of the shell round the neck of the gun. To produce a greater effect, the space between the shell and the charge may be filled with wads, or some other substance.

Bombs may be used without mortar-pieces, in the manner practised by the Venetians at Candia, when the Turks had possessed themselves of the ditch, rolling down bombs upon them, along a plank set sloping towards their works, with ledges on the sides to keep the bomb right forwards. They are sometimes also buried under ground to blow up. See CAISSON.

M. Blondel, who has written on the art of throwing bombs, observes that the first bombs were those thrown into the city of Watchendonch, in Guelderland, in 1588, though others pretend they were in use a century before, viz. at the siege of Naples by Charles VIII. in 1495. Stowe says (p. 584), that mortars and bombs were invented in 1544 by foreigners, whom Henry VIII. employed. But they came not into common use before the year 1634, and then only in the Dutch and Spanish armies. One Malthus, an English engineer, is said to have first carried them into France, where they were put in use at the siege of Collioure, in 1642.

The art of throwing bombs makes a branch of gunnery, founded on the theory of projectiles, and the laws and quantities of gun-powder.

Mess. Blondel, Guisnée, de Reffons, de la Hire, and others have written expressly on the art of throwing bombs.

BOMB-battery. See BATTERY.

BOMB-chest, is a kind of chest filled usually with bombs, sometimes only with gun-powder, placed under ground, to tear and blow it up in the air, with those who stand on it.

Bomb-chests were formerly much used to drive enemies from a post they had seized, or were about to take possession of: they were set on fire by means of a *suicidee* fastened at one end, but they are now much disused.

BOMB, water. See WATER-bomb.

BOMB-veffels, which are small ships formed for throwing bombs into a fortress, are said to be the invention of M. Reyneau, or Renard, and to have been first used at the bombardment of Algiers, in 1681. Till then, it had been judged impracticable to bombard a place from the sea.

The bomb-ketches on the old establishment carry one 13-inch, and one 10-inch mortar; with eight 6-pounders, besides swivels, for their own immediate defence. The modern bomb-veffels carry two 10-inch mortars, four 68-pounders, and six 18-pounders caronades; and the mortars may be fired at as low an angle as 20 degrees; though these mortars are not intended to be used at sea, but on very particular occasions, their principal use, at these low angles, being to cover the landing of troops, and to protect our coasts and harbours. A bomb-ketch is generally from 60 to 70 feet long from stem to stern, and draws eight or nine feet water. The tender is generally a brig, on board of which the party of artillery remain, till their services are required on board the bomb-veffel. The following instructions serve for their management and security in action.

1. A Dutch pump, filled with water, must be placed in each round-top, one upon the fore-castle, one on the main-deck, and one on the quarter-deck; and furnished with leather buckets, for a fresh supply of water.

2. The booms must be wetted by the pumps before the tarpaulins and mortar-hatches are taken off; and a wooden screen, 5 feet square, is to be hung under the booms, over each mortar, to receive the fire from the vents.

3. The embrasures being fixed and properly secured, the port must be let down low enough to be covered by the sole of the embrasure. Previous to its being let down, a spar must be lashed across it, to which the tackles for raising it again must be fixed: this spar serves to project the tackles clear of the explosion.

4. The mortars must not be fired through the embrasure at a lower angle than 20 degrees, nor with a greater charge than 5 lbs. of powder.

5. Previous to firing, the doors of the bulk-head, under the quarter-deck, must be shut, to prevent the cabin being injured by the explosion.

6. The bed must be wedged in the circular curb, as soon as the mortar is pointed, to prevent re-action; the first wedge being driven tight before the rear ones are fixed, in order to give the full bearing on the table, as well as the rear of the bed.—The holes for dog-bolts must be corked up to prevent the sparks falling into them.

7. When any shells are to be used on board the bomb, they must be fixed on board the tender, and brought from thence, in boxes in her long-boat; and kept along-side the bomb-ship till wanted, carefully covered up.

8. In the old constructed bomb-veffels it is necessary to hoist out the booms, and raft them along-side previous to firing; but in these new ones, with embrasures, only the boats need be hoisted out; after which the mortars may be prepared for action in 10 minutes. See KETCH.

BOMBA, in *Zoology*, a species of TRICHODA, one of

the genera of Animalcule or Vermes infusoria. This kind is briefly described as being of a changeable form, with a few hairs on the anterior part. This is found abundant in stagnant water; the body is thick, somewhat pellucid, of a yellowish colour, and filled with paler molecules. Müll. Gmel. &c.

BOMBARD, BOMBARDA, a piece of artillery anciently in use, exceedingly short and thick, and with a very large mouth, by some also called *tafflyk*, by the Dutch *donderbus*. Some derive the word, by corruption, from *Lombard*, as supposing this piece first used in Lombardy. Du-Cange, after Vofsius, derives it from *bombus* and *ardeo*; Menage, from the German *bombarden*, the plural of *bomber*, *lallyta*. But we doubt whether the Germans knew any such word. It is no unusual thing with Menage, and many other etymologists, to give derivations from words of their own making.

There were some of these pieces said to have carried balls of 300 pounds weight; Froissart mentions one of fifty feet long. To load them, they made use of cranes, &c. The bombard is supposed to have been in use before the invention of cannon.

Bombards can hardly be supposed to have been of metal, nor charged with gun-powder. They were rather a sort of baliste for throwing stones, and were played with ropes.

BOMBARDE, in *Geography*, a fort and village of the island of St. Domingo, about 3 leagues N. of La PlateForme; 6 S. E. of the Mole, and 22 from Port de Paix. N. lat. 19 42'.

BOMBARDIER, an engineer, or person, whose business is to take care of the firing and throwing bombs out of mortars.—He first drives the fusee, then fixes the shell, points, loads, and fires.

BOMBARDIER, in *Entomology*. See CARABUS.

BOMBARDING, the art or act of attacking a city or fortress, by throwing bombs into it, in order to ruin or set on fire the houses and magazines, and do other mischiefs.

Bombarding is not reckoned the most honourable method of making war, as it rather tends to do mischief to the inhabitants than to the works.

BOMBARIN, in *Zoology*, the name used by some old writers for the Hippopotamus.

BOMBASINE, in *Commerce*, a kind of silk stuff manufactured at Milan, and thence sent into France and other countries. The French also use the word bombasine for stuff made of cotton, more properly called dimity.

BOMBAST, in *Rhetoric*, denotes a style too high and pompous for the subject and occasion; or a certain manner of elocution and action, which is grand when supported by dignity in the sentiment, and force in the expression, but never fails to appear ridiculous where the sentiment is mean, and the expression flat. See STYLE.

BOMBAX, in *Botany*, (a name given to the common cotton tree by Serapion an Arabian physician in the beginning of the ninth century; Pliny had before called cotton Bombyx. Gr. *βουβαξ*. Suid.) silk cotton. Lin. Gen. 835. Reich. 901. Schreb. 1127. Jussieu, 275. Willden. 1284. La Marek. *Fromager*. Class and order *Monadelphica Polyandria*. Nat. Ord. *Columnifera*—*Malvaceae*. Juss.

Gen. Char. *Cal.* permanent, either of one leaf, tubular-campanulate, three, four, or five-cleft; or of five unequal leaves. *Cor.* either five petals, or one petal five-cleft. *Stam.* filaments five or more, connate at the base, sometimes slightly, sometimes tubular. *Pist.* germ superior, turbinate-oblong. *Stigma* capitate, with five teeth more or less developed. *Pericarp.* large obovate-oblong, membranous and almost woody, five-celled, five-valved. *Seeds* numerous, round, woolly. *Recept.* columnar five-cornered, forming the partitions.

Eff. Char. *Cal.* simple. *Capfule* fomewhat woody, five-celled, five-valved. *Seeds* woolly. *Recept.* five-cornered.

Species, 1. *B. pentandrum.* (La Marck Tab. 587.) "Flowers pentandrous." Linn. "Anthers bent; leaves in fevens." Willden. A tree fixty or eighty feet high. Bark greenifh, fmoother, eafily feperated from the wood; often fprinkled, efppecially when young, with large, conic, fpinous tubercles; branches near the fummit, pendant; leaves on long petioles, digitate, folioles from five to nine, either entire or ferrate, lanceolate, ending in a point; flowers in a fimple umbel; partial peduncles about an inch long, with feveral alternate bractes; petals five, white, and velvety without, fmoother, concave, and of a purple or delicate rofe colour within; anthers two or three, on a filament, twifted together; fruit half a foot long, fhaped like a cucumber, very flender at its bafe; feeds oval with a fharpifh point, enveloped with a great quantity of fhort dark cotton which is not fpun, but ufed for fluffing pillows, mattraffes, &c. Rumphius fays that the valves open at the bafe. Plumier afferts the contrary. Jacquin, who faw the living plant in fruit, gives no information on the fubject. A native of both Indies. Cultivated by Mr. Miller in 1739. 2. *B. erianthos.* (Cavan. Tab. 152.) "Flowers pentandrous; anthers fimple, erect; leaves in fevens." Willd. Trunk very fpinous; leaves terminated by a filament, very fmoother; calyx fhort and very large: petals three inches long, whitifh, covered without with a fhort thick down, fmoother within, concave, and rounded at their extremity; tube formed by the lower part of the filaments, bottle fhaped; anther linear, longitudinally fixed to the upper part of the filament. Found by Commerfon in Brazil. 3. *B. pyramidale.* "Stem without thorns; leaves cordate, angular; flower pentandrous; anthers united; fruit very long, pyramidal." Cavan. A large tree with very fpreading branches; wood white and fo light that fifhers ufe it inftead of cork; bark thick, fibrous, cinereous, marked with whitifh fspots, and reddifh wrinkles; leaves a foot in diameter, ftrongly nerved, green on the upper, yellowifh and downy on the lower furface, on long and thick petioles; flowers numerous on long peduncles; coroll large, monopetalous, campanulate, deeply divided into five fegments; calyx large, reddifh, green, campanulate, with five blunt divifions; filaments five, thick, fupporting as many large nearly arrow-fhaped anthers which are fpirally united and enclofe the fummit of the fstyle; fstyle reddifh, club-fhaped, marked at the end with five fpiral furrows; capfule furrowed, from eight to ten inches long; feeds very fmall, fomewhat egg-fhaped, enveloped with fine, fhort, reddifh cotton. A native of the Antilles. 4. *B. grandiflora.* "Leaves in fevens; flowers pentapetalous, large, polyandrous; flamens united into a tube at the bafe." Cavan. Calyx large, expanding with four blunt divifions; coroll fuperb, of five petals, each five inches long, but narrow in proportion to their length, whitifh, fleshy at their bafe, velvety without, fmoother within, and rounded at their extremities, inferted at the bafe of the tube of the filaments, which is naked, entire in its whole length, and terminated by a prodigious number of red filaments a little fhorter than the coroll; anthers kidney-fhaped, fmall and loofely attached to the filaments; fstyle filiform, thick, longer than the flamens, with five fmall teeth; fruit unknown. Described by Cavanilles from a fpecimen in the Herbarium of Thouin. It grows about Rio-Janeiro. 5. *B. Ceiba.* "Flowers polyandrous; leaves in fives." Linn. Trunk clofely armed with fhort, ftrong fpires, fo large as to be hollowed out into canoes of twenty-five tons burden; calyx fmall, campanulate, with five fmall teeth: coroll monopetalous; tube ftraight, twice as long as the calyx; border divided into five

long, concave obtufe fegments; filaments numerous, proceeding from five diftinct bodies, which are united at the bafe and form a conic tube adhering to the bafe of the coroll; anthers oblong, loofe; germ fomewhat ovate, with five angles; capfule oblong, fmall at the bafe; feeds nearly round, covered with down, which is ufed by the lower ranks to fluff pillows and chairs. A native of South America, near Carthageua. Cultivated at Hampton Court in 1692. 6. *B. heptaphyllum.* "Flowers polyandrous; leaves in fevens." Linn. "Stamens in five bodies." Cavan. A tree fifty feet high, fix feet diameter at its bafe; wood foft, light, and brittle; bark thick, cinereous, fpinous when young; leaves digitate; calyx four-cleft; flowers numerous, large, odorous; coroll of five petals, downy without, attached by its bafe to the bottom of the tube of the filaments; filaments very numerous, kidney-fhaped, fhorter than the coroll, loofely attached; fruit elongated. 7. *B. globofum.* "Leaves in fives or fevens, obovate, emarginate; fruit globular." Willd. (Aub. Gu'aa. Tab. 281.) A tree thirty feet high; trunk a foot and a half in diameter; leaves palmate, green, fmoother, oval, obtufe, flightly crenulated at the fummit, the middle one the largeft, on long petioles, with two long, pointed, caducous ftipules at their bafe; flowers unknown; fruit in axillary and terminating racemes. A native of Cayenne. 8. *B. goffypium.* "Leaves five-lobed, acuminate, tomentofe beneath." Linn. A large tree with green, nearly fmoother bark; leaves alternate on long, flender, pubefcent petioles; flowers large, in fimple panicles on downy peduncles; calyx of five unequal leaves; petals five, as long again as the calyx, expanding, yellow; filaments numerous, flightly united at their bafe; anthers oblong, curved; capfule oval-obtufe; feeds kidney-fhaped. A native of the eaft of Coromandel.

The fpecies known to Linnæus were at firft placed by him with the common cotton and its congeners, under the old Greek name Xylon; but afterwards feperated on account of the fimple calyx. Thofe with the double calyx he then called goffypium; thofe with the fimple one bombax. The fpecies of the genus bombax, as it now ftands, differ fo much from each other in moft of the parts of fructification, as almoft to juftify the divifion of them into diftinct genera. The calyx, the coroll, the number and fupport of the flamens, the form and infertion of the anthers, all vary: nothing is conflant but the fimple calyx; the five-celled, five-valved capfule, and the woolly feeds. We have altered the natural and effential generic characters, and fo formed them as not to exclude any of the fpecies.

Propagation and Culture. Silk cotton is propagated by feeds fown in a hot-bed in the fpring. In about two months it fhould be tranfplanted into a fmall pot filled with frefh loamy earth, and plunged into a moderate hot-bed of tanners' bark. At firft it fhould be fhaded from the fun; but afterwards, when the weather is warm, fhould be allowed frefh air, and frequent fupplies of water in fmall quantities, with a uniform degree of heat. In autumn it muft be removed into the bark-ftove and fparingly fupplied with moifture. It makes a pleafing variety in a large ftove, but is not likely to produce flowers in England. See Miller, Gardener's Dictionary.

BOMBAY, in *Geography*, a fmall ifland in the Indian Sea, near the weftern coaft of Hindooftan, about 7 miles in length and very narrow, containing a very ftrong and capacious fortrefs, a large city, a dock-yard, and marine arsenal. It is feperated on the N.E. by a narrow ftrait from Salfette, another ifland, and thefe two, together with the neighbouring fhores of the continent, form a large found, in which are feveral other iflands, particularly Caranjah and Elephanta;

Elephant; the latter (which see) being famous for its subterraneous temple, and both of them acquisitions from the Mahrattas. It was first taken possession of by the Portuguese, soon after their arrival in India, and called by them *Buon Bahia*, or Good Bay, from the excellence of its harbour, which is so spacious as to accommodate, as it is affirmed, a thousand ships at anchor, and well sheltered from all winds. The Portuguese ceded it to the English in 1662, as part of the dower of the Infanta, queen of Charles II. After the king's marriage, a fleet under the command of lord Malborough was sent to take possession of it; and sir Abraham Shipman was appointed governor. But upon their arrival in September 1663, the viceroy, actuated by the Popish clergy, who objected to the cession of the island to heretics, refused to surrender it. At length, however, in 1664, he was terrified into compliance, and a treaty was established, by which Mr. Cook, upon the death of Shipman, was invested with the possession of the island, in quality of governor. By this treaty the inhabitants were to be continued in the free exercise of their religion, and in the undisturbed possession of their estates under the crown of England. Although the trade of Bombay was at this time very prosperous, it was soon found, that the royal revenues were not sufficient for defraying the charge of the establishment, and that the trade itself was subject to very considerable obstructions; so that the king found it expedient to make a full grant in fee-tail of the port and territory to our East India Company, which was done by charter, dated 2^d March 1668, and thus they have continued to hold it to the present time.

The city of Bombay, the principal port and settlement of the English in this part of India, is situated in the northern part of the island, N. lat. 18° 58', E. long. 72° 38'. It is about a mile in length, but narrow; and defended both towards the sea and land with various fortifications, which have been constructed at a great expence, and which have rendered it the most considerable fortress in India. On the island also there are small forts sufficient for protecting it from any irruption of the Indians; and in the harbour there are basons hewn out in the rock, for the purpose of careening ships. The houses of Bombay are in general neither splendid nor commodious; but there are several handsome buildings, among which are the governor's palace, and a large, elegant church near it; the houses are not flat-roofed, as they are in other parts of the East, but they are covered with tiles in the European fashion. The English have glass windows. The other inhabitants of the island have their windows of small pieces of transparent shells framed in wood, which render the apartments very dark. The soil of the island is sterile, and incapable of any great improvement; its chief produce consists of cocoas and rice, besides mangoes and some Indian fruits. It draws a considerable supply of provisions from the continent, and from the fertile island of Salsette. Large quantities of salt are manufactured on the shore, from the sea-water that flows into pits adapted to this purpose. The sea-breezes and frequent rains cool the atmosphere, and render the climate of this island temperate; and though the air is not so pure as at Madras, yet it is much more wholesome than at Bengal; the coast of Malabar being pretty healthy, though less so than the coast of Coromandel. The island of Bombay has been rendered much more healthy than it was formerly, by a wall, which has been built to prevent the encroachment of the sea, where it formed a salt marsh, by draining the marshes in its environs, and by an order that none of the natives should manure their cocoa-nut trees with putrid fish. Nevertheless, many Europeans, especially on their first arrival,

are seized with fevers, fluxes, and other disorders, which prove fatal; and others shorten their days by not adhering to a mode of life suitable to the climate. The natives, however, and others, who abstain from excess of animal food and strong liquors, enjoy a good share of health, and live to a considerable age. The want of fresh water is an inconvenience to which the inhabitants are subject; the best being that which they preserve in cisterns after rain; whereas that which is supplied by their wells has a brackish taste.

This island is become very populous, in consequence of the toleration which is granted by the English to persons of every religious profession. The number of inhabitants is estimated by Niebuhr at 140,000, and of these the Europeans form the most inconsiderable class. The other inhabitants are Portuguese, or Indian Catholics; Hindoos, the original possessors of the country; Persians from Kerman; Mahometans of different sects; and some Oriental Christians. The English have a handsome church at Bombay, but they are disadvantageously circumstanced with regard to officiating clergy. The Catholics are much more numerous than the Protestants, and have many priests, as well Europeans as Indians, who attend their studies at Goa. The pope, many years ago, appointed for their superintendance a bishop of Bombay, but he was dismissed by the governor of the island. The Catholic churches are decent buildings, and are within sumptuously ornamented. The Jews had once a college and a synagogue in the middle of this island; but the college was converted into a country-house for the English governor, and the synagogue into a suite of assembly rooms.

Bombay is the seat of the English government for the coast of Malabar; as Madras is for the Coromandel coast, Calcutta for Bengal, and as Bencoolen was for Sumatra. These four governments, of which that of Bengal has the superiority and control, are obliged, by an act of the British parliament passed in 1773, (13 Geo. III. c. 63.) to afford mutual assistance in cases of extraordinary exigence. The different establishments are under similar administration, and all processes between subjects of the company are determined by the law of England. The council or regency of Bombay (as well as that of Bengal) consists of a governor and three members of council. The other servants of the company are factors and writers of different ranks, and are sometimes transferred from one department to another. The governor and members of council of the other presidencies are to be under the control of the government-general of Bengal, with respect to treaties with the native powers of India, levying war, making peace, collecting and applying revenues, levying and employing forces, or other matters of civil and military government; and they are required in all cases to obey the orders of the said government-general, unless the directors of the company shall have sent to these settlements any contrary orders not known to the government-general, of which, in that case, they are to give this government immediate advice. The Court of Directors are to appoint to these several governments, and likewise the commander in chief of all the forces, and the three provincial commanders in chief. All governors and counsellors are prohibited from trading, except from the company, 24 Geo. III. sess. 2. c. 25. 33 Geo. III. c. 52. See BOARD of *Controul* and *East India Company*.

BOMBAY Hook, an island of America at the mouth of Delaware river, about 8 miles long and 2 broad, formed by the Delaware on the eastern side, and Duck Creek and Little Duck Creek on the Maryland side; these are united together by a natural canal. The N. W. end of Bombay Hook is about 47 miles from Capes Henlopen and May; from the Hook to Reedy Island is 9 miles.

BOMBAZINE RAPIDS, lie on a river in Lincoln county, and district of Maine in America, and are navigable for boats with some lading, at a middling pitch of water. They took their name from Bombazine, an Indian warrior, who was slain by the English in attempting to cross them.

BOMBAZINE, a lake, seven or eight miles long, in the township of Cattleton, county of Rutland, and state of Vermont.

BOMBELLA, in *Entomology*, a species of **BOMBYX**, of a middle size, that inhabits Austria, the wings of which are cinereous, sprinkled with fuscous. Fabr. Mant. This is *Tinea Bombycella* of the Vienna catalogue. (Wien. Schmet. terl.)

BOMBERG, DANIEL, in *Biography*, one of the early printers, was a native of Antwerp, and settled at Venice, where, in 1518, he printed a folio edition of the Hebrew Bible. See **BIBLE**. He also began an edition of the Talmud, in 1520, and completed it some years afterwards in eleven volumes folio. Each of the three impressions of this immense work is said to have cost him 100,000 crowns. His whole property was devoted to the impressions of valuable editions of Hebrew Bibles and rabbinical works, for which purpose he employed a great number, as some say, more than 100 of learned Jews. Bomberg was himself a Hebrew scholar. He died about the middle of the 16th century.

BOMBIC ACID. The silk worm has a small reservoir near the anus, from which, when full grown, or especially when in the chrysalis state, a minute quantity of an acid liquor is seen to ooze out. If the entire animal is bruised, it gives a liquor containing the usual soft animal matters, together with a native acid. Alcohol separates the former, and leaves the latter in solution, which, by evaporation, furnishes a very four pungent yellow fluid, which shews all the marks of an acid by reddening blue vegetables, and uniting with alkalis and some earths. The discoverer, Chauffier, considers it as peculiar, and hence it has obtained a separate place in the list of animal acids; but from analogy with the experiments on the *formic* acid, and other circumstances, the separate existence of the bombic acid is very questionable. No other chemist has yet undertaken to confirm or dispute the original statement. Mem. de l'Acad. de Dijon. 1783.

BOMBICHIE, in *Geography*, a town of Asia in Syria, 44 miles E. N. E. of Aleppo.

BOMBINA, in *Entomology*, a large species of **CURCULIO**, described by Fabricius, as a native of Cayenne. The colour of this insect is ferruginous brown, and the wing-cases striated, with black elevated tubercles.

BOMBINA, in *Zoology*, a species of **RANA**, or frog, the belly of which is orange, spotted with sky-blue, and the pupil of the eye triangular. Blumenb. This kind appears to be extremely variable in point of colour and markings. In the tenth edition of the Linn. Syst. Nat. it is described as the *Rana variegata*. Roefel, in his "History of Frogs and Toads," calls it *Bufo igneus*, (*bufo vulgo igneus dictus*). It is likewise *La sonnante*, and *le couleur de feu*, of Lacepede, and *Rana ignea*, or fire-frog, of Dr. Shaw.

The permanent varieties, if they may be so expressed, of this particular species, do not seem to be very correctly ascertained. Gmelin, upon the authority of preceding writers, constitutes the following varieties: β has the belly black, with clear white spots and speckles; γ is of a fuscous colour; and δ is distinguished by its loud sonorous voice.

This is the smallest of the European kinds of either the frog or toad. The general habit resembles that of a toad, but it is said to leap and swim with as much or even greater facility than the common frog. Dr. Shaw observes, that he places it among the frogs instead of toads, on account of its depositing its ova in clustered heaps; not in strings like the latter

animals. In Germany, Italy, and other European countries, which this creature inhabits, it is known to delight in marshy places. The sound of the male, which alone is vocal, is clear and sharp, and is thought by some to resemble, in a very peculiar manner, that of a man giggling with laughter. This, indeed, is not the universal opinion; some authors compare it to the tone of a bell, or the note of a cuckow, for which reason it has obtained the name of *bombycina*.

This animal, according to Dr. Shaw, may be considered rather as an aquatic than terrestrial species; being rarely found on land, but chiefly inhabiting turbid stagnant waters, in which, in the month of June, it deposits its spawn, the ova being much larger in proportion than in most others of the genus. The tadpoles are hatched towards the end of June, and are of a pale yellowish brown colour; and, when young, are often observed to hang from the surface of leaves, &c. by a glutinous thread proceeding from the small tube or sucker beneath the lower lip. They arrive at their full size towards the close of September, and at that period are remarkable for the fleshy or muscular appearance of the tail, which is stronger in proportion than in most other tadpoles. About the beginning of October they assume their complete or ultimate form; and when the tail has so far decreased as to be still a quarter of an inch in length, that remaining portion becomes entirely obliterated in the space of about twelve hours. The fire-frog is a lively active animal; leaping and swimming admirably well. When surprised on land, or unable to escape, it squats close to the ground; at the same time turning back its head and limbs in a singular manner, and if farther teized and irritated, evacuates from the hinder part of the thighs, a kind of saponaceous frothy fluid, of no bad scent, but which, in some circumstances, has been found to excite a slight sensation of acrimony in the eyes and nostrils. This species is observed to breed at the age of three years, and may be supposed to live about ten; but this is not entirely ascertained.

It ought not to escape remark, that the triangular form of the pupil of the eye, which Gmelin and others consider as the most striking criterion of this species, can only be observed in a full light, for when examined in the shade its shape is circular.

BOMBOESKJE, in *Zoology*, the **SCIURUS ASIATICUS** in Le Bruyn's It. p. 434, t. 254.

BOMBUS, in *Medicine*. See **FLATULENCY**.

BOMBUS, in *Music*, an artificial motion with the hands, imitating, in cadence and harmony, the buzzing of bees. The word is originally Greek, and signifies the buzz or noise of bees, gnats, and the like. In this sense, *bombus* made one of the species of applause used by the ancient auditories.

BOMBYCILLA BOHEMICA, in *Ornithology*, the name under which Brisson describes the Bohemian chatterer, *Ampelis Garrulus*. The same author likewise calls an American variety of this bird *Bombycilla Carolinensis*.

BOMBYCINUM, in *Ancient Writers*, properly denoted a species of silk, brought from Assyria and the island of Cos. In which sense it stood distinguished from *Sericum*, another sort of silk brought from the Indies.

BOMBYCINUM VELAMENTUM. See **VELAMENTUM**.

BOMBYLIUS, in *Entomology*, a genus of **DIPTEROUS** insects, distinguished by the following character: beak or sucker very long, setaceous, straight, and consisting of two unequal valves, within which three setaceous bristles are contained; feelers two, short and hairy: antennæ subulate, and connected at the base. Linn. Gmel. &c.

The antennæ of the insects in this genus are short, and contain three articulations, the first of which is long, the second short, and the third or last conicle, and terminating

in a kind of appendage, almost forming a fourth joint, as is to be observed with the assistance of glasses. Those who have carefully examined the structure of the trunk with the microscope affirm, that the number of valves or bristles concealed within the external bivalve sheath are four instead of three, as Gmelin describes them. The antennæ are inserted at the base of the trunk.

Insects of this genus have the head comparatively of a small size, of a form somewhat rotund, and almost wholly occupied by the eyes. The thorax large, the abdomen bulky, and rounded at the extremity as in the bee. Both the thorax and abdomen are hairy, or covered with down. The wings longer than the body, and extended horizontally. Legs long and slender.

The size and rotundity of the body afford an excellent natural character, by which this tribe of insects may be distinguished from those of the genera *Empis* and *Astilus*, with which some naturalists have confounded them. The Fabrician species of *Volucella*, *Cytherea*, and *Anthrax*, have been referred to the *Bombylius* genus with very little propriety.

The true *Bombylius* is a lively active tribe of insects, that subsist entirely on the nectareous juices they extract from flowers, with the assistance of their long proboscis or trunk. They fly with much rapidity, making all the time a soft humming noise similar to that of the bee. In England the largest species (major) has acquired the name of the humble bee fly. The insects of this tribe are found in the winged state in the summer, but their metamorphose is utterly unknown.

Only a small number of species in this genus are at present known, namely major, medius, minor, minimus, ater, fuscus, griseus, virescens, and albifrons: these are natives of Europe. The extra-European kinds are *æqualis*, *capensis*, *cupreus*, *maculatus*, *pygmaeus*, and *vericolor*.

BOMBYX, a genus of **LEPIDOPTEROUS** insects, or rather one of the subdivisions of the **PHALÆNA**, an extensive genus, in which all the insects of the moth tribe are comprised by Linnæus. Fabricius, in his "Entomologia Systematica," admits the *Bombyx* as a genus, applying the term *Phalæna*, which Linnæus gave indiscriminately to all the species of the moth tribe, as a general name to that particular description of moths which have the palpi cylindrical, the tongue advanced and membranaceous, and the antennæ filiform.

The true definition of the *Bombyces*, whether considered as a subdivision of the *Phalæna*, or as constituting a genus of themselves, is not sufficiently explicit. A great number of the species may be readily referred to their proper station in the genus, by observing with attention the characters laid down by Linnæus; but there are others which cannot be so accurately distinguished from the *Noctua* as we could wish, by the assistance of those characters. If, for instance, we advert to the earlier editions of the Linnæan *Systema Naturæ*, we shall find even in the small number of species which that naturalist describes, that the greatest confusion prevails in this respect. Had Linnæus been himself correct in his ideas of the natural character of the *Bombyces*, we are almost persuaded he would not have considered *Phalæna bucephala* as a *Noctua*, any more than *dominula*, *fuliginosa*, *Jacobææ*, and some others, which he includes as such in his arrangement of the *Lepidoptera*.

Linnæus thought at first the pectinated antennæ of the *Lepidoptera* a sufficient criterion of the *Bombyces*, provided the wings were incumbent and depressed, while the insect remained in a resting position, because the geometræ, though often furnished with pectinated antennæ, have the wings expanded horizontally when at rest. But later observations of

other naturalists have determined this character of the *Bombyx* to be insufficient to distinguish it.

In the *Systema Naturæ*, Linnæus divides the *Bombyces* into sections in the following order; the *elingues*, or those without a manifest spiral tongue, and the *spirilingues*, having an involuted spiral tongue. These two principal sections are subdivided again; the *elingues*, into those with the back smooth or not crested,—with expanded wings,—with reversed wings,—with deflected wings,—with erect crests, or tufts on the back; and the *spirilingues*, those smooth, with expanded wings,—with deflected wings,—and with the back crested.

This mode of arrangement is entirely superseded by the *Entomologia Systematica* of Fabricius. The latter writer takes his characters, as usual, chiefly from the tongue and palpi. His *Bombyx* is thus generically described; feelers two, compressed, reflected; tongue short, and membranaceous; antennæ filiform. By this many of the Linnæan *Bombyces* are excluded, for the reception of which he establishes two other genera, those of *Cossus* and *Hepialus*, both of which most strictly appertain to the Linnæan *Bombyces*. The *Bombyx cossus* gave Fabricius the idea of forming a distinct genus of the species analogous to this insect. The characters, he lays down for the *Cossus* are these; the palpi or feelers two, compressed, cylindrical; with no tongue; and the antennæ short and filiform. His *Hepialus* has two hairy feelers, between which is the rudiment of a bifid tongue; and the antennæ are moniliform.

Gmelin, in the last edition of the *Syst. nat.* endeavours to reconcile the Fabrician genera as subdivisions to the principal Linnæan genus *Phalæna*. His *Bombyces* consist of the *Attaei*, which have the wings expanded, and the *Bombyces* (strictly so) which have not the wings expanded, and these latter are again arranged in subdivisions in the following order: first, those with reversed wings, as in *Quercifolia*; second, those with deflected wings, as in *Bucephala* and *Hebe*; third, those with incumbent wings, as in *Antiqua*; and fourth, those with convoluted wings, as in *Bella*. The four families, into which Olivier separates the *Bombyces*, scarcely differ from the preceding; they consist of those with expanded wings, with wings reversed, with wings bent down (deflected), and with wings recovered (incumbent).

The *Bombyces* are to be considered as a true natural family of the moth tribe, which for the most part may be distinguished by the casual observer, who will attend to the structure of the antennæ, the form of the body, the position of the wings, and some few other particulars to be mentioned hereafter. The antennæ, which are filiform, and either pectinated or ciliated, differ greatly in the two sexes of the same species; the male being generally distinguished by having the antennæ much broader, or larger, than in the other sex. The thorax of the *Bombyx* is rather more bulky, and the body thicker than in the *Noctua*, especially in the females. Thus far consistent with the Linnæan character; but a strict attention to the feelers and structure of the tongue, as Fabricius observes, will be also necessary to determine many of the *Bombyces*, which approach so closely to the *Noctua* as not to be accurately distinguished by any other means. For this reason Fabricius is commendable in having endeavoured to define the precise limits between the *Bombyces* and their analogous tribes: his character is more definite than that which Linnæus had previously assigned to this family. The discrimination of Fabricius is obvious in separating the two tribes or genera of *Cossus* and *Hepialus* from the *Bombyces*, under which head Linnæus comprehends them; for those insects certainly form distinct natural families, both in their general appearance, their metamorphoses, their habits of life, and other peculiarities, from that

which

BOMBYX.

which ought to be considered as the natural family of bombyces.

The insects of the bombyx tribe never fly except in the evening. During the day time they secrete themselves under the leaves, or beneath the branches, in the clefts of trees, where they may remain secure till about sun-set, at which time they appear to be on the alert, at first crawling about the branches, then fluttering their wings, and becoming brisker in all their motions as the evening comes on. The larger sort of moths, which we see first starting from the woods or hedges after some of the geometræ, are the *swifts*, the Fabrician hepiali, which fly swiftly as their trivial name implies, but low or near the surface of the ground; these at twilight are succeeded by the bombyces and noctuæ, whose flight is more elevated. They continue to sport about till it becomes quite dark. The males of the bombyces are commonly first upon the wing in search of the females, which latter are in some few species entirely destitute of wings, or at least have only the rudiments of them close to the thorax; in which case the female waits upon the trees or herbage for the arrival of the male; the female of bombyx antiqua, the vapourer moth, is a striking proof of this, for it has so little the appearance of a moth that any one, except an entomologist, would mistake it for an apterous or wingless insect. Those females which have wings are commonly larger even than the males.

The bombyces are produced from a larva, or as it is more usually termed by common observers, a caterpillar. This is of a long cylindrical form, having in some species a smooth skin, or in others more or less tuberculated; sometimes the skin is covered with a fine silky down, or with hairs; and some of the larger kinds are armed with spines and bristles. All the larvæ of the bombyces subsist on vegetables. Their jaws are strong, and of a horny texture, and below them is a small opening, through which the creature draws the silky thread of so much utility in its general economy. Most of these larvæ have sixteen feet, some have only fourteen feet, and others no more than twelve, six of which are hooked, and situated on the three first annulations near the head, the others towards the lower extremity of the body are short, broad, and very different in structure.

The greater number of species in the bombyx tribe, when in the larva state, lead a solitary life, in which case they separate as soon as they are hatched from the eggs, and crawl about to provide for themselves, the smallest of these even being able to obtain its own subsistence; they can eat as readily, and spin, or throw out the silky thread with as much facility as when grown bigger. The latter is of considerable utility to the larva, for when it wishes to descend from one branch of the tree or bush to another, instead of being obliged to pursue a circuitous course, by crawling or walking, it need only fasten one end of the silken thread to any particular spot and lower itself by its assistance to the branch desired; or when suspended mid-way between the branches, it can pass aside with a swing to any other point within a convenient distance. In like manner, when observed by birds or other enemies, it can drop in an instant and elude the enemy, waiting concealed below among the leaves or on the ground till the danger is over, and then remounting to the former spot by the aid of this thread. This is a provision of nature for the security of the larvæ of the bombyces, in common with that of other lepidopterous insects.

Some species of the bombyces live in societies, as may be observed, for instance, in *bombyx neustria* of entomologists, (the *lackey-moth* of English collectors). The larvæ of this species, by their united labours, spin a capacious habitation, in which the infant brood is hatched from the egg, and after

undergoing their several transformations finally become moths.

Like other larvæ of the moth tribe, those of the bombyces cast their skin several times. When full grown, and approaching the pupa state, those of the bombyx kind spin a sort of web, in which we find the most valuable silk produced by these creatures at any time of their lives. The silk spun by the hairy larvæ is observed to be of little value, because the creature interweaves it with the hairs it plucks off its skin for this purpose. The common silk worm (*bombyx mori*), whose cocoon consists of the most valuable kind of silk, as is well known, has the skin perfectly smooth, or free from hair. There are certain species of the larger bombyces, the larvæ of which have smooth skins, but still beset with annular series of spines or bristles, that produce very strong silk, and are reared with the view of obtaining the cocoons for the manufacture of silk in the East Indies. The breed of these useful insects has long been cultivated in India, although the silk produced from them is very little, if at all, known in Europe. See *SILK*. The bombyces remain in the pupa state for a certain time, varying according to the species, some only a few days or weeks, others six or twelve months, two years, or even three. The same day that the creatures emerge from the pupa state they are in a condition to perpetuate their race. Almost immediately after coupling the males die; the females live long enough to deposit the eggs in a proper place for their security, and where the infant brood may find subsistence, after which they perish likewise.

The species of the bombyx tribe are numerous. Those already described by naturalists amount to a large number; and there are, in the cabinets of the curious, many more, especially of the extra-European species, that have never been described; even in the collections of this country, those of the latter description are numerous. The following are described by Linnæus and Fabricius, and enumerated by Gmelin: atlas, hesperus, arotus, cecropia, paphia, polyphemus, cypria, cytherea, mulitta, promothea, erythrina, janus, megera, hippodamia, nictitans, semiramis, boreas, luna, epimethea, argus, pavonia, minor, media, major, achelous, angulata, liberia, tau, jo, abas, salmonea, proterpina, fenestra, penelope, tyrrhea, perspicua, armida, militaris, castalia, populifolia, quercifolia, illicifolia, promula, cassandra, capensis, aluco, australasia, quadricincta, rubi, pruni, amphione, potatoria, ocularia, hibisci, cynira, cerati, pini, trifolii, quercus, stigma, lusca, dumeti, catax, lanetrus, vinula, fagi, versicolor, mori, populi, eueria neustria, tricolor, castrensis, francoica, taraxaconis, cinerea, mali, avellanae, processionea, pityocampa, rurea, atra, rufa, lagopus, imperialis, crassicornis, hyphinoë, cyane, bucephala, helops, oleagina, cava, pudica, casta, maculosa, virgo, mene, deflorata, tarquinia, tarquinius, hebe, villica, plantaginis, vittata, monacha, flava, lutea, dispar, amasis, chrysothorax, auriflua, bicolor, falcis, cassina, centrolinea mendica, advena, rutila, lentifera, crataegi, eridanus, tibialis nitidula, plumigera, obsoleta, coronae festiva, dryas, coryli, flavomaculata, nuda, furcula, curtula, reclusa anachoreta, anastomosis, testudo, afella, bufo, cippus, pudibundus, scopularia, fascelina, tremula, cæruleocephala, argentina, decora, rufa, dictæa, elegans tritophus, ziczac, dromedarius, terebra, cossus, palpina trepida, quæna, gnoma, arenaceus, morio, rubea, alphas, purpurea, ceraria, murina, nebulosa, strigosa albida, aulica, helvola, undulata, lubricipes, lota, læta, communimacula, compressa, milhauseri, spreta, lincus, strigula, begga, vni-grum, rufula, rufina, grammica, striata, matronula, parthenias, leporina, celsa, dione, capucina, camelina, oo, aesculi, antiqua gonostigma, paradoxa, zona, pylotis,

pylotis, graminis, popularis, fulminea, glorioſæ, crini, roſea, luſoria, cribrum, libatrix, lectrix, credula, dominula, hera, ſanguinolenta, ricini, crotalariæ, colon, populeti, ancilla, conſperſa, fuliginofa, ornatricis, priverna, franciſca, jeſuita, viciella, veſtita, muſcella, bombella, pectinella, annulata, grifea, jacobææ, rubicollis, pulchella, bella, hiſtrio, and umber. To which are to be added bombyx figura Donov. Ind. Inf.; hepialus mappa Donov. Brit. Inf.; coſſus labyrinthicus, argenteus, lituratus, and nebulofus, Donov. Inf. New Holland.

In adhering to the Fabrician ſyſtem, in preference to that of Linnaeus, we are to exclude from the foregoing liſt of bombyces the following ſpecies: lagopus, roſtrata, ſagitta, gemina, deſorata, and ſaga, all of which are to be referred to the Fabrician genus *hybla*; hamuli, jodutta, lupulina, heceta, obliqua, canna, crux teſtudo, afella, bufo, and mappa, ſpecies of the *hepialus* genus of Fabricius: and coſſus, unguiculatæ, terebra, aefculi, ſcalaris, pyrina, labyrinthicus, argenteus, lituratus, and nebulofus, which ſtrictly belong to the Fabrician genus *coſſus*.

BOMBYX is alſo a name given to the *Silk-worm*.

BOMBYX, in the *Ancient Muſic*, a kind of inſtrument, which, in Ariſtotle's time, was made of a reed, calamus, and, by reaſon of its length, was difficult to play on.

The word ſeems alſo to have been uſed for a key, or contrivance for ſhutting and opening the holes of wind inſtruments.

BOMBYX, in the *Ancient Naturaliſts*, ſignifies indifferently either ſilk or cotton.

BOMENE, in *Geography*, a port town of Zealand, one of the provinces of Holland, on the north ſhore of Schouwin iſland, one league eaſt of Brouwerſhaven.

BOMING, an iſland of Aſia, in the mouth of the Ganges. N. lat. 22° 45'. E. long. 91° 25'.

BOMIO, in *Ancient Geography*, a ſtation near Axbridge, according to Antonine's Itinerary; but placed by Camden and Gale at Boverton, in Glamorganſhire.

BOMMEL, in *Geography*, a town of Holland, in the iſland of Over-Flahee, 7 miles W. of Willemladt.

BOMMEL, a ſtrong town of the duchy of Gueldres, ſeated on the Wahal, in the iſland of Bommel-Waert, firſt ſurrounded with a wall by Otho III. count of Gueldres, in 1229; 60 miles N. E. of Antwerp, and 7 N. of Bois-le-Duc. Bommel was taken by the republican troops of France, October 4, 1794.

BOMMEL-Waert, a kind of iſland, in the province of Gueldres, about five leagues in length from Louveſtein N. W. to Fort St. Andrew S. E., and two in its greateſt breadth, formed by the rivers Maes and Wahal. It is defended by three forts, viz. St. Andrew, Voorn, and Crevecœur. The firſt has five baſtions, and was built in 1599 by the admiral of Arragon, and the cardinal Andrew of Auſtria, lieutenant-general of the Spaniſh forces; the ſecond is ſituated at a ſmall iſland, called Voorn, at the eaſt end of Bommel-Waert, and was conſtructed by the prince of Orange, and on that account is ſometimes called Fort Naſſau; and the third is at the ſouth ſide of the iſland towards Bois-le-Duc. Theſe three forts were conſtrained to ſurrender to prince Maurice in the year 1600. In 1672, the French took the iſland under maſhal Turenne, who, after deſtroying the fortifications, abandoned it in the following year. At the commencement of the religious diſputes, count Charles de Manſvelt, paſſing this iſland with ſome Spaniſh troops, was encamped by ſeveral Dutch ſhips under the command of count Hohenlo, who ordered the dykes to be opened, and thus totally inundated the iſland, ſo that the Spaniards were obliged to retire to the citadel, and would

have miſerably perished, if a ſudden froſt had not conſtrained the count to abandon the ſiege, and to allow them liberty to retire. In commemoration of this deliverance a chapel was built at Bruſſels, in honour of the immaculate conception of the Virgin, next the Dominican church, which, being deſtroyed in 1695, was afterwards re-built with greater magnificence. In 1794, the republican troops of France, having compelled the Dutch to abandon Bommel, overtook them in their retreat, and compelled a great part of them to ſurrender. They afterwards availed themſelves of the frozen ſtate of the Wahal, and were making progreſs towards Gorcum and Calenberg; but they were attacked by the Britiſh troops in conjunction with the Heſſians, and driven acroſs the river, with the loſs of a conſiderable number of men and four pieces of artillery. But this temporary ſucceſs was of no permanent avail for reſtraining the progreſs of the French army.

This iſland belonged to the province of Guelderland, except the town of Louveſtein, which, with a very ſmall diſtrict at the weſtern end of the iſland, belonged to Holland.

BOMO, in *Ancient Geography*, a name given to the iſland of Eubœa, from the cattle with which it was ſtored; the ancient Arabian word *bomo*, or *bohmo*, ſignifying, according to Heſychius, cattle, or herds of cattle. This is, probably, the moſt ancient appellation; the iſland having been firſt peopled, as Strabo informs us, by the inhabitants of Arabia and Phœnicæ.

BOMOA, in *Geography*, a town of North America, in New Navarre, 10 miles S. of Cinaloa.

BOMONICA, in *Antiquity*, an appellation given at Sparta to the children, who, in the ſacrifices of Diana, ſtrove who ſhould receive the greateſt number of ſtripes with rods, which they ſometimes continued to do the whole day, and even, as Plutarch relates, to death itſelf.

The word is formed from *βημας*, *altar*, and *νικη*, *victory*; importing as much as *victor ad aras*, or *conqueror at the altars*.

BOMPART, MARCELLUS, in *Biography*, practiſed medicine at Clermont Ferrand the early part of the ſeventeenth century, and was auſic counſellor to the king. No memoirs of his life are known; but his work "Miſer Homo," in which he gives a ſuccinct account of all the principal diſeaſes afflicting the human frame, was much eſteemed. It was dedicated to Pietre, Riolan, and Gny Patin; and to be patroniſed by them was highly creditable: alſo "Nouveau Chaffé Peſté," Paris, 1630, 8vo.; and "Lettres d'Hippocrates traduites et commentées," 1632, 8vo. Haller. Bib. Med. Eloy. Diſt. Hiſt.

BOMPÉL, in *Geography*, a town of Hindooſtan, in the Panjab, 15 coſſes eaſt of Seba, and 3 miles S. E. of Nadone, a town on the Beyah. N. lat. 31° 55'. E. long. 75° 57'.

BOMRAUZE, a town of Hindooſtan, in the Carnatic, 58 miles W. N. W. of Madras, and 36 N. of Arcot. N. lat. 13° 24'. E. long. 79° 38'.

BOMY, a town of France, in the department of the ſtraits of Calais, and chief place of a canton in the diſtrict of St. Omer, 8 miles S. W. of Aire.

BON, JOHN, LL, in *Biography*, a native of Anterville, in Champagne, and eminent in his time for his knowledge in medicine, phyſician to the king of France, and to the cardinal de Guiſe, published, in 1571, "Therapeia Puero-rum," 16to. Paris, "induced to it," he ſays, "by the ignorance of the ſurgeons, midwives, and tonſors, who attended women in child-birth. By their blunders and inexperience in their art, many women loſt their lives, and many children

children were destroyed." His work is very full on the subject, giving rules for the management of women before, during, and after parturition. He has left formulæ for a variety of ointments, with which he directs the pudenda of the women to be anointed, and which he thought conduced much to accelerate the birth of the child. When these failed, lapis ætites was to be tied to one of the thighs of the woman, and polipody of the oak to the feet. But these, he gravely admonishes, are to be taken away as soon as the child is born, lest they should draw away the womb also. Such mighty power was attributed to these trifles! It is probable, however, that the author only meant by these processes to gain time, and to prevent the too hasty interference of the midwives, surgeons, &c.; and as there was nothing in the remedies that could injure the woman, who would frequently be delivered by the natural pains, during their use, he might not be sorry to find the attendants attributing the safety of the woman and child, and the happy termination of the labour, to them. Whatever his real opinion might be, it is certain, that, among the people, these kinds of remedies acquired great credit, and the use of them was continued for near a century after his time. Among other objects that engrossed the attention of this writer, we find him giving formulæ for ointments for smoothing the wrinkles of the abdomen, and for preventing the breasts of women who had borne children from becoming large and pendulous. "Ne venter rugis indecorus," he says, "et statens, eas viris suis ingratas, parum amabiles, et abominandas reddat; ne mammæ in majorem molem extendantur." His book appears to have been in great request, as it passed through many editions, and is inserted in the "Collection of Treatises on disorders attending pregnancy and child-birth," by Caspar Wolfius, published in 1586, re-edited by H. Spachius, fol. 1597, under the title of "Gynecia, sive de mulierum morbis," from which the above quotations have been taken. Haller. Bib. Med.

BON, JOHN PHILIP, probably of the same family with John le Bon, published, at Padua, "De Concordantiis Philosophiæ et Medicinæ," 4to. 1573; he was also author of several poetical works, which were much esteemed in their time. Eloy. Dict. Hist.

BON, in *Botany*, (*Alpinus*). See COFFEE.

BON, *Cape*, in *Geography*, called by the Moors *Ras-Addar*, and the promontory of Mercury, or Hermes, of the ancients, is a cape of Africa, in the kingdom of Tunis, in the Mediterranean sea, distant 11 leagues E.S.E. from that of Zibeeb, and forming the eastern point, as Zibeeb does the western, of the gulf of Tunis. It is so high, that from its summit the mountains of Sicily, distant more than 20 leagues, may be discovered in fair weather. See ÆGIMURUS, and DAKHUL. Cape Bon is situated about N.N.E. from Tunis. N. lat. 36° 50'. E. long. 11° 15'.

BON, in *Modern History*, the name of a feast celebrated annually by the Japanese in honour of the dead. On this occasion they use a great number of lights, and run with eagerness to the tombs of their departed relations with such choice meats as they conceive to be suited to the taste and nourishment of the dead.

BON, Fr.; *Buono*, Ital.; as *tems bon*, and *tempo buono*, used, in *Music*, to express the accented parts of a bar. It is the first note of binary measure of two minims or two crotchets in a bar; the first note of the ternary measure of $\frac{3}{4}$ or $\frac{3}{8}$, and the first and third notes of common time. It is opposed to *tems mauvais* and *tempo cattivo*, the unaccented part of a bar. The French at present, distinguish these portions of a bar by the terms *tems fort* and *tems foible*, strong and weak, and almost loud and soft parts of a bar. It is on

the accented part of a bar that a discord regularly prepared is struck, and resolved on the unaccented part.

BOVA, JOHN, *Cardinal*, in *Biography*, was born at Mondovi, in Piedmont, in 1609, and entered at an early age into a reformed congregation of Cistercians. After having studied philosophy and theology at Rome, he returned to his own country, and became, in 1651, general of the congregation; and he was, at length, viz. in 1669, nominated a cardinal by pope Clement IX. Upon the death of this pontiff, he was thought of as a fit person to succeed him; but another was elected. The cardinal spent the remainder of his days in study and pious exercises, and died at Rome in 1674. He was the author of several works, chiefly of a devotional kind; such as, "De Divina Psalmodia, deque variis ritibus omnium ecclesiarum in psallendis divinis officiiis," 4to. containing an historical account of the practice of psalmody in the Christian church; and "Rerum Liturgicarum libri duo," 4to. giving a similar account of the celebration of the mass. Both these works have been often reprinted; and of the latter an edition much enlarged was published at Turin, in 1747, by father Salas, in 4 vols. fol. Gen. Dict.

BOVA, JOHN DE, professor of medicine at Padua, published, 1758, "Historiæ aliquot curationum, mercurio sublimato corrodente, perfectarum," Verona, 4to. This medicine was much commended by baron Van Swieten, and forms probably the basis of most of our nostrums celebrated for their power of removing pimples, blotches, &c. from the face and other parts of the skin. It was intended by the author to supersede salivation in the cure of lues venerea, and in some cases it has been used with complete success; but it too often disappoints the expectation of the prescriber, to be entirely depended on. "Tractatus de Scorbuto," 4to, 1761. The author shews that this disease, though most frequent in cold marshy places, is not unfrequent in warm countries. "Dell uso e dell abuso dell caffè," Venet. 1761. Coffee, which is hot and drying, should only be used, he says, by persons of cold phlegmatic constitutions. In the quantity it is usually taken in this country, it will scarce be hurtful to any habit or constitution. "Osservationes medicæ ad praxim in nosocomio, anno," 1765, 8vo. Patav. 1766. Haller Bib. Anat.

BOVA, in *Botany* (*Dodoens*). See VICIA *Narbonensis*, and FABA.

BOVA *Nox*. See SMILAX.

BOVA, in *Geography*, a sea-port town of Africa, in the eastern or Levantine government of the kingdom of Algiers, and province of Constantina; known to the Moors by the name of Blaid el Aneb, or the town of jujebs, from the plenty of fruit which is gathered in the neighbourhood. Bona, says Dr. Shaw (*Travels*, p. 46.), is, without doubt, a corruption of Hippo, or Hippona, though the ruins of the ancient Hippo-regius are situated somewhat more than a mile to the south, and furnished materials for the erection of Bona, which is the Aphrodisium of Ptolemy, and placed by him 15' to the north of Hippo. Bona was formerly rich and populous, but is now poorly built and thinly inhabited. Bona, besides its capacious harbour to the east, had formerly a convenient little port under its walls towards the south; but by the constant discharge of ballast into the one, and a neglect of cleansing the other, both are rendered unsafe and inconvenient. However, a great quantity of corn, wool, hides, and wax, are every year permitted to be shipped off from this place; and, by proper management, it might be rendered the most flourishing city in Barbary; and, by introducing a supply of fresh water, it would also become one of the most convenient and delightful. The

adjacent country produces corn and fruit, and great numbers of small and large cattle, but is much exposed to the incursions of the plundering Arabs. The French have a factory at Bona, where they purchase corn, oil, leather, wax, and wool, and constantly keep a resident agent, who has charge of the correspondence between Bona, Algiers, La Calle, and Marseilles. N. lat. 37°. W. long. 7° 50'.

BONA Fortuna, Cape, is a cape of Russia, in the White Sea. N. lat. 65° 35'. E. long. 58° 25'.

BONA Sbaals. See *BASSAUS*.

BONA Dea, the good goddess, in *Mythology*, a mysterious kind of divinity, whose name was unknown to men, and whose sacred rites, performed by the Vestal virgins for the safety of the Roman people, were attended only by women. Some have supposed that this name belonged to Cybele, or the earth, as the source of all good things. Plutarch confounds her with Flora. Varro pretends that she was the wife of Faunus; and that she maintained her character for chastity to such a degree, as never to allow herself to look upon any man besides her husband. Lactantius, on the contrary, says, that this wife of Faunus, having drunk wine in violation of the prevailing custom of the period in which she lived, was whipped to death by her husband with rods of myrtle; and that he, afterwards repenting of the deed, and lamenting the loss of his wife, placed her in the rank of divinities. The feasts of the Bona Dea were annually celebrated, with peculiar solemnity, on the first day of May. The house, in which the rites of the festival were performed, was adorned at a great expence; and as the night was the season appropriated to this purpose, the apartments were illuminated with a great number of lights. The vestals were conveyed into the house of the sovereign pontiff, or one of the chief magistrates; and care was taken to exclude all males, and all animals of this species; and every thing masculine was so scrupulously excluded, that even pictures of that sort were covered during the ceremony. To this purpose, Juvenal (vi. 339.) says:

“ — ubi velari pictura jubetur
Quæcunque alterius sexus imitata figuram est.”

It was supposed, that if a man by chance, and without any deliberate intention, became the witness of these mysteries, he would be struck blind. Clodius, however, was guilty of polluting these mysteries. Whilst Pompeia, the wife of Cæsar, with whom he had an intrigue, was, according to annual custom, celebrating in her house the awful and mystic sacrifices of the “Bona Dea,” Clodius determined to gain access to his mistress, even in the season of her holy ministry. Accordingly, he dressed himself in a woman’s habit, and by the benefit of his smooth face, and the introduction of one of the female servants who was in the secret, hoped to pass without discovery. But by some mistake between him and his guide, he lost his way when he came into the house, and unluckily fell in among the other female servants, who, detecting him by his voice, alarmed the whole company by their shrieks, to the great amazement of the matrons, who presently threw a veil over the sacred mysteries, while Clodius found an opportunity of making his escape by the favour of some of the damsels. This story was presently spread abroad, and raised a general scandal and horror through the whole city. Cæsar put away his wife upon it; and persons of all ranks were desirous of availing themselves of this circumstance to get rid of a citizen, who by this, as well as other specimens of his audaciousness, seemed born to create much disturbance to the state. It had been the constant belief of the populace, that if a man should ever pry into these mysteries, he would be instantly deprived of sight; but it was not possible, as Ci-

cero says, to know the truth of it before, till Clodius ventured upon the experiment; though it was now found, as he tells him, that the blindness of the eye was converted to that of the mind. The affair was soon brought before the senate, and by them referred to the college of priests, who declared it to be an abominable impiety: upon which the consuls were ordered to provide a law for bringing Clodius to a trial for it before the people. Clodius’s faction, however, ultimately prevailed; and when the trial came to the issue, 25 condemned, and 31 absolved him. When Cæsar, on this occasion was summoned to give evidence, he declared, that he knew nothing at all of the matter, though his mother Aurelia, and sister Julia, who were examined before him, had given a punctual relation of the whole fact; and being interrogated, how he came then to part with his wife? he replied, “that all who belonged to him ought to be free from suspicion as well as guilt.” Cicero, in his oration for Milo against Clodius, often refers to this sacrilege, with a view of rendering his adversary odious to the people. Many Roman writers have exclaimed against the licentiousness and infamy of these mysteries, called by way of eminence the Roman mysteries, and celebrated on the 4th of December, though those of the goddess Cybele were celebrated on the first of May. Nevertheless, this goddess is called *holy* in an inscription recorded by Gruter, “*Bonæ Deæ Sanctæ sacrum, &c.*” Lucretius (ii. 598.) depicts the good goddess as bearing a mural crown, and drawn in a chariot by lions. She is also thus represented on the medals of the emperor Philip. The Greeks also had their good goddesses, whom they denominated the goddesses of women; and the Carthaginians paid divine honours to a goddess under this appellation, whom they believed to be Juno.

BONA Fides, or *Bona Fide*, is used in speaking of things done with an honest intention, in opposition to those done with a design of fraud and deceit, said to be *mala fide*. In this sense, we say, a grant, a conveyance, *bona fide*.

In many cases, in the civil law, the *bona fide* of an action excuses the want of some of the customary forms

Contracts *bonæ fidei* among *Civilians*, stand contradistinguished from those *stricti juris*; the former being gained by plain honesty and conscience, which sometimes include several things not expressly mentioned; whereas the latter are restrained to the express terms of the deed. A buyer *bonæ fidei*, is he who really believed the thing to belong to the seller at the time when he purchased it. A possessor *bonæ fidei*, is he who is in possession of a thing belonging to another, but which he truly believes his own. To be entitled to the benefits of next accession, it is requisite the persons have possessed the thing *bona fide*, or really thought themselves the proprietors.

Prescription cannot arise from acts done *mala fide*; since what was unjust in its origin, can never be made just by time and continuance. See *PRESCRIPTION*.

BONÆ Fidei Actions, those wherein for farther light, the judge might take cognizance of things not mentioned between the parties.

BONA Fide Judgment, that wherein the parties are obliged to pay each other what is due *bona fide*, i. e. justly and equitably; and the judge has a power of estimating what is thus due to the actor or plaintiff; a power given him by the formula of the prætor, viz. *ex fide bona, vel quantum æquitas melius*.

BONA Gestura. See *GOOD A-BEARING*.

BONA Gratia, a phrase antiently used in speaking of divorces, which were brought amicably about for some just reason, with the consent of both parties, and without any

crime on the part of either, as in case of old age, disease, barrenness, monachism, captivity, or the like.

BONA Defuncti ad colligendum. See *COLLIGENDUM*.

BONA Mobilia. See *MOBILIA*.

BONA Notabilia, in *Law*. Where a person dying has goods, or good debts, in another diocese, but within the same province, besides his goods in the diocese where he dies, amounting to the value of five pounds at least, he is said to have *bona notabilia*: in which case, the probate of his will, &c. belongs not to the bishop of the diocese where he dies, whose jurisdiction cannot extend beyond the bounds of his own diocese, but to the archbishop of the province.

Though if a person happens to die in another diocese than that wherein he lives, on a journey; what he hath about him above the value of five pounds, &c. shall not be *bona notabilia*.

BONA Patria, a jury or assise of countrymen, or good neighbours. See *ASSISE* and *JURY*.

BONA peritura, perishable goods. By stat. 13 Ed. I. cap. 4. the cargo of a ship that hath been cast away shall be kept for a year and a day, and restored to the rightful owner; but if the goods be such as will not endure so long, they are *bona peritura*, which the sheriff is allowed to sell, and to account in money for the value.

BONA vacantia, goods, such as royal fish, shipwrecks, treasure-trove, waifs, and estrays, in which no one can claim a property. These goods, by the law of nature, and by the imperial law, belonged to the first occupant or finder; but in the modern constitutions of European governments, they are annexed to the supreme power by the positive laws of the state.

BONACCIOLUS, LEWIS, in *Biography*, a physician of great eminence and authority, practised medicine at Ferrara, in the early part of the 16th century. His great work "Æneæ muliebris, sive de fœtus formatione," was first published in 1503, in fol. "qua, præter alia, plurima quoque ad coitum, et ad rem veneream facientia, dictione liberima describuntur." It was nevertheless dedicated to Lucretia, daughter to pope Alexander VI. But the dedication, Blomenbach observes, is only to be found to the folio edition, princip. which is extremely rare. A copy of this edition was sold by Paterfon, in 1791, with the splendid Paris library. This writer, Douglas says, was the first who distinguished the clitoris from the nymphæ, and shewed them to be distinct parts. The *Æneæ* was again printed in 1587. It was also inserted by Caspar Wollius in his Collection of Treatises, called "Gynecia, sive de mulierum morbis," 4to. 1586, re-edited by H. Spaelius, fol. 1597; and with Pinæus's physiological treatises. Though of little value now, the work was for a long time held in great esteem; the author having given in it a more accurate anatomy of the fœtus, and of the partes generationi subservientes, than any preceding writer. Douglas Bib. Hal. Bib. Anat.

BONACHI, in *Geography*, a town of North America, in New Navarre, 180 miles S. of Casa grand.

BONACOPUS, HERCULES, in *Biography*, of Ferrara, and for some years professor in medicine at Bologna, published, in 1552, "De affectu quem Latini tormina appellant," 4to.; "De humorum exuperantium signis ac ferapiis, de compositione Theriacæ, de modo preparandi aquam ligni sancti, &c." 4to. 1553; the latter medicine was now in the zenith of its reputation for its powers in curing the lues venerea; "De curatione pleuritidis, ab Hippocratis, Galeni, &c. monumentis deprompta," 4to. 1553. He died in 1558. Bonacopus had much learning, and contributed by his works to revive among his compatriots a taste for literature, particularly for the works of the ancient Greek fathers in medi-

cine. His brother, or near relative, James Bonacopus, was also much in esteem. He was physician to pope Paul III. He died in 1553, aged 69 years. Astruc. de Morb. Gall. Haller. Bib. Med.

BONAFIDES, FRANCIS, professor in the practice of medicine at Padua, published, in 1533, "Quæstio de cura pleuritidis per venæsectionem, adversus Curtium," 4to. Venet. He defends the practice of the Arabian physicians, who recommended bleeding by the vena saphæna, on the side opposite to the part affected, in plethoric habits; in debilitated constitutions by the basilica in the arm, of the side where the pain was felt; a distinction not attended to in modern practice. Haller. Bib. Med.

BONAIRE, in *Geography*, an island almost uninhabited, near the coast of South America, about 20 leagues from the continent, and 14 S. E. of Curaçoa, belonging to the Dutch. It is about 50 miles in compass, and has on the S. W. side near the middle of the island, a good bay and road. Here were formerly a few houses, with a fort guarded by a small number of soldiers; and five or six Indian families resided here, and cultivated maize, yams, potatoes, &c. The island has plenty of cattle and goats, which are annually salted and sent to Curaçoa. On the south side is a good salt pond, from whence the Dutch procure salt. N. lat. 12° 16'. W. long. 68° 18'.

BONAMES, a town of Germany in the circle of the Upper Rhine, 3 miles N. N. W. of Frankfort on the Mayne.

BONAMY, PETER-NICHOLAS, in *Biography*, was born at Louvres, in the district of Paris, in 1694, and educated for the ecclesiastical profession. But, devoting himself entirely to literature, he became under-librarian of St. Victor, and distinguished both by the politeness of his manners, and the variety as well as assiduity of his studies. In 1727, he was admitted a member of the Academy of Inscriptions and Belles Letters, and made many valuable contributions to its Memoirs. His papers are characterised by simple but correct language, variety of erudition, clearness of argument, and solidity of criticism. At the instigation of M. Turgot, a place was created of historiographer of Paris, and Bonamy was appointed to occupy it. He was thus led to write various memoirs relative to the history and antiquities of the city; and on occasion of a bequest of a curious library to the city, he was made librarian. From the year 1747, he conducted the "Journal of Verdun" with the strictest propriety and decorum. In universal esteem for candour and probity, as well as learning, he died at Paris, in 1770, aged 76. Gen. Biog.

BONAMY'S Point, in *Geography*, lies on the southern side of Chaleur bay, at the N. W. extremity of Eel river cove, and forms the S. limit of Ristigouche river.

BONANA, in *Ornithology*, a species of *ORIOULUS*, of a fulvous colour, with the head and breast chestnut; back quill, and tail feathers, black. Gmel.

This is called by Brisson *xanthornus*, and *le carouge*. It is supposed to be the *xochitotol* of Heru. Mex. and *xochitotol altera* of Ray. Brown names it the bonana bird.

The length of this bird is seven inches: bill black; base of the lower mandible grey; head, neck, and breast chestnut; upper part of the back velvet black; lower part, with the rump, belly, thighs, and under the wings, a deep orange red; vent the same, tipped with chestnut; greater wing coverts, quills and tail, black; legs and claws grey. The female differs in having the colours less vivid than in the male.

The bonana bird is a native of Martinico, Jamaica, and the other islands in the West Indies, where it chiefly inha-

bits woods. The nest of this species is of a curious structure, being composed of leaves and fibres of vegetables, sewed with the greatest ingenuity to the leaf of a banana plant, in such a manner that the leaf itself forms one of the sides to the nest; when completed, it is said to be exactly in shape of the fourth part of a globe.

Another bird, of a species very analogous to the above, is described by Ray and Sloane under the names of *watchy picket*, *Spanish nightingale*, *American hang-nest*, and *idærus minor nidum suspendens*. This appears to have been confounded with the former kind. Brisson, deeming them both the same, included the synonyms of the two species together, which led later observers into an error. Dr. Latham separates them; and, upon the authority of this able ornithologist, Gmelin gives the *watchy picket* as a distinct species under the name of *oriolus nidipendulus*. This specific name is chosen, in allusion to the manner in which the nest is fastened to the extremity of the further twigs of the trees in which it lives. The nest of the banana bird is before described; that of the *watchy picket* is very different, being of a long cylindrical form, composed of stalks, fibres, and the inward hairs of the "old man's beard," which latter bears a strong resemblance to horse-hair. The two opposite methods of constructing, as well as placing the nest, as Dr. Latham judiciously observes, cannot surely belong to one bird. See *NIDIPENDULUS*.

Obs. Gmelin places the *watchy picket*, with a note of scepticism, as a synonym to *motacilla calidris*. This might possibly mislead, without observing that Sloane, Ray, &c. describe more than one bird under that name; the latter is the *American nightingale* of Edwards, and the *hang-nest warbler* of Latham, the bird called the *watchy picket* by Sloane, *Hist. Jam.* 2. p. 299.

BONANNI, PADRE FILIPPO, in *Biography*, a Jesuit, who published at Rome, in 1722, in 4to. drawings of a curious collection of musical instruments, represented in the hands of the performers; entitled "Gabinetto Armonico Pieno d'Instrumenti Sonori indicati e spiccati—ed offerto al fanto Re David." The collection is curious, and the instruments are not ill executed; but we are not sure that the drawings are always correct.

BONARATTE, in *Geography*, a small island of the Indian ocean, south-east of Saleyer, ceded by the Macassers to a raja of Boni, in Celebes, who used it as a place of education for his dancing girls, and appropriated to the same purpose by the kings of Boni. It is chiefly inhabited by Bougenese.

BONARELLI, GUIDUBALDO, *Count*, in *Biography*, an Italian poet, was born in 1563, in the palace of the duke of Urbino, to whom his father was favourite minister; and, after previous instruction at home, was sent to study theology at Pont à Mousson, in France, where he made such proficiency, that he was invited, at the age of 19, to take the chair of philosophy at the Sorbonne. He returned, however, into Italy, and was employed by Cæsar, duke of Modena, in some important negotiations at the courts of Rome and France; but incurring disgrace by his marriage, he withdrew to Ferrara, and, in 1607, published the pastoral drama by which he acquired celebrity. This drama was acted by the academy of "Intrepidi" at this place, of which Bonarelli had been one of the founders. In his way to Rome, for the purpose of assuming the office of major-domo to cardinal Este, he was seized at Fano with a disorder, which terminated his life, Jan. 8, 1608. The drama of Bonarelli, entitled "Filli di Sciro," was much applauded both in Italy and other countries at its first appearance, and was ranked by common opinion next to the *Aminto* of Tasso, and the

Pastor Fido of Guarini. Although this pastoral has many poetical beauties, it strongly indicates the corrupt taste which then prevailed; nevertheless it maintains its place among Italian pastorals. Many editions of it have been printed: and it has been translated into the French and English languages. *Gen. Biog.*

BONARES, in *Geography*, a town of Spain, in Andalusia; one league from Lucena.

BONARIENSIS, in *Ornithology*, that species of *LOXIA* or *grof-beak*, described by Buffon under the name of *noir-fouci*. The head and back of the neck are blue; body above blackish, beneath yellow; belly and vent sulphur colour; wings and tail blackish, edged with blue.

This bird is about seven inches long, and is observed generally to fly in pairs; they haunt gardens, where they do much mischief, as they feed on seeds. The bill is blackish; legs reddish; claws acute, curved, and grooved; the hind claw largest. This is the *marigold grof-beak* of Latham.

BONARIENSIS, a species of *TANAGRA*, that inhabits Bonaria. This is eight inches long; the colour black, glossed with violet, and with greenish on the wings and tail. Gmel. &c. Buffon calls this bird *tangavio*. The beak is black, the legs blackish, with large claws. The female is of a brown colour, with the head black, and glossed with blue.

BONARIENSIS, a species of *MOTACILLA*, of a black colour; throat and sides ferruginous; face, chin, middle of the belly, and exterior tail feathers, white. This bird is of the size of a linnet; bill blackish; hind-claw large. Buffon calls this *demi-fin noir et roux*. It is the *white-chinned warbler* of Latham.

BONAROTA, in *Botany*, Michel. and Scopol. See *PÆDEROTA*.

BONASCOLA, in *Geography*, a town of Italy, in the state of Genoa, near the sea-coast; 4½ miles S.S.W. of Brugnatto.

BONASIA, in *Entomology*, a species of *CICADA* (*membracis, cruciata*) found in America. Fabricius describes it as having the thorax bicornuted, produced behind, and edged with white; at the base of the wings is a white spot.

BONASIA, is also the name of a species of *PAPILIO* (*Heliconius*), the wings of which are fuscous, with a common fulvous band; the lower pair spotted at the base with black.

BONASIA, in *Ornithology*. Under this name Brisson describes several species of the *TETRAO* genus; as for instance, *tetrao Canadensis* he calls *bonasia freti Hudsonis*; *tetrao Canace*, *bonasia Canadensis*; *tetrao lagopus*, *bonasia fœtica*; and *tetrao togatus*, *bonasia major Canadensis*.

BONASUS, in *Zoology*, one of the synonyms of the wild ox. See *Bos TAURUS*.

By some the *bonasus* is understood to be that particular kind of wild ox which has the horns bent back, and the mane very long. *Bonafus* of Pliny, &c. *bos cornibus in flexis, juba longissima*. Linn. *Syst. Nat.* The bison is thought by Gesner to be the *bonafus* of Aristotle.

BONAT, in *Geography*, a town of France, in the department of the Creuse, and chief place of a canton, in the district of Gueret, 3½ leagues N. of Gueret.

BONAVENTURA, ST., in *Biography*, a cardinal of Rome, and entitled the "Seraphic doctor," was born at Bagnarea, in Tuscany, in 1221; and having entered into the order of Minorites, in 1243, studied at Paris under Alexander de Hales, and there taught theology with great applause. He received his doctor's degree in 1255, and in the following year was made general of his order. He declined accepting the archbishoprick of York, to which he

was nominated by pope Clement IV. in 1265; and, after his death, the choice of a successor was referred by the cardinals to Bonaventura, who fixed on Gregory X. by whom he was made cardinal, and whom he attended to the second council of Lyons, in 1274, where he died in the same year. He was canonized by Sixtus IV. in 1482, and declared a doctor of the church by Sixtus V. in 1588. His works have been collected in 8 vols. fol. and were printed at Rome in 1588; and an edition of them in 14 vols. 4to. has also been published. Among these are his "Life of St. Francis," the founder of his order, and "A Commentary on the Master of the Sentences," in which he appears to be a complete master of the theology of the 13th century. To him has been ascribed the institution of religious confraternities; and though his private character, and literary talents, are commended both by protestants and catholics, he has incurred some reproach for the zeal with which he promoted the worship of the virgin Mary, as the mother of God. *Moreri. Encycl. Melacim vol. iii.*

BONAVENTURA, FREDERIC, an eminent scholar and physician of Urbino, in Italy, who flourished in the early part of the 17th century, published, in 1601, "De natura partus octometris, adversus vulgarem opinionem, libri decem," Francof. folio; an enormous volume, containing upwards of one thousand pages, on this uninteresting subject, in which he has introduced the opinions of different writers, and accounts of all the controversies that have been held on the legitimate period of utero-gestation in women. The author had published a dissertation on the subject, in the preceding year, which he incorporated in the great work, but with which a modern reader would probably have been fully contented. *Haller. Bib. Med.*

BONAVENTURA, Cape, in *Geography*, is situate on the coast of New Guinea, in S. lat. $6^{\circ} 15'$, and about 65 leagues N. E. from port St. Augustine. The land is low and luxuriant, and produces the cocoa-nut, bread-fruit, plantain, &c.

BONAVENTURA, the name of an island, north-east of the bay of Chaleur, off the coast of New Brunswick, in the gulf of St. Lawrence, and a little to the south-west of the point which forms the south-east entrance into that river; about a league from Gaspé bay.—Also, an island on the starboard side of the entrance into Porto-Bello harbour, opposite to the mouth of Guanches river. See **PORTO-BELLO**.

BONAVENTURE, or **BUENEVENTURA**, a river, bay, harbour, and fort, on the coast of Papayan, in South America, nearly south from Panama bay. N. lat. $3^{\circ} 20'$. W. long. $75^{\circ} 18'$. Barks and sloops of 40 or 50 tons may go up to a village a league beyond the fort. Bonaventure is the staple port of Cali, Papayan, Sta. Fé, &c.

BONAVENTURE, Cape and Port, are situated on the east coast of Newfoundland, about south-west of Bonavista cape, and form the north entrance into Smith's sound, from whence the coast runs S. by W. into Trinity bay.—Also, a bay on the east side of the island of St. Vincent. N. lat. $13^{\circ} 9'$. W. long. $61^{\circ} 18'$.

BONAVISTA, so called in reference to its beautiful appearance at sea, the most easterly of the Cape de Verde islands, about 20 miles long, and 12 broad, and distant about 70 leagues west from the coast of Africa. Its surface is low towards the sea, but within hilly, particularly towards the north-east extremity, where is a hill, which, from its conical and truncated shape, appears to have been a volcano; and there is another hill, much higher towards the south-west end, with high land to the westward of it. The soil is sandy, barren, and uncultivated; milk, goats, fish, and turtle, are the principal food of the inhabitants. It affords some salt; and if the culture of it were not neglected, it

would yield cotton and indigo. It is known at a distance by several white banks on its north side, where the shore is bold, and where a rapid river discharges itself into the sea. This island has a good harbour on its west side, where vessels may lie in 15 or 16 fathoms water. At the distance of a league or a league and a half from the south-east point of the island is a reef of rocks; and over this point, says Capt. Cook, there is a pretty high round mountain, rising not far from the shore. This point, by his observations, is in N. lat. $16^{\circ} 0'$, and longitude from London, by account, $21^{\circ} 51' W$. The latitude of the north end of the island is $16^{\circ} 12' N$. and of the south end $15^{\circ} 57' N$. but that at the east end was not ascertained. Mr. Wales, in the second voyage, determined the latitudes of these three points as follows: north point $16^{\circ} 13\frac{1}{2}' N$. east point $16^{\circ} 3\frac{1}{2}' N$. and latitude of the south point $15^{\circ} 58' N$. Stavonius says, that this island has two eminences of a middling height, that appear distinctly upon it; and that there are two reefs, one at the north side, and one at the south side, which stretch out to the eastward, and which are both very dangerous. According to the account in lord Macartney's embassy to China, the sea-coast, on the south-east side was guarded by rocks; but towards the south-east end the shore was much covered with white sand. On that side there seemed to be neither cultivation nor inhabitants. The latitude of Bonavista, was $16^{\circ} 6' N$. and the longitude $22^{\circ} 47' W$. The variation $12^{\circ} 36'$ to the westward of the pole. This island belongs to the Portuguese.

BONAVISTA, Cape, the extreme N. W. point of the island of Cuba in the West Indies, opening into the gulf of Mexico, from whence the land falls off southerly to cape St. Antonio.

BONAVISTA, Cape and Bay of, lie on the east side of Newfoundland island, the cape lies in N. lat. $48^{\circ} 54'$, and W. long. $52^{\circ} 33'$, and was discovered by John Cabot and his son Sebastian, in 1497, under a commission for exploring unknown lands, obtained from Henry VII. The bay is formed by this cape and cape Freels, 15 leagues apart.

BONAYE, a town of France in the department of the Lower Loire, and chief place of a canton, in the district of Nantes. The place contains 834, and the canton 9,530, inhabitants; its territory comprehends 135 kilometres and 7 communes.

BONCAT, a town of France, in the department of the Lower Pyrenées, 6 leagues N. of Bayonne.

BONCHAMPS, a town of France, in the department of the Mayenne, 2 miles S. W. of Craon.

BONCONICA, OPPENHEIM, in *Ancient Geography*, a town of Gaul, placed between Mogontia to the north, and Borbatomagus to the south, seated on the river Rhemus, in Germania prima.

BONCONVENTO, or **BUON-CONVENTO**, in *Geography*, a town of Italy, in the territory of Sienna, where the emperor Henry VII. died; 12 miles S. of Sienna.

BONCORE, THOMAS, doctor in philosophy, medicine, and law, in *Biography*, has left a memorial of a destructive pestilence, which raged at Naples, where he was in high credit, as a practitioner in medicine, in the year 1622. "De populi, horribili, ac pestilenti gutturis affectione, nobilissimam urbem Neapolim vexante, consilium," 4to. 1622, Neap. An early account of the scarlatina anginosa, or malignant sore throat, which has of late years made such frequent appearance, and proved so destructive, among children particularly, in this country. *Eloy. Bib. Hist.*

BOND, JOHN, an English grammarian of the 16th century, was a native of Somersetshire, and after finishing his

his grammatical education at Winchester school, was entered, in 1569, at the age of 19 years, a student in the university of Oxford, where he was distinguished by his proficiency in academical learning: Having taken his degrees of bachelor and master of arts, the former in 1573, and the latter in 1579, he was promoted by the master and wardens of New College to the mastership of the free-school at Taunton, in Somersetshire, which office he occupied with reputation for several years. At length he quitted the laborious station of school-master, and directed his attention to physic, which he practised more for amusement than profit. He died in 1612, and was buried in the chancel of the church at Taunton. He wrote "Commentaries on Horace and on Persius."

BOND, or *Obligation*, in Law, is a deed whereby the obligor, or person bound, obliges himself, his heirs, executors, and administrators, to pay a certain sum of money to another called the obligee, at a day appointed. If this be all, the bond is called a single one, "Simplex obligatio;" but there is generally a condition added, that if the obligor does some particular act, the obligation shall be void, or else shall remain in full force; as payment of rent, performances of covenants in a deed, or repayment of a principal sum of money borrowed of the obligee, with interest, which principal sum is usually one half of the penal sum specified in the bond. In case this condition is not performed, the bond becomes forfeited or absolute at law, and charges the obligor while living; and after his death the obligation descends upon his heir, who, on defect of personal assets, is bound to discharge it, provided he has real assets, by descent as a recompence. So that it may be called, though not a *direct*, yet a *collateral*, charge upon the lands.

This security is called a "specialty;" the debt being therein particularly specified in writing, and the party's seal, acknowledging the debt or duty, and confirming the contract, rendering it a security of a higher nature than those entered into without the solemnity of a seal. In order to make a good obligation, it has been held that three things are necessary, *viz.* writing in paper or parchment, sealing, and delivery: but it hath been adjudged not to be necessary, that the obligor should sign or subscribe his name, sealing being deemed sufficient, and subscribing being no essential part of the deed. And though the seal be necessary, yet if the word seal be wanting, it is remedied by verdict and pleading over, for all necessary circumstances shall be intended; and if it were not sealed, it could not be the deed or obligation of the party. Moreover, though sealing and delivery be essential in an obligation, it is not necessary to mention in the bond, that it was sealed and delivered, because, according to lord Coke, (2 Co. 5 a.) these are things which are done afterwards. The name of the obligor subscribed is sufficient, though there is a blank for his Christian name in the bond; and where the obligor's name is omitted to be inserted in the bond, if he signs and seals it, the court of chancery may make good such an accident.

An obligation is good, though it has no date, or a false or impossible date; the date not being of the substance of the deed; but the day of the delivery is the day of date, though no day be set forth. Every deed is supposed to be delivered and made on the day of its date; and if the plaintiff declare on a date, he cannot afterwards reply, that it was first delivered at another day. A plaintiff may suggest a date in a bond which has none, or one that is impossible, &c. provided that the parties and sum are sufficiently expressed. A person shall not be charged by a bond, though signed and sealed, without delivery, or words, or other act, amounting to a delivery. But it may be delivered by mere words;

and an actual delivery without speaking any word, is sufficient. If a bond be altered by interlineation in a material part, it becomes void, and it may be made void by rasure, &c. or by rasing the date, &c. after delivery. If the words at the end of the condition, "that then this obligation to be void," are omitted, the condition will be void, but not the obligation. If the condition of a bond be impossible at the time of making it, or be to do a thing contrary to some rule of law that is merely positive, or be uncertain or insensible, the condition alone is void, and the bond shall stand single and unconditional; for it is the folly of the obligor to enter into such an obligation, from which he can never be released. If it be to do a thing that is *malum in se*, the obligation itself is void; for the whole is an unlawful contract, and the obligee shall take no advantage from such a transaction. And if the condition be possible at the time of making it, and afterwards becomes impossible by the act of God, the act of law, or the act of the obligee himself, there the penalty of the obligation is saved; for no prudence or foresight of the obligor could guard against such a contingency. Co. Litt. 206. When a condition is doubtful, it is always taken most favourably for the obligor, and against the obligee; but so that a reasonable construction may be made as nearly as possible according to the intention of the parties. If no time be limited in a bond for payment of the money, it is due presently and payable on demand. 1 Brownl. 53.; and if a condition be impossible in respect of time, it shall be paid presently. Jones 140. 1 Leon, 101. If the party, who is bound to perform the condition, disables himself, this is a breach. A bond made with condition not to give evidence against a felon, &c. is void; but the defendant must plead the special matter. 2 Wilf. 741, &c. Condition of a bond to indemnify a person from any legal prosecution is against law, and void. 1 Lutw. 667. And if a sheriff takes a bond as a reward for doing of a thing, it is void. 3 Salk. 75. See **CONDITION**.

On the forfeiture of a bond, or its becoming single, the whole penalty was formerly recoverable at law; but here the courts of equity interposed, and would not permit a man to take more than in conscience he ought, *viz.* his principal, interest, and expences, in case of the forfeiture accrued by non-payment of money borrowed; the damages sustained, upon non-performance of covenants; and the like. And a similar practice having gained some footing in the courts of law, see 2 (Keb. 55). 555. Salk. 596, 597. 6 Mod. 11. 6. 101.), the statute 4 and 5 Ann. c. 16. at length enacted, in the same spirit of equity, that, in case of a bond, conditioned for the payment of money, the payment or tender of the principal sum due, with interest and costs, even though the bond be forfeited and a suit commenced thereon, shall be a full satisfaction and discharge. The court of Chancery will not generally carry the debt beyond the penalty of a bond; yet in a case, where a plaintiff sought relief against such penalty, though it was decreed, it was on the payment of the principal money, interest, and costs; and notwithstanding they exceeded the penalty, this was affirmed, 1 Vern. 350. 1 Eq. Ab. 92. 6 Vin. tit. *Penalty*. 3 Comm. 435. And where the condition of a bond is to perform a collateral act, damages may be recovered beyond the penalty, and the court of K. B. will not stay the proceedings on payment of the money into court. 2 Term Rep 388.

All persons who are enabled to contract, and who are supposed in law to have sufficient freedom and understanding for that purpose, may bind themselves by bonds and obligations. 5 Co. 119. 4 Co. 124. 1 Roll. Abr. 340. If a person, illegally imprisoned, enters into a bond, during such restraint, to the person who causes it, the same may be avoided

avoided for dures of imprisonment. Co. Litt. 253, 2 Inst. 482. The bond of a feme covert is *ipso facto* void, and shall bind neither her nor her husband. The bond of an infant, even for necessities, with a penalty for payment, is void. But if an infant, feme covert, &c. enter with a stranger, who is not subject to their disabilities, into an obligation, the stranger shall be bound by it. However, infants, idiots, feme coverts, and aliens, may be obligees. Sole corporations, such as bishops, prebends, parsons, vicars, &c. cannot be obligees; but a corporation aggregate may take any chattel, as bonds, leases, &c. in its political capacity, which shall pass in succession, because it is always in being. Cro. Eliz. 464. Dyer, 48 a. Co. Litt. 9 a. 46 a. Hob. 64. 1 Rol. Abr. 515. If a drunken man gives his bond, it binds him; and a bond without consideration is obligatory, and no relief shall be had against it, for it is voluntary, and as a gift. Jenk. Cent. 109. But on the general issue, the defendant may give in evidence that they made him sign the bond when he was so drunk that he knew not what he did; and though a voluntary bond cannot be relieved against in equity, it may not be paid in a course of administration, so as to take place of real debts, even by simple contract; yet it shall be paid before legacies. 1 Chan. Caf. 157. An heir is not bound, unless he be expressly named in the bond, though the executors and administrators are. Dyer 13. Two or more persons may bind themselves jointly in an obligation, or they may bind themselves jointly and severally; in which last case, the obligee may free them jointly, or he may free any one of them at his election; but if they are jointly and not separately bound, they must be freed jointly; and in such case, if one of them dies, his executor is totally discharged, and the survivor or survivors only chargeable. 2 Rol. Abr. 148. Dyer 19 310. 5 Co. 19. 1 Salk. 393. 1 Lutw. 696.

With regard to discharge of bonds, if a lesser sum be paid before it is due, and the payment is accepted, it shall be good in satisfaction of a greater sum; but after the money is due, a lesser sum, though accepted, shall not be a satisfaction for a greater sum. Moore, 677. 3 Bult. 301. 1 Lutw. 464. It has been adjudged, that the acceptance of one bond cannot be pleaded in satisfaction of another bond. Cro. Car. 85. Moore, 872. Cro. Eliz. 716. 727. 2 Cro. 579. A bond, on which neither principal nor interest has been demanded for 20 years, will be presumed in equity to be satisfied, and be decreed to be cancelled; and a perpetual injunction granted to stay proceedings thereon. 1 Ch. Rep. 79. Finch. Rep. 78. Satisfaction, moreover, may be presumed within a less period, if any evidence can be adduced in aid of the presumption, such as the settlement of an account in the intermediate time, without any demand. Yet length of time is no *legal* bar; and is only a ground for the jury to presume satisfaction. 1 Term Rep. 270. As to the pleading of performance of a condition, the defendant must set forth in what manner he has performed it. By stat. 8 and 9 Will. III. c. 11. § 8. in actions on bonds for performance of covenants, the plaintiff may assign as many breaches as he pleases, and the jury may assess damages. In debt on a bond, the defendant may have several pleas in bar. 1 Salk. 180. But a defendant in an action on a bond cannot plead, "Non est factum;" and a tender as to part. 5 Term Rep. 97. In debt on an obligation the defendant cannot plead, "Nil debet," but must deny the deed by pleading "Non est factum;" for the seal of the party continuing, it must be dissolved, "Eo ligamine quo ligatur." Hard. 332. Hob. 218. In bonds to save harmless, the defendant being prosecuted, is to plead "Non damnificatus, &c." The stealing of any bond, bill, &c. for money,

being the property of any one, is made felony, as if offenders had taken other goods of like value. Stat. 2 Geo. II. c. 25.

Form of a bond or obligation, with condition for the payment of money. "Know all men by these presents, that I David Edwards, of Lincoln's Inn, in the county of Middlesex, esquire, am held and firmly bound to Abraham Barker, of Dale-hall, in the county of Norfolk, esquire, in ten thousand pounds of lawful money of Great Britain, to be paid to the said Abraham Barker, or his certain attorney, executors, administrators, or assigns; for which payment well and truly to be made, I bind myself, my heirs, executors, and administrators, firmly by these presents, sealed with my seal. Dated the fourth day of September, in the twenty-first year of the reign of our sovereign lord George the third, by the grace of God king of Great Britain, France, and Ireland, defender of the faith, and so forth, and in the year of our Lord one thousand seven hundred and ———."

The condition of this obligation is such, that if the above bounden David Edwards, his heirs, executors, or administrators, do and shall, well and truly pay, or cause to be paid, unto the above named Abraham Barker, his executors, administrators, or assigns, the full sum of five thousand pounds of lawful money of Great Britain, with lawful interest for the same, on the fourth day of March next ensuing the date of the above written obligation, then this obligation shall be void and of none effect, or else shall be and remain in full force and virtue.

DAVID EDWARDS, (*L. S.*)

Sealed and delivered, being first duly stamped, in the presence of

GEORGE CARTER,

WILLIAM BROWNE.

Blackstone's Com. ii. 340. Jacob's Law Dict. by Tomlins, vol. i. tit. *Bond*.

BOND of Arbitration. See ARBITRATION.

BOND, Assignment of. See ASSIGNMENT.

BOND, bail. See BAIL.

BOND, counter. See COUNTER-BOND.

BOND of resignation. See RESIGNATION.

BOND-tenants, are the same, in respect to the nature of their tenure, with copy-holders, and customary-tenants. Blackstone's Com. vol. ii. p. 148.

Bond, in *Masonry* and *Brick-laying*, is when bricks or stones are, as it were, knit and interwoven; and when they lay, make good bond, they mean that the joints are not made over, or upon other joints; but reach at least six inches, both within the wall and on the surface, as the art of building requires.

BONDAGE properly denotes a state of servitude or slavery.

BONDAGE, bondagium, in *English Law Writers*, the same with *VILLENAGE*.

Tenants in bondage, paid heriots, and did fealty; they were not to fell trees in their own garden, without licence of the lord.

The widow of a tenant in bondage held her husband's estate, *quandiu vixerit sine marito*.

BONDAGE by the forelock, or *bondagium per anteriores crines capitis*, was when a freeman renounced his liberty, and became slave to some great man; which was done by the ceremony of cutting off a lock of hair on the forehead, and delivering it to his lord; denoting, that he was to be maintained for the future.

Such a bondman, if he reclaimed his liberty, or were fugitive from his master, might be drawn again to his servitude

by the nose; whence the origin of the popular menace, *to pull a man by the nose*.

BONDELLIA, in *Ancient Geography*, a town of Italy, in Etruria. Ptolemy.

BONDENO, or BUONDENO, in *Geography*, a town of Italy, in the duchy of Ferrara, at the conflux of the Panaro and Po, 9 miles W. of Ferrara.

BONDMAN, *BONDUS*, formed from the Saxon *bond*, signifying a fetter, in the *English Law*, is used for a villain, or tenant in vilenage. See VILLAIN.

The Romans had two kinds of bondmen; one called *servi*, who were those either bought for money, taken in war, left by succession, or purchased by some other lawful acquisition; or else born of their bondwomen, and called *verne*. Both are called in our law villains in gross, as being immediately bound to the person and his heirs. We may add a third kind of bondmen mentioned by Justinian, called *adscriptitii glebe*, or *agricensii*; who were not bound to the person, but to the ground or place, and followed him who had the land. These, in our law, are called *villains regardants*, as belonging to the manor or place.

In the English as well as Scottish laws, those called by the Romans *verne*, are sometimes also denominated *nativi*, as being born on the land. See NATIVUS.

BONDORF, in *Geography*, a country of Germany, in the circle of Swabia, about five leagues long, and between one and three broad, lying between the Brisgaw and the landgraviates of Baar and Stuhlingen. It had formerly lords of its own, but in 1613 was purchased by the abbey of St. Blaife. It is assailed in the imperial matricula, at 25 florins, 30 kruitzers; and its contingency to the chamber, at Wetzlar, is 12 rixdollars, 15½ kruitzers. This territory comprehends the town of Bondorf, 28 miles N.N.W. of Zurich, and several villages.

BONDOUN, a kingdom of Western Africa (formerly a part of the kingdom of Bambock), the capital of which is Fatteconda, near the eastern bank of the river Faleme. This kingdom is bounded on the north by Kajaaga, on the east by Bambock, on the south-east and south by Tenda and the Simbani wilderness, on the south-west by Woolli, and on the west by Foota Torra. It lies between N. lat. 13° 32' and 14° 32', and between W. long. 10° 8' and 11° 18'. Mr. Park, in his journey through this kingdom towards the east, found that the country, though covered with woods, like that of Woolli, rose into hills, especially towards the Faleme river, and that the soil varied to a considerable degree; but wherever the land was cleared, great natural fertility was observable. Bondou, in particular, may literally be pronounced "a land flowing with milk and honey." Both these articles, together with rice, and Indian corn of two or three species, were to be obtained at a small expence. Of their honey, the unconverted or pagan natives make an intoxicating liquor, much the same as the mead, or metheglin, of Europe; and this, and the wine of the palm-tree, constitute their principal liquors. The price of a fowl in Bondou was a button, or a small bit of amber; goat's flesh and mutton were proportionably cheap; and for six or eight amber beads Mr. Park might at any time have purchased a bullock. The domestic animals are nearly the same as in Europe. Swine are found in the woods, but their flesh is not esteemed. Probably the marked abhorrence with which this animal is held by the votaries of Mahomet has spread itself among the Pagans. Poultry of all kinds, the turkey excepted, may be had every where. The Guinea fowl and red partridge abound in the fields; and the woods furnish a small species of antelope, of which the venison is highly and deservedly prized. Of the other wild animals in the Man-

dingo countries, the most common are the hyæna, the panther, and the elephant. But of the method of taming the latter animal, and applying his services to the use of man, the natives of Africa are totally ignorant; and when they were told by Mr. Park, that this was done in the east, they treated the information with contempt, and exclaimed "Tobaubio fonnio," i. e. the white man's lie. They find means, however, to destroy the wild elephants by fire-arms for the sake of their teeth, which they transfer in barter to those who sell them again to the Europeans. They eat the flesh, and deem it a great delicacy. The pastures of Bondou furnish an excellent breed of horses; but the usual beast of burthen in all the negro territories is the ass. The application of animal labour to the purposes of agriculture is no where adopted, and the plough is an instrument altogether unknown. The chief implement used in husbandry is the hoe, which in different districts is of various forms; and labour is universally performed by slaves. The Mandingoes cultivate, besides the grains proper to tropical climates, ground-nuts, yams, and pumpions. They likewise raise cotton and indigo, and they produce of these materials a tolerably fine cloth, of a rich blue colour; and they make good soap from a mixture of ground-nuts and a ley of wood-ashes. Their trade with the whites is composed of slaves, gold-dust, ivory, and bees-wax. Their inland traffic consists chiefly of salt, which is procured from the Moors, in barter for corn and blue cloth, and of warlike stores which are obtained from the European traders on the Gambia river. These are sold again to itinerant merchants, called "Slattees," who come down annually from distant countries, with slaves, and a commodity called "Shea-toulou," which is an excellent sort of butter, produced from the kernel of a nut boiled in water. They also bring down small quantities of iron, which is manufactured in the interior districts; but those articles of this metal which are in use among the natives of the coast, are made of iron from Europe. The natives of the Gambia countries are also supplied, in considerable quantities, with sweet smelling gums and frankincense, which are the produce of Bondou.

Bondou is chiefly inhabited by Foulahs, a race of negroes, who lead a wandering life, and employ themselves chiefly in the pasturage of cattle, and the cultivation of corn. Among these, however, are a great number of Mandingoes, by whom the trade of the country is chiefly conducted. The government in Bondou, and in all the adjacent petty states, is monarchical, but no where absolute. The persons, who are called chief-men, constitute a sort of aristocracy, which serves much to restrain the powers of the sovereign. The king cannot declare war, nor conclude a peace, without their advice. When Mr. Park visited Bondou, the king was a "Soninke," or Pagan, like the king of Woolli; but he had adopted the Moorish name of Almami, and with the name he seemed to have imbibed somewhat of the Moorish disposition; for although the traveller had presented to him his umbrella, and some other articles, he compelled him, as he had before compelled major Houghton, to strip in his presence, and surrender his coat, which, he said, he should reserve for his own wearing, on great and public festivals. In return, however, he gave Mr. Park five minkallies (drams) of gold-dust, and loaded him with provisions. Every considerable town is under the immediate government of a magistrate, called the "Alkaid;" by whom the duties and customs on itinerant traders, which are paid in kind (the only system of taxation), are levied. The office is hereditary. The people of the lower classes are in a state of slavery, or vassalage, to individual proprietors; but the power of the master is far from being unlimited. He may punish his

slave corporally; but cannot deprive him of life for any offence, nor even sell him to a stranger, without first bringing him to a public trial, called a "Palaver," before the chief men of the town; and on such occasions the cause of the slaves is pleaded by the native Mahometans, who are a sort of professional advocates. These indulgences indeed extend only to native or domestic slaves; for captives taken in war, and those who are obtained in traffic, may be sold at pleasure, and treated as the owner thinks proper. Park's Travels into Africa. Rennell's Proceedings of the African association.

BONDUR, a town of Asiatic Turkey, in the province of Natolia, 24 miles west of Irbarteh.

BONDRE'E, in *Ornithology*, the honey buzzard (*falco apivorus*.) stands under this name in Buffon's History of Birds. The French writers of the present day also call it bondrée.

BONDUC, and BONDUCELLA, in *Botany*, (Plumier). See GUILLANDINA.

BONDUCH, in the *Materia Medica*, a name by which many authors have called the Molucca, Marfao, or Bezoar nuts.

BONE, in *Anatomy*. The bones are the most solid parts of animals, and may be regarded as the walls of a building supporting and containing the other parts. The human body is composed of a pile of bones, the extremities of which are variously shaped, and adapted to each other, and calculated to admit of a variety of motions. Bones appear to be composed of a vascular substance, not differing materially in structure from that of the rest of the body, except that there is deposited in its interstices phosphat of lime, which gives to the whole mass rigidity, strength, and a permanent figure. That state of the vessels in which they secrete, and deposit, earthy matter, occurs in diseases of other parts of the body. The nutrient vessels of arteries, membranes, and ligaments, occasionally deposit lime, and cause the ossification of those parts. The earth of bone is also deposited in some species of tumours, and often in considerable quantity, and in an irregular manner in the cellular substance of a limb, when the bone of it is diseased. After this general view of the subject, we proceed to give an account of the structure of a bone, both with respect to the arrangement of its earthy particles, and with relation to its vascular texture.

It is customary, however, in giving an account of the structure of bones, first to describe their original formation in the fœtus; and this is useful, because it demonstrates the simplicity of the process, and tends to refute old and erroneous ideas respecting it. The parts of the young fœtus which are afterwards to become bones, are merely a vascular, gelatinous substance, scarcely distinguishable from the other parts; afterwards the outline of the bone becomes evident, and its substance is rendered white and firm, in proportion to the quantity of lime deposited in it. The quantity deposited in it, even at the time of birth, is only sufficient to give firmness to the whole mass, but not to prevent its flexibility. The extremities of all the long bones consist of large portions of cartilage, and these, by degrees, become bony. This change is effected by an alteration, first, in the organization of the part; the cartilage is absorbed, the vessels enlarge, so as to admit of injection, and then they appear to have the power of depositing earthy matter, or forming bone. The formation of bone begins in the centre of a cartilage, and gradually extends from thence to the remote parts, so that the separate piece of bone, formed at the extremity, remains to nearly the period of puberty, conjoined to the body of the bone, by a crust of cartilage. In this state it is technically termed an epiphysis. The observation of these facts

led formerly to the erroneous notion, that it was necessary that cartilage should exist, prior to the formation of bone; and that it was converted by pressure, or in some inexplicable manner, into bone. It were a waste of argument to refute this opinion. We can perceive a striking advantage that results from the bones of the fœtus being formed as they are. Their flexibility admits of the form of limbs becoming adapted to the varying figure of the pelvis, through which they must pass, and their elasticity, which is powerful, restores them afterwards to their natural shape.

The subject which first engages our attention, in examining the structure of bone, is the arrangement of the earthy parts. The phosphat of lime is deposited by the arteries in minute points or particles, and these being placed lengthwise, with respect to each other, form fibres; again these fibres being placed parallel to one another, form bony plates, scales, or laminæ. That bones are fibrous and laminous, is evident from a mere inspection of them in the fœtal state; that they are so in the adult subject may be demonstrated by calcination, or long exposure to weather: in which cases the connecting vascular substance is more suddenly or slowly dissipated, and thus the arrangement of the earthy matter is rendered visible. The earthy fibres of long bones extend themselves in a direction parallel to the axis of the bone; in broad bones they shoot out in every direction, like rays from a centre. In long bones the earthy matter is consolidated in the circumference and sides, so as to form thick and strong walls; whilst a tube or more spongy bony structure is found in their centre. In broad bones a similar structure is observed; the earthy matter is consolidated exteriorly, so as to form dense plates or tables; whilst interiorly the fabric of the bones is spongy or cancellous. In the internal spongy part of bones the marrow is deposited. In the middle part of long bones the walls are very thick, being composed of a great number of bony lamellæ, and these walls gradually become attenuated as they approach to the extremities of the bone, where they are proportionally very thin. Long bones are also slender in the middle, but at the same time strong, on account of the great quantity of earthy matter thus consolidated to form their walls; whilst there is but little cavity or medullary structure. These bones expand greatly at their extremities, in order to afford an extent of surface for the formation of joints, and for the support of the weight of the body. In the extremities of long bones, though the walls are thin, there yet exists a great deal of bony matter, which is deposited so as to leave interspaces between its fibres, forming what is termed the cancellous structure, or lattice-work of bones. It has been therefore concluded, that the quantity of earthy matter may be nearly equal in each part of a bone, and give to it an equal degree of strength; but that it has this difference of arrangement, that in the middle it is compacted so as to form very thick and dense walls, occupying but little space, and leaving but little internal cavity, whilst in the extremities it occupies a greater space, and forms a less solid kind of fabric. It would be desirable to ascertain, with some precision, where similar circumstances are to be met with in broad bones; and though no precise rules can be given, yet this may be admitted as a general truth, that where a broad bone swells out into a protuberance, there we shall find the walls or tables thin, and the cancellous structure abundant; and, on the contrary, where a broad bone is condensed so as to occupy but little space, there we shall find the tables proportionately thicker, and the cancellous structure less in quantity.

Having thus described the arrangement of the earth of bones, we may next enquire into the advantages which result from this structure. The long bones are made slender

in the middle, to allow of the convenient arrangement of large muscles round them; they become expanded at their extremities to afford an extent of surface for the formation of joints, and the support of the weight of the body. A cavity is left in the middle; for if all the earthy matter had been compacted into the smallest possible space, the bones would have been such slender stems, as to be very unsuitable to their offices; and if they had been of their present dimensions and solid throughout, they would have been unnecessarily strong and weighty. Besides, it can be proved by mathematical demonstration, that the strength of the bone becomes augmented, in proportion as its fibres are placed at a greater distance from its centre.

With regard to the vascular structure of bones, there can be no doubt but that it exactly resembles that of the rest of the body. That bones possess numerous arteries, is proved by the injection of young bones from the general arterious system of the subject; for they are made very red by the injection conveyed into them by numerous, though minute arteries, which enter them by pores evident on their surface. The effect of feeding animals with madder is an additional and striking proof of the same fact; for the bone becomes deeply tinged with the red colour of the madder. The cause of this phenomenon has of late been explained by Dr. Rutherford: he has shewn that it arises from a chemical attraction that exists between earths and certain colouring materials, which causes them to combine so intimately as to form pigments which are called lakes by painters. Dr. Rutherford dissolved madder in distilled water, and added to it muriate of lime, which produced no change of appearance in the solution; on the further addition of phosphat of soda, a double decomposition took place; the muriatic acid combined with the soda, and the phosphoric acid with the lime. The phosphat of lime also combined with the madder, and they were together precipitated, forming a beautiful red powder. If blood be constantly conveyed into bones by numerous arteries, it must be returned from them again by veins, or otherwise it must accumulate in them in considerable quantities. That bones possess absorbents in common with other parts is equally clear, and is proved by their mode of growth, and also by their diseases. The growth of the tube of a bone is a proof of the mutation of its parts by absorption; for if bones grew merely by new matter deposited on the surface, the tube of the bone should be of the same dimensions in the adult as in the fœtus: on the contrary, however, the tube enlarges, and bears the same proportion to the whole bone in either state. If any number of laminae of the sides of a bone, or if a portion of its whole substance perish, the mortified part is detached in the same manner that it is in soft parts; and this detachment is manifestly the effect, in the first instance, of the agency of the absorbing vessels. Though a portion of animal substance has perished, it still possesses the same powers of cohesive attraction that it did while living; it still tenaciously adheres to the living parts; but a space takes place all round the dead portion, and the production of that space can only rationally be attributed to the removal of parts by the absorbents. In diseases of bones their form becomes entirely altered, if an increased deposition of matter takes place in their internal parts; and this alteration of form could not happen unless the walls were removed by absorption, and deposited anew in conformity to the augmented bulk and figure, which the diseased deposition had occasioned. Not to cite lesser instances, one may be mentioned, which Mr. Hunter used to shew in his lectures, of a very large and globular bony tumour, which had formed in the extremity of one of the bones of the leg in an ox. The tumour was so solid, that

the section of it admitted of being polished, and the walls of the bone had become thin, and of a spherical form, so as to make a neat kind of case containing this bony tumour. That bones possess nerves as well as arteries, veins, and absorbents, cannot be doubted; for though they have naturally but little sensibility, they become extremely painful when diseased; and again a fungus sometimes grows out of a bone, which is sensible, though it may have no connection whatever with the surrounding soft parts; of course it must have derived its nerves, by means of which it possesses its sensation, from the bone out of which it arose. That the vessels and nerves of a bone are connected together by common cellular substances, as in other parts of the body, is demonstrated by soaking a bone in dilute muriatic acid, which dissolves all the lime, and leaves the vascular matter a little thickened, but perfectly flexible. We then see that this vascular and cellular matter has a laminated arrangement corresponding to that of the earthy, which has been described, so that between each layer of earthy matter, there is a layer of soft substance, and of course the different layers of soft substance are connected by vessels and cellular membrane, which intervene between the bony fibres, and connect the different strata together. Bones are covered by a strong, firm, fibrous substance, termed periosteum, on which the vessels are first distributed; from this they descend, connected by cellular substance, between the fibres of the bone. The vessels and nerves of the bone enter it through holes which are evident on the surface, and which are larger and more numerous in the extremities of the long bones than in the middle. The vessels do not penetrate the bone in a transverse direction, but obliquely, running transversely through a certain number of lamellæ, and then taking a perpendicular course between others, which prevents the bone from being weakened, particularly at any one part, by that want of earthy matter which is necessary to leave room for the admission and distribution of vessels.

The marrow that is contained in bones is of an unctuous nature, and in herbaceous animals, hardens when it becomes cold; but it remains fluid in those which are carnivorous. Some of the red parts of the blood are deposited with it in young animals, but in those that are adult it is no longer tinged with blood. The marrow is contained in fine cells, which do not communicate with one another, like those of the common cellular substance. This is proved by sawing a bone through, and keeping it in a temperature which will preserve the marrow fluid, with the part which is sawn downwards. Under these circumstances, if the cells communicated, the gravitation of the liquid marrow would cause it quickly to drop out, and leave the cells empty; but this does not happen. The cells which contain the marrow are lodged in the cancelli of the bone, at the extremities of the long bones; but in the middle they are unsupported by this kind of osseous structure. The cellular substance which contains the marrow, being condensed upon the inside of the walls of the bone, and adhering to them, has been termed the periosteum internum. In the principal bones we perceive arteries, much larger than those for the nutrition of the bone, which penetrate the walls obliquely, and spread their branches upon the medullary cells, for the nourishment of these parts. That these are the chief nutrient arteries of the marrow cannot be doubted; and it has been contended, that they have exclusively this power, and that they do not anastomose with the nutrient arteries of the bone. This opinion has been formed, because in some cases of accidental injury, in which the medullary artery has been destroyed, the marrow has, as it were, perished. This opinion, however, stands in direct opposition to all analogy; and it must indeed be con-

sidered as a very strange peculiarity, were not the minute contiguous nutrient arteries to inoculate with one another. The writer of this article is of opinion, that they do in this, as in other instances, for it is common in amputation to cut off the trunks of the medullary arteries, and yet the marrow of the remaining bone does not perish; and, again, the bone may be injected from the medullary artery alone. We may next inquire into the uses of the marrow. Havers thought that it transfused through the bone, and by this means prevented it from becoming brittle; nay, he even described the pores through which such transfusion was supposed to take place. The cells, however, which contain the marrow are perfect vesicles; and we know that no transfusion of contained fluids takes place through the membranes which contain them during life, though in consequence of putrefaction it does after death. If a bone be deprived of its periosteum in a living body, no transfusion of oil from its surface takes place; and even after death a recent bone may be deprived of its periosteum, and put in warm water for a considerable time, and yet no sudden transfusion of oil from the surface will take place, as might be expected if there were natural channels for this purpose. The canals which Havers described, are probably the passages through which the vessels are transmitted. If then this opinion of the use of the marrow be unfounded, we have still to inquire, for what purpose is it designed? The utility of the bones being formed as they are, small and tubular in their middle, expanded and spongy at their extremities, has been already explained. If then spaces are necessarily left in their interior parts, those spaces must be filled with something, for they cannot be left void, or the immense pressure of the atmosphere would crush their parietes, and abolish the vacuum. There is no matter in the animal body more suitable to fill their spaces than the marrow; and it is to be regarded as a part of the adipose system of the animal. In corroboration of this remark, it has been observed, that in impoverished and dropical subjects, where there is no fat in other parts, there is likewise none even in the bones; and if a bone be sawn, and the medullary cells broken down, so that the fluid which they contain may drop out upon paper, that it will not penetrate it, and render it transparent like oil; but, on the contrary, that it will encrust upon it, from its being of a gelatinous nature, like that fluid which is found in the interstices of the common reticular or cellular substance. From the circumstances which have been detailed in the foregoing account, viz. the great and general vascularity of bones;—the quantity of soft substance existing in every part of them;—their growth and mutation of form in disease, &c.;—it is natural to conclude, that there exist in the composition of every bony fibre, arteries for its formation, absorbents for its removal, cellular substance for the connection of its parts, and nerves to give animation to the whole. In this view of the subject, we perceive no essential difference of structure between bones and other parts of the body; nor do we expect any essential difference in the functions of their nutrient, and other vessels. We naturally conclude that bony fibres are formed and repaired, and that they undergo mutation or removal in the same manner, and from the same causes, that soft parts do. Mr. Hunter, however, from observing the striated appearance of the bones of animals, who have been at one time fed with madder, and at another with common food, and observing that the exterior stria was red if the animal was killed after having been for some time fed with madder, and white if it had only taken its ordinary food, concluded that bones grew by a deposition on their surface, and a correspondent removal of the internal part of the walls of the bone. Mr. Hunter also, to investigate the truth of Du Hamel's opinion respecting the growth

of bones, bored two holes in the tibia of a pig, one near the upper end, and the other near the lower; the space between the holes was exactly two inches; a small leaden shot was inserted into each hole: when the bone had been increased in its length by the growth of the animal the pig was killed, and the space between the two shots was exactly two inches. Mr. Hunter's experiments and opinions are published by Mr. Home in the second volume of Transactions of a Society for the improvement of Medical and Chirurgical Knowledge. We forbear to give a more detailed account of them, or enter into any discussion of the subject, but refer the reader to the original paper, because we believe that no theory will be found, on consideration, to be adequate to account for the phenomena of the growth and diseases of bones, except that which admits the bony fibres to be of the same structure as the soft fibres of the body, and consequently concludes that both are formed, removed, and renovated in the same manner. We subjoin some references to the instructive works on the structure of the bones. *Albini icones ossium fœtus, cui accedit osteogen. brevis historia.*—Annot. Acad. J. G. Walter handbuch von den knochen. Reichel Diss. de ossium ortu & structura in Saundif. thesaur. diss. vol. ii. Boehmer institutiones osteologicæ. Blumenbach Geschichte und beschreibung der knochen. The works of Ruysch. Nesbit's human osteogeny explained. Kerckring anthropograph. ritograph. & osteogenia fœtum. Du Hamel in memoires de l'acad. des Sciences, 1742. Haller. in op. minor. tom. ii.

BONE, in Chemistry and the Arts. The analysis of bone, and the products obtained from it by various chemical processes, deserve considerable attention, as this great class of animal substances ranks among the most important to the chemist.

So great a similarity is found in the composition of the bones of different animals, that their properties may first be described generally.

Bone, when first taken from the animal, is moist and greasy on its surface; and if cylindrical, it contains a quantity of the peculiar fat called *marrow*. When this is separated, and the bone exposed to the air, it gradually dries, becomes brittle and whiter; but the articulating heads long remain moist, greasy, and yellow. When once dry, and kept in a dry and airy place, they are scarcely susceptible of further spontaneous alteration.

The effect of mere heat on bone has long been known to chemistry and the arts, as furnishing some very important articles of chemical manufacture. Heated in the open air, bone first becomes oily and yellow, gives out a watery vapour, to which succeeds a thick, dense, fetid smoke, which readily takes fire, and when once kindled, affords heat enough, when the bones are in sufficient quantity, to complete the entire calcination, which lasts for many hours, during which they become successively black and carbonaceous, brittle, and at last, when every thing combustible is consumed, they remain nearly white, friable, light, and extremely porous or cellular in texture, and retaining their original shape and bulk. This process of burning bones in the open air, in large heaps, is performed near great towns for the sake of the earthy salt *bone-ash*, which is left behind, and forms on an average about half the weight of the fresh bone. It is composed chiefly of phosphat of lime, and is used by the assayers as the material for cupels, and for a few other purposes.

But the volatile products which are wasted in the above process, are highly valuable when the bones are distilled in close vessels, without addition as before, but with a proper apparatus to receive and condense the volatile products. In these circumstances, with a heat at first gentle, but gradually

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increasing, bone yields, at first, a limpid water, with a peculiar animal oily smell, which soon becomes impregnated with carbonated ammonia, together with an oil, at first of a clear yellow, pungent, and not ungrateful to the smell, but afterwards rendered brown, and even black, by the increasing heat, strongly fetid and ammoniacal. With the empyreumatic oil, a large quantity of sulphurated hydrogen, of carbonated hydrogen, and of carbonic acid gas escapes. The products of this distillation, when condensed, are the ammoniacal water, and the empyreumatic oil; the former contains, besides carbonat of ammonia, a portion of sebatic and prussic acid united with the alkali; the oil may be separated into the less and more empyreumatic, by changing the receiver occasionally, and keeping apart the first portions of the oil as the purest. If this oil is again repeatedly distilled by itself from clean vessels with gentle heat, it becomes at last as colourless as water, pungent, and not very unpleasant to the smell, so volatile at a common temperature as only to be kept by inverting under water the mouths of the vessels that contain it, and acting in medicine as a powerful sudorific. It is called from the name of the inventor, *DIPPEL'S OIL*, which see.

The only valuable part of the products of the distillation of bone is the ammonia, or volatile alkali, which is mixed with every part of the distilled liquid, and is afterwards purified by subsequent processes, assisting in the formation of the *MURIAT of ammonia*, or forming the pure *CARBONAT of ammonia* of the shops, the *sal volatile*, *spirit of hartshorn*, &c. When the distillation is discontinued, the bones remain in the retort of a brown colour, and swimming in a black, thick, extremely fetid, tenacious oil. If they are then gradually heated to redness in close iron vessels, every thing volatile is dissipated, and the earthy part remains dry and friable, still retaining the original form of the bones, but thoroughly impregnated with the charcoal of the oil, so as to become a fine glossy black. This is afterwards ground to a fine powder, mixed with size into cakes of a convenient weight, and forms one of the species of *lamp-black*, used very largely as a pigment. The harder and compacter bones, such as ivory, furnish a similar and more valuable black pigment, simply by heating to redness in close vessels.

But the analysis by heat, though it furnishes some valuable articles of commerce, is not well calculated to exhibit the constituent parts of bone in their proper characters.

In fact the ammonia, probably much of the oil, and all the gasses, are formed by the action of heat out of the real constituents of bone, as they exist in the animal.

Water and acids are the chief re-agents to be used by the chemist.

Cold water has scarcely any action on bone, but by long maceration its texture becomes more loose and open, and the gelatinous part becomes gradually changed, as by slow animal putrefaction.

Hot water acts with great ease upon bone, when reduced to small pieces by rasping or bruising; the first effect is to separate most of the *natural* oil of bone which rises to the top, and when cool concretes to a fatty fat. The water then dissolves the *gelatin*, which is found to compose a very considerable part of the substance, even of the driest and most compact bone; and in this method a clear insipid pure jelly is extracted, rendering the water, even when in large proportion, of a stiff, tremulous consistence when cooled, which, by evaporation, leaves at last a strong, hard *glue*.

The experiments of M. Pelletier on this subject are important. This accurate practical chemist took six pounds of dry bone shavings, procured from the button-mould makers, macerated them for two days in cold water, and then boiled them for nine hours with 24 quarts of water. The product

was a very strong clear jelly, and at the bottom of the vessel the *marc*, or earthy residue, which was pressed in order to separate the portion of somewhat turbid jelly, with which it was entangled. By subsequent boiling down, the jelly became so stiff when cold, as to bear to be cut into firm slices, which were hung up on strings in a place under cover from the weather (as in the common manufacture of glue), and in a fortnight became hard, brittle glue of good quality. The produce was 15½ ounces of clear glue, half an ounce more from the *marc*, and somewhat foul, and the *marc* itself weighed 4 lb. 3 oz. The loss in the operation amounted to 13 oz. In like manner 50 lb. of ivory shavings, exhausted by repeated boiling, gave 9½ lb. of clear glue, and 30 lb. of the *marc* remained.

These facts are important to the manufacturer; nor is the use of bone less interesting as an article capable of supplying much good and wholesome nutriment to man and other animals. In the making of soups it is a matter of common observation, that bones contribute, when boiled with the meat, to the richness of the liquor; but it is not commonly known how much they may be made to add to the nutritious quality; nor is it generally known that the hardest and driest bones, even those that have been kept for years, retain their gelatinous part unchanged.

The exact proportion of jelly cannot easily be ascertained by extraction with water, for even when converted into the hardest glue, it has become intimately united with a portion of this fluid; and it is by no means certain that the utmost defecation of glue equals the degree of dryness of natural gelatin, as it exists in the more solid bones.

The quantity of jelly is also much increased, either by giving the water by which it is extracted a higher heat than the boiling point, or by reducing the bones to a fine powder, and using repeated coction and pulverization.

The former method was used by Papin, who, in his valuable experiments on the solubility of animal substances, when confined with highly heated water in his *Digester*, found that he was able to extract every thing from powdered bone, but the mere earthy part. The latter mode has been brought into notice by M. Proust, in an important economic-chemical memoir on the "Method of ameliorating the subsistence of the Soldier," published at Madrid, in 1791.

Though there is a great general similarity between the bones taken from different parts of the body, they differ much in the relative portion of fat, of gelatin, and of earth. The younger the animal is, the less earthy salt, *ceteris paribus*, is contained in its bones. The large, round, joint-heads of the thigh, and other large bones, contain much more oil than the rib or blade bones, as is seen when they are exposed to the air; the latter soon becoming dry and clean, but the former remaining long foul and greasy.

No method of extracting all the soluble part of bone answers the purpose so completely, as long boiling in Papin's digester with a very great heat; the earthy residue then remains quite friable in the fingers, and gives little, if any, volatile, oily, or ammoniacal product on burning. But the jelly which remains in the water, and the oil which swims at the top, are found to have acquired a burnt unpleasant taste; and in the process, a considerable quantity of gas is generated, doubtless from partial decomposition of the soluble part. On the other hand, even after repeated boiling and laborious pulverization, unassisted by a higher heat than that of boiling water, the earthy residue still feels clammy and cohesive between the fingers, and retains some of the oil.

M. Proust asserts, that the knuckle and joint bones simply chopped into small pieces, and boiled for a quarter of an hour in a common copper, yielded no less than one fourth of their weight of fine insipid fat, which rose to the top of

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the water, and on cooling concreted into the consistence of suet. The haunch bones yielded about one eighth of fat. The utmost economy of bones, therefore, when used as human food, may be obtained in the following method. First chop the fresh bones into small pieces, and extract the fat in the way just mentioned; then dry the bones, and powder, or reduce them to a fine paste, by some pretty strong mechanical power; and boil them with about ten times their weight of water, for some hours, till half the water is wasted, more or less according to the kind of bone; the joint and thick bones making a richer jelly than the thin bones, and therefore requiring somewhat less boiling down to make a jelly of a determinate consistence.

M. Proust finds that this proportion of water is sufficient to leave a jelly of about the same richness as would be produced by dissolving one ounce of bone jelly, dried to the consistence of portable soup, in thirty-one ounces of water, and makes a jelly of a very agreeable degree of richness. The extraction is much assisted by using an iron vessel with a close lid, to give a heat somewhat greater than that of boiling water, though not to the degree of a Papin's digester.

In all the above experiments on the extraction of jelly and fat from bones, the uncooked bone is understood to be used. The bones of *boiled* meat, though deprived of some of their extractive matter, are still rich in nutriment; but *roasting* renders them entirely unfit for this purpose.

The earthy part, which composes on an average about half the weight of the larger bones of animals, was discovered first by Gahn, a Swedish chemist, to consist of the phosphoric acid united with a large proportion of lime. It will be more minutely described under the article *PHOSPHAT OF Lime*; and it is the most convenient substance from which *PHOSPHORUS* is prepared. It may here be mentioned, that the stronger acids, such as the sulphuric or nitric separate a part of the lime from this earthy salt, but only a part, for when sulphuric acid is added to bone ash, sulphat of lime is formed in great quantity, most of which remains at the bottom of a supernatant liquor, consisting of a great excess of phosphoric acid united with a small portion of lime, and also some sulphat of lime dissolved therein. It should be remarked in the analysis of this salt, that this acid phosphat of lime, is not decomposed by any single acid, nor even by the pure or carbonated alkalies; for, on adding the latter, the precipitate is not carbonated lime, but still the phosphat.

This earthy salt, when in solution, is, however, entirely decomposed by the nitrat or acetite of lead; the lime remaining dissolved in the liquor by the nitric or acetic acid, and the phosphat of lead forming an insoluble precipitate. Phosphat of lead is distinguishable from sulphat of the same metal by being readily soluble in nitric acid. If the phosphat is sprinkled on hot charcoal, the lead is reduced, and the luminousness and peculiar smell of phosphorus are perceivable. The phosphat of lime is equally distinguishable from the sulphat of lime by being very soluble in most acids, even when dilute.

Much light has been thrown on the analysis, and with it the physical structure of bone, and of most other of the hard supporting or protecting parts of the body, by the accurate and numerous experiments of Mr. Hatchett, whose researches into these subjects are admirably calculated to shew the extreme advantage which physiology derives from the labours of the chemist, when assisted by accurate knowledge, and guided by a philosophical spirit.

When bones, boiled or fresh, are steeped in any acid, a slight effervescence is perceived, and they presently are rendered soft and flexible by the gradual abstraction of the

earthy basis (chiefly phosphat of lime), which becomes dissolved in the acid. If the bone be previously boiled for a long time in water, its gelatin is removed by this liquid; but if the bone is in its natural state, the gelatin also is gradually dissolved in the acid, rendering it yellow and somewhat tenacious. The insoluble residue (except in a few kinds of bone, such as the enamel of the teeth) is either a membrane or a spongy cartilage, retaining the form of the original bone; for, in the process of ossification, membrane or cartilage forms the first basis or rudiments of bone, which is afterwards completed by the gradual deposition of the earthy salts. Though phosphat of lime forms the chief ingredient in the earth of bones of all animals, a small portion of sulphat of lime is mixed with it: and Mr. Hatchett has detected also a little carbonate of lime. The carbonic acid of this is that which occasions the slight effervescence during the action of the acid; the lime remains dissolved in the acid after the precipitation of the phosphat of lime by pure ammonia. A carbonated alkali then precipitates it together with the now decomposed earth of the calcareous sulphat.

We have thus shewn the great constituent parts of bone to be *gelatin*, soluble by boiling in water, and giving a fine clear jelly; *oil*, separable, during the boiling, by rising to the top of the water, and when cold concreting into a suet; *phosphat of lime*, soluble in dilute nitrous muriatic or acetic acid, and precipitable thence by pure ammonia; some *sulphat of lime*; a little *carbonate of lime*; and a *membranous or cartilaginous* substance, retaining the form of the bone after every thing else has been extracted by water and an acid.

For a highly probable opinion on the nature and origin of this membrane or cartilage, we are indebted to Mr. Hatchett who has shewn a number of characteristic marks, in which it most strongly resembles inspissated albumen, and by which it differs from gelatin. The chief of these are the following:

When dry, it is semi-transparent like horn, and more or less brittle. In this state it resists the action of water very powerfully; for when boiled for many days with this fluid, a scarcely perceptible precipitate is given by nitro-muriat of tin; a test of dissolved albumen. In this it strikingly resembles coagulated albumen, and as pointedly differs from gelatin, which, as we have seen, is readily extracted by water even from the driest and hardest bones.

This bony membrane, as well as albumen, is scarcely acted on by cold muriatic and sulphuric and dilute nitric acids, which last readily extracts gelatin from bone. However, after an immersion in these acids of some weeks, the bony cartilage, when taken out and steeped in ammonia, gradually dissolves into a blood-red liquor. But if the nitric acid is heated, the albuminous membrane is rapidly dissolved with the copious discharge of nitrous gas.

With caustic fixed alkali, the bony membrane or cartilage is readily dissolved into a perfect animal soap (a strong mark of resemblance to albumen, and difference from gelatin), and during the process much ammonia is given out. Acids again separate the albumen from the soap, unaltered in chemical properties.

Lastly, the bony cartilage is extremely slow to enter into a state of putrefaction, though kept moist and warm for many weeks: and in this too it resembles coagulated albumen.

Therefore in addition to the above-mentioned constituent parts of bone, we may add *albumen*, in a condensed state, forming the substance of the original cartilaginous or membranous structure, both of all the organized bones, and, as Mr. Hatchett has also shewn, of most of the hard parts which serve for the covering, protection, and arming of almost

almost every part of the animal creation. See the articles SHELL, HORN, &c.

The enamel of the tooth is a singular variety of the bone, being entirely destitute of the albuminous membrane. When an entire tooth is immersed in dilute nitrous acid, the enamel totally dissolves without residue; but the core of the tooth is acted on like other bone, leaving a cartilage of the same shape. The solution of enamel is found to be almost entirely phosphat of lime, by the tests already mentioned, being precipitable by pure ammonia, giving phosphat of lead, by adding the acetate of this metal, &c.

Fish-bones Mr. Hatchett found to contain rather a larger quantity of cartilage, in proportion to the phosphat of lime, than the bones of quadrupeds. Of the different kinds of horn and defensive weapons, the stag's-horn, elephant's-tusks, and the other hard and heavy defences, entirely resemble bone; but the horns of cattle, rams, and the softer species, contain so little earthy residue, that they owe their solidity entirely to the extreme condensation of the other constituents, the gelatin and albumen.

Bones may be softened by a short immersion in a weak acid. This arises from the partial abstraction of the earthy basis; and advantage may be taken of this property in the working of bone, for the various purposes of manufacture to which this article is applied by the turner, comb-maker, cutler, &c. Bone thus softened, is again made hard, by being steeped in alum-water. Alkalies also soften bone, as they do every other animal matter, by beginning to act upon the softer parts. See IVORY.

Bones readily take various colours, which, if dissolved in an acid, sink deep into the substance of the bone, and produce a pleasing effect. The metallic solutions are generally preferred for this purpose. To give a green, dissolve verdigris in distilled vinegar, immerse the bones in the solution, put the whole in a vessel, very well closed, and bury it in a dunghill, or give it a slow and uniform warmth in any other way for about ten or twelve days. The bones are then found very deeply and permanently dyed green, and capable of a good polish. The once prized *Turquoise* stone is fossil bone of various animals, accidentally impregnated with sulphat of copper whilst buried in the earth. To give the artificially dyed bones a finer colour, boil them in nut-oil, and they will then take a very high polish.

A permanent black is given to bone, either by nitrated silver, or in the following manner: boil equal parts of litharge and quick-lime in water, and the bones along with them for some hours, stirring them frequently. Other metallic solutions may be used for different colours.

Or the dye may be given by preparing the vegetable coloured lakes, or concentrated dyes; and by rubbing the bone, first with dilute nitrous acid to open its texture, and then rubbing in the dye for some time. This may be applied in various ways, first softening the bone by a weak acid, whereby it is made fit to receive the colour.

Bones are whitened by simple exposure to sun, wind, and weather, being first thoroughly cleaned, and particularly by occasional immersion in brine: thus the bones of sea-birds and fish, left for some time on the shore, are found beautifully white and clean. The same effect is produced much more speedily, but perhaps less permanently, by the oxy muriatic acid, the bone being exposed for some hours to this acid gas in close vessels, as Mr. Smith of Bristol has observed. The acid first makes the bone yellow, which, by exposure to air goes off, and leaves the bone beautifully white. This colour a little fades, when the bone is kept in close cases excluded from the light. See SKELETON.

From all that has preceded, it will appear obvious that

to the chemist and manufacturer, bone is one of the most curious and valuable of the animal substances, though considered vulgarly as little better than refuse, and scattered about without care. Besides its use as a hard and good material for turnery and workmanship of various kinds, it gives, by chemical decomposition, a large quantity of useful, nutritive jelly, fit for human food, or the same, in the form of glue, for the arts. When subjected to fire, it yields a vast quantity of ammonia, and is actually the material used in very many manufactures of the ammoniacal salts; and the residue, strongly calcined in close vessels, (and therefore retaining its carbonaceous ingredient,) produces useful and fine black pigments; or, burned with access of air, leaves an earthy salt, necessary to some important chemical processes.

Some of the preparations from bone are only used in medicine. Of these, are Dippel's oil, and the less rectified *oleum cornu cervi*, (oil of hartshorn,) both powerful sudorifics, and supposed antispasmodics; the *spiritus cornu cervi*, (spirits of hartshorn,) so universally known as a stimulant and cordial; and the carbonat of ammonia, often called salt of hartshorn. The white calcined earth of bones, *cornu cervi calcinatum*, enters into the composition of one or two pharmaceutical preparations, but without exhibiting any obvious properties. In diseases of the bones, where the softening and spontaneous deformity shews an evident want of their earthy basis, this calcareous phosphat has been given with apparent advantage. Of the unprepared bones, the elk's tooth, rhinoceros's horn, and shavings of the dried human skull, &c. are medicines entirely exploded only within a few years from the European pharmacopœias, and still maintaining high credit in the countries whose characteristic credulity and superstition in medicine first brought them into repute. The only real utility of unprepared bone in medicines is found in furnishing, when boiled in water, a light and nutritive jelly for the invalid; and for this purpose, hartshorn shavings are employed with advantage. *Memoirs de Pelletier*, tom. ii. Proust in the *Journal de Physique*, tom. liii. Hatchett in the *Phil. Trans.* for 1799 and 1800. Smith in Beddoes's *West of England Contributions*. Johnson's *Animal Chemistry*. *Encycl. Method. Arts and Metiers*, (Article *Ecaille*), &c. &c.

BONES, Diseases of the, in Surgery. As bones are organized parts of the animal body, they are liable to most of the diseases with which the softer organs are affected. They are either spontaneous, or accidental; but, from the hardness of their composition, and the small degree of vascularity and sensibility they possess, there must necessarily be a considerable difference between the phenomena and symptoms of diseased bones, compared with those of the soft parts. They are naturally endowed with little or no sensation; but are extremely painful in an inflamed state, when the blood-vessels, which enter their substance, are distended, and the nervous filaments are kept upon the stretch, as in the case of venereal nodes, &c.

Bones may be wounded with a sharp instrument, or contused with a blunt one, in the same manner as the muscles, or integuments; and they will re-unite again, if the injury they suffer be not so extensive as to intercept the circulation, or destroy their vitality. But, if a bone be so injured as to perish, its substance will either be gradually comminuted and dissolved, or cast off in a larger portion, by the process we denominate *exfoliation*. If any two ulcerated surfaces of flesh (suppose two contiguous fingers) be applied together, and allowed to heal, they will coalesce, and the vessels from one part will shoot into the other: in like manner, if the articulating surfaces of two contiguous bones (suppose

(suppose of the tibia and femur), be deviated of their cartilage by ulceration, their extremities may coalesce, and form one continuous bone, which is named *anchylosis*. A stiff joint, from this cause, is irremediable, and in general it may be considered as the most favourable termination of diseased joints; for they too commonly are attended with such distressing symptoms as to require amputation, in order to preserve the patient's life. See WHITE SWELLING, and *Diseases of the JOINTS*.

The consideration of *Fractions* and *Dislocations* is reserved for their proper places in the Cyclopædia, where will be likewise described the manner of reducing bones, vulgarly called *bone-setting*. This art, (which requires a very correct acquaintance with the anatomy of the joints and muscles), has, most unaccountably, been often left to ignorant farriers and mechanics, who are totally destitute of knowledge on these subjects! We might, with as much reason, entrust the repairing of a watch, or a mill, to persons who never had an opportunity of examining their mechanism! By accident, it is barely possible, some good might be done; but the greater chance is, that the instrument would be damaged rather than rectified, in the hands of such unskilful operators.

Bones will, in ricketty and serofulous constitutions, pass into a state of spontaneous enlargement, or decay, or flexibility, &c. The spongy parts of bones, e. g. the extremities of cylindrical bones, are most liable to become diseased in such subjects, especially during the early period of life; but in venereal patients, who are also very susceptible of morbid changes in the bones, they are their hard parts chiefly which become affected, as in the middle of the tibia, or ulna, or upon the central portions of the frontal and parietal bones. See RICKETS, SCROFULA, and LUES VENEREA. Some observations on the surgical treatment of diseased bones will be also made under the heads of CARIES, NECROSIS, SPINA BIFIDA, DISTORTION, CURVATURE, MOLLITIES, and EXOSTOSIS.

The structure of bones may be altered from several causes; but principally, from either a deficiency, or a redundancy of the phosphat of lime, which enters into their composition, and gives them solidity. When there is too little phosphat of lime, the gelatinous parts of the bones being unable to sustain much weight or resistance, they will become preternaturally flexible; and, on the contrary, when there is too much phosphat of lime, in proportion to the gelatinous part, the bones will be very fragile, and perhaps, may even break from the mere action of the muscles. The flexible state is most common in young persons, and the superabundance of osseous matter is chiefly predominant in old age; but either condition of the bones may occur at any period of life, from peculiar morbid dispositions. The popular notion of our bones being more frangible in cold weather than in hot, is erroneous, and without foundation; since the difference of season makes no difference in the texture of the living bones: and the only natural cause to be assigned for the fracture of our limbs more frequently in the winter than in the summer, is that of an increased slipperiness and hardness in the ground from frost, &c. which must necessarily occasion more physical violence and frequency in our falls.

BONES, in the funeral solemnities of the ancients.—Divers usages and ceremonies relating to the bones of the dead, have obtained in different ages; as gathering them from the funeral pile, washing, anointing, and depositing them in urns, and thence into tombs; translating them, which was not to be done without the authority of the pontiffs; not to say worshipping them, still practised to the bones of the

saints in the Romish church. Among the ancients, the bones of travellers, and soldiers dying in foreign countries, were brought home to be buried, till, by an express S. C. made during the Italic war it was forbid, and the soldiers' bones ordered to be buried where they died; the reason was, lest the melancholy sight should discourage the people from venturing their lives. Antiquaries are divided as to the manner of distinguishing the bones of the deceased, from those of the beasts and slaves, who were sacrificed at his funeral, and thrown into the same fire: probably it was done by disposing the body of the dead in the middle of the pile, and the others towards the sides. Potter's *Archæol.* tom. ii. lib. iv. cap. 6.

The Romans had a peculiar deity, under the denomination of *Osifago*, to whom the care of the induration and knitting of the human bones was committed: and who, on that account, was the object of the adoration of all breeding women. Pitisc. *Ant.* tom. ii. p. 341.

BONES, *fossile*, or *petrified*, are those found in the earth, frequently at great depths in all the strata, even in the bodies of stones and rocks.

There are divers sorts of fossile bone; some of a huge size, usually supposed to be the bones of giants, but more truly of elephants or hippopotami; others smaller, as vertebrae, teeth, and the like.

It has been disputed whether these be really animal substances, or mineral, that is, stones thus figured. Modern naturalists generally allow them to be animal, not merely on account of their figure and resemblance, but of their chemical principles, which are found to be wholly of the animal kind. It is supposed they were repositied in those strata at a time when all things were in a state of solution, and that they incorporated and petrified with the bodies where they happened to be lodged.

In the Philosophical Transactions (vol. lxxxiv. p. 407, &c.) we have some observations on fossile bones by the late Mr. John Hunter. They were occasioned by an examination of bones of this kind, found in the caves of Gailenreuth and Klausstein, two small villages in the principality of Bayreuth, (or Bareith), and presented to the Royal Society by the margrave of Anspach. These bones are considered more as incrufted bodies than extraneous fossils, since their external surface has only acquired a covering of crystallized earth with little or no change in their internal structure. The principal earth with which bones are most commonly incrufted is the calcareous; and this happens either by the bones being immersed in water, in which this earth is suspended, or by water's passing through masses of this earth, which it dissolves, and afterwards deposits upon bones which lie underneath. Bones which are incrufted seem never to undergo this change in the earth, or under the water, where the soft parts were destroyed; while bones that are fossilized become so in the medium, in which they were deposited at the animal's death. The incrufted bones have been previously exposed to the air; which is evidently the case with these bones, and also with those of the rock at Gibraltar, those found in Dalmatia, and those of the island of Cerigo. They are thus distinguished from fossilized bones: but as they are found in different situations, it is more difficult to account for their present state. Those in Germany are found in caves; the coast of Dalmatia is said to be wholly formed of them; and this is the case with a large portion of the rock of Gibraltar. With respect to the first class of bones, as they are those of carnivorous animals, resembling, in some respects, those of the white bear, and yet differing, in some circumstances, from the present animal of that species, Mr. Hunter suggests, that the animals to which they

They belong resorted at different periods to these caves, as places of retreat, and perished in them. In Gibraltar, they are mostly the bones of animals of the ruminating tribe, of the hare kind, and of birds, with some of a small dog, or fox, and likewise shells. Those in Dalmatia appear to be mostly of the ruminating tribe. From these facts, it may be presumed, that their accumulation did not arise from any instinctive mode of living, as the same mode could not suit both carnivorous and herbivorous animals. As to the local distribution of these bones, it is necessary to recur to successive shiftings of the situation of the sea, in consequence of which we may have a stratum of marine extraneous fossils, one of earth, mixed probably with vegetables and bones of land animals, a stratum of terrestrial extraneous fossils, then one of marine productions; but as the sea carries its inhabitants along with it, wherever there are those of land animals, there will also be a mixture of marine ones; and from the sea commonly remaining thousands of years nearly in the same situation, we have marine fossils unmingled with any others. As all operations respecting the decomposition, as well as the growth, of animal and vegetable substances, proceed more rapidly on the surface of the earth, to which the air has access, than within it, we shall find fewer changes as we descend into the earth, and at last probably arrive at a certain depth, where no change takes place. Substances, therefore, that are fossilized at a great depth, and deposited in stone, clay, &c. are preserved for a very long time from putrefaction; as much so as if they were in a vacuum; the heat also in such situations being uniform, commonly about 52° or 53°; and in the colder regions they are still longer preserved. It has been generally understood, that in extraneous fossils the animal part is destroyed: but Mr. Hunter has not found this to be the case. Shells, and bones of fish, must probably have the least in quantity, having been longest in that state, otherwise they should have the most; for the harder and the more compact the earth, the better is the animal part preserved; and this is an argument in proof of their having been longest in a fossil state. In the fossil bones of sea-animals, as the vertebrae of the whale, the animal part is in large quantity, and exists in two states; the one having some tenacity, but the other like wet dust; in some of the harder bones it is more firm. In the fossil bones of land animals, and those which inhabit the waters, as the sea-horse, otter, crocodile, and turtle, the animal part is in great quantity. In the horns of stags dug up in Great Britain and Ireland, when the earth is dissolved, the animal part is in considerable quantity, and very firm. The same observations apply to the fossil bones of the elephant found in England, Siberia, and other parts of the globe; also those of the ox kind; and more particularly to their teeth, especially those from the lakes in America, in which the animal part has suffered very little: the inhabitants finding little difference in the ivory of such tusks from the recent, except its having a yellow stain; the cold may probably assist in their preservation. In incrusted bones, the quantity of animal substance is very different in different bones: in those of Gibraltar, there is very little; it partly retains its tenacity, and is transparent, but the superficial part dissolves into mucus. Those from Dalmatia furnish similar results. Those from Germany, especially the harder bones and teeth, seem to contain all the animal substance natural to them, though in this respect they differ among themselves. The bones of land animals have their calcareous earth united with the phosphoric acid of the aerial, and retain it, when fossilized, as Mr. Hunter thinks, in proportion to the quantity of animal matter they contain. This he infers from the quantity of effervescence. In some bones of the whale, put in-

to the muriatic acid, the effervescence is very great; in the Dalmatia and Gibraltar bones it is less; and in those of the German caves, it is very little, since they contain by much the largest proportion of animal substance. From the experiments and observation of the ingenious Mr. Hatchett, (see Phil. Trans. vol. lxxxix. p. 333.) we learn that the bones of the Gibraltar rock consist principally of phosphat of lime; and that the cavities have been partly filled by the carbonate of lime, which cements them together. Fossil bones, he says, resemble bones which, by combustion, have been deprived of their cartilaginous part: for they retain the figure of the original bone, without being bone in reality, as one of the most essential parts has been taken away. Such fossil, or burned bones, can no more be regarded as bone, than charcoal can be considered as the vegetable of which it retains the figure and fibrous texture. Bones which keep their figure after combustion, resemble charcoal made from vegetables replete with fibre; and cartilaginous bones, which lose their shape by the same cause, may be compared to succulent plants which are reduced in bulk and shape in a similar manner. Hence he is led to question if bodies, consisting of phosphat of lime, like bones, have concurred materially, to form strata of limestone, or chalk; as it appears to be improbable, that phosphat is converted into carbonate of lime, after these bodies have become extraneous fossils. The destruction, or decomposition of the cartilaginous parts of teeth and bones in a fossil state, must have been the work of a very long period of time, unless accelerated by the action of some mineral principle; for, after having, in the usual manner, steeped in muriatic acid the os humeri of a man, brought from Hythe in Kent, and said to have been taken from a Saxon tomb, Mr. Hatchett found the remaining cartilage nearly as complete as that of a recent bone.

M. Cuvier communicated to the Société d'Histoire Naturelle at Paris, a curious memoir upon the fossil bones of animals. The following abridgment has been taken from the Société Philomatique, N° 18. Year VI. In order to determine the relations and differences that subsist between the several species of animals that do exist, or have existed on the surface of the globe he directed his attention to the following. 1. The animal which afforded the bones and teeth, called the bones and horns of the mammoth, by the Russians and Siberians, and of which remains are found in Europe, is a species of elephant, resembling the elephant of Asia; but differing from it in the alveolæ of its teeth, its tusks being longer, the angle of its lower jaw more obtuse, and the laminae of which its grinders are composed thinner. The true analogous living animal is not known, though it has been hitherto considered as the ordinary elephant. 2. The animal, of which the remains are found on the banks of the Ohio in North America, which the Americans and English have also named mammoth, though it differs much from the former. Remains of it are found in Europe and Asia. It must have been nearly as high as the elephant, but more bulky; its tusks are smaller; its grinders are armed with large cutting points, of which the section by wear presents double transversal lozenges. There are three molar teeth on each side, one of four, one having six, and one eight points. 3. The animal of which the teeth tinged by copper afford the turquois stone, and of which there was a mine at Simore, in Languedoc. The remains of this species are found in the department of Ain, in Peru, and elsewhere. It must have considerably resembled the former; but the points of its molar teeth are round, and when worn, their section presents first, a circle, then a semi-oval, and afterwards a figure of a trefoil, which has caused them to be confounded with the teeth of the rhinoceros;

some of these teeth have 12 points, others 6, others 4. 4. The rhinoceros. The feet and fragments of the jaws of this animal are found in France, and elsewhere, in which the author has hitherto observed nothing which differs from the common rhinoceros; but, as he has not yet seen an entire bone, he cannot positively affirm that they are identical. 5. The species of rhinoceros, with an oblong cranium, which is found in Siberia, Germany, and other countries. The author has seen teeth, and parts of the jaw-bones, found in France, which appeared to him likewise to belong to this animal; the principal character of this species consists in the long closure of the nose: the living analogous animal is unknown. 6. A molar tooth with two transversal eminences, which is in the possession of Citizen Gillet; and of which the National Museum possesses a young tooth that resembles neither the teeth nor the germs of any animal yet known, whether living or fossil: the only tooth which this slightly resembles is the last molar tooth of the rhinoceros. This tooth, therefore, indicates the existence of a sixth fossil species, of which the living analogous animal is unknown. 7. The animal twelve feet in length, and six in height, of which the skeleton was found under ground at Paraguay, and is preserved in the royal cabinet of Spain, at Madrid. The author proves by a detailed comparison of the bones, with those of all the known quadrupeds, that it is a proper and distinct species, more nearly approaching the sloth than any other genus, and that it may be called the giant sloth. Citizen Cuvier, in this place, communicates the interesting discovery he has made, that the sloth (*Bradypus tridactylus*, Lin.) has naturally and constantly nine cervical vertebrae. It is the first known exception established by Citizen Daubenton, that all quadrupeds have neither more nor less than seven cervical vertebrae. 8. The animal, of which the remains are found in the caverns near Gaylenreuth and Muggendorf, in the margraviate of Bayreuth, in Franconia. Various authors have considered it as a white bear; but it differs from this animal, as well as from all the known bears, in the form of its head, which is particularly characterized by the projection of the front, by the absence of the small tooth, which all the known bears have behind each canine tooth, by the oleous channel of the humerus, in which the brachial artery passes, and by several other circumstances in the figure and proportion of the bones. This animal, however, resembles the bear more particularly than any other kind. 9. The carnivorous animal of which the bones are found in the plaster-stone of Montemartre: the form of its jaws, the number of its molar teeth, and the points with which they are armed, indicate that this species is referable to the genus *canis*; but it does not completely resemble any species of this genus. The most striking distinctive mark is, that the seventh molar tooth is the greatest in the animal of Montemartre, whereas the fifth is the largest in dogs, wolves, foxes, &c. 10. The animal of which the lower jaw was found near Verona, has been considered by Joseph Monti as a portion of the cranium of the sea-cow; a notion which all the geologists have adopted, though it be contrary to the most simple notions of comparative anatomy. This jaw, according to Cuvier, has belonged to an animal resembling, though specifically different from, the mammoth, the animal of the Ohio, and that of Simore. Its most particular character consists in the curve which forms its symphyfis. 11. The animal of the stag kind of which the bones and the antlers are found in Ireland, in England, at Maestricht, &c. It is sufficiently different from all the stags, and even the elk, to which it has been referred, by the enormous magnitude of its antlers, the flattening of their superior part, and the branches which spring from

their base. Several figures of these are given in the Philosophical Transactions. 12. The genus of the ox or beeve alone affords several fossil species: the craniums of two were found in Siberia, which have been described by Pallas, who referred one of them to the ordinary buffalo; but he has since attributed them to a peculiar species, natives of Thibet, named arui. Citizen Cuvier proves, by osteologic comparison, that those craniums have not belonged to the buffalo. The other appeared to Pallas to have belonged to the buffalo of the Cape, or the musk ox of Canada. Citizen Cuvier shews that they cannot have belonged to the former; but not being in possession of the cranium of the arui, nor the musk ox, he makes no decision respecting their identity with the fossil craniums.

The author likewise describes two kinds of craniums which have been found in the turf-pits of the department of La Somme, which greatly resemble our common ox, and that of L'Aurouchs, but are more than one fourth longer.

From this inquiry the Citizen Cuvier concludes, 1. That it is not true to affirm that the animals of the south have formerly lived in the north, their species not being perfectly identical. 2. That in every country there have lived animals which do not at present exist, either on the same spot, or elsewhere in any known country. Hence he leaves to geologists, the task of making, in their systems, such changes or additions as they may think best suited to explain the facts which he has thus established.

BONE is also applied abusively in speaking of other matters which bear some analogy, either in respect of structure or office, to the bones of animals.

In this sense rocks are sometimes called the bones of the earth. Divers species of figured stones, as the *cephalites*, *cardites* &c. are denominated mineral bones, *cnosta*, *osteocolla*, &c. Some naturalists consider shells as a species of bones. The lobster, according to Fontenelle, is an animal which carries its bones on its outside.

BONES, *Giants*. See GIANTS BONES.

BONES, *Mammoth*. See MAMMOUTH.

BONE-fire. See Bon-FIRE.

BONE-lace. See LACE.

BONE, *burle*, *Neper's*, *quitter*, *ring*, *whale*. See the several articles.

BONEF, in *Geography*, a town and abbey of the Netherlands, in the county of Namur, 3 leagues north of Namur.

BONCONTRÉ, a town of France in the department of the Coté d'Or, and chief place of a canton, 5 miles S.W. of St. Jean.

BONETTA *Shoal*, lies about N.E. by E. from Bonavista island, one of the Cape de Verd islands, distant from it about 12 or 14 leagues.

BONEZIDA, a town of Transilvania, on the Samos, 12 miles N. of Clausenburg.

BONFADIO, JAMES, in *Biography*, an eminent Italian scholar of the 16th century, was born at Gorzano, in the Breseian territory, and studied in the university of Padua. From thence he went to Rome, where, for some time, he served the cardinals Merino and Ghinucci, as secretary; and after wandering from place to place, he resumed his studies at Padua, where he was probably employed in the instruction of youth. Deriving from none of his employments more than a precarious subsistence, he was, in 1545, invited to the chair of philosophy, in the city of Genoa, to which was united the office of historiographer, with a considerable pension. Whilst he was busily prosecuting his studies, he was charged and convicted of an unnatural crime; beheaded in prison; and his body was publicly burnt in July 1550. As a writer in the Latin and Italian languages, both in prose and verse,

he excelled; and his translation of Cicero's oration for Milo, is reckoned one of the most elegant pieces of Italian prose which the century affords. His capital work is the "Annals of the republic of Genoa," written in Latin, and comprising the history from 1528, where Giustiniani left off, to February 1550. It was first published at Padua, in 1586, 4to. and translated into Italian by Paschetti. The style is elegantly simple, the narrative lively, and the sentiments elevated. His Italian letters and poems were printed at Brescia in 1746—47. Gen. Dict. Nouv. Dict. Hist.

BONFATTI, in *Geography*, a town of Italy, in the kingdom of Naples, and province of Calabria citra, 3 leagues W. of St. Marco.

BONFINI, ANTHONY, in *Biography*, was born at Aicoli, and after being some years professor of belles-lettres, at Recanati, was invited by Matthias Corvinus king of Hungary, in 1484, to his court, where he was employed in writing the history of the Huns. Here he enjoyed the office of tutor to the queen, Beatrice of Arragon, and received many honours from Matthias, and his successor Ladislaus. He died in 1501, aged 75. Of the history of Hungary he left 4½ decads, brought down to 1495; of which 3, or 30 books were printed, by Martin Breuer, in 1543, and the remaining 15 books were added to a new edition by Sambucus, in 1568. This work is written with elegance, and is classed among the best modern histories in Latin. He also wrote an account of the capture of Belgrade by Mahomet II.; and a work entitled "Symposion Beatricis, seu dialogorum de fide conjugali et virginitate, lib. iii." He likewise translated, from the Greek into Latin, the works of Philostratus, Herodotus, and Herodian. Gen. Dict.

BONGARS, JAMES, a polite scholar and able negotiator, was born of protestant parents at Orleans in 1554. Having studied first at Strasburg, and attended a course of law under Cujacius, he entered into the service of the king of Navarre, afterwards Henry IV. by whom he was employed for 30 years in various negotiations, particularly with the German princes. Being at Rome in 1585, he wrote a severe reply to the violent bull fulminated by Pope Sixtus V. against Henry IV.; and he also published a spirited answer to a German piece, imputing the bad success of the joint expedition in 1587, to the misconduct of the French. He was distinguished by his knowledge of books, and had collected a large library, a great part of which was at length annexed to the public library of Bera. As a critic he became known by a valuable edition of "Justin," Paris, 1581, 8vo. He also edited a collection of the Hungarian writers, and the "Gesta Dei per Francos." But his reputation was principally owing to his Latin letters, written during his negotiations, and published after his death, at Leyden, in 1647, and afterwards translated into French. The style is clear, easy, and polished, and they seem to have been dictated by an honest heart. A collection of his French letters, "Le Secretaire fans fard," has also been published. Although a Calvinist, Bongars disapproved of the religious wars of that party. He died at Paris in 1612. Gen. Dict.

BONGO, or BUNGO, in *Geography*, one of the islands of Japan. The principal town, seated on the east side of the island, is called by the same name. This is a port opposite to Tonfa, and separated from it only by a narrow channel. N. lat. 32° 41'. E. long. 131° 57'.

BONGO PALA, in *Botany*, Piso. See *MYRISTICA aromatica*.

BONGUATRORA, *Serpens ornatissima amboinensis bonguatrora* of Seba, in *Zoology*, the name the coluber *abatulla* bears among the natives in the island of Amboyna. See *ABATULLA*.

BONHAMPTON, in *Geography*, a town of America,

in Middlesex county, and state of New Jersey; about 6 miles N.E. from New Brunswick.

BONI, a kingdom of the island of Celebes, which lies on the western side of a bay, called on that account the bay of Boni, is the second kingdom, in point of importance, in the island. Its extent from the river Chiarana to the river Salenico is about 20 leagues; and within land it is bordered upon Soping, Lamoree, Macaffer, and Bosleboele. In ancient times this kingdom was independent of, and unconnected with any other. It is still in close alliance with the two small kingdoms of Soping and Loeboe, or Loehoe. The natives of Boni, that they may not appear inferior to the Macassers, deduce their origin in like manner from the gods. The first king they say, descended from heaven, and was known by the name "Matta Salompo," that is, the all-seeing. This sovereign, their first monarch, instituted the laws of the country, which are still observed; made the royal standard, called "Worong Porong;" and appointed seven electors, under the denomination of "Matoua petoes." The prince or sovereign is called "pajong;" and he is elected for life by seven nobles, which number is kept up by the pajong, and they are appointed by him from certain freeholders. The pajong is often restrained by a sort of parliament, elected by the freeholders; it consists of 400 members, 200 of which are called "mattona," 100 are called "pabicharro," and 100 are called "galarang." The first sovereign, after reigning 40 years, reigned the kingdom to his son, and, with his wife, ascended again to heaven; and from him all the succeeding kings of Boni are descended; none others, besides his posterity, born of marriages with royal princesses, being entitled to the crown. Notwithstanding the common descent of the rulers of Boni and Macaffer from the gods, these two nations are avowed enemies. About the beginning of the 17th century the Bouginefe, or people of Boni, and their queen, were compelled to conform to the mahometan religion; and the condition imposed upon them was, that the enemies of Macaffer should likewise be the enemies of Boni, but not the enemies of Boni those of Macaffer. At this time Boni was able to bring 70,000 fighting men into the field. The hatred which was thus excited among the Bouginefe against the Macassers, and their incessant quarrels, enabled the Dutch, who, as their interest required, favoured sometimes the one party, and sometimes the other, to make themselves masters of the island. The princes of Boni, Soping, &c. united themselves to the Dutch by the Boni contract, which was concluded November 18th, 1667; and to this the Macassers were afterwards compelled to accede. At present the Bouginefe are the most powerful, as the Macassers were about a century ago.

The Bouginefe, or Buggesses as they are usually called by the English, are of a middle size, and have a brown, but not dark, complexion. Among the female sex in particular, some are found almost entirely fair. Their features in general are agreeable, only that their nose is a little flattened. They are less open and more treacherous in their dispositions than the Macassers; and never attack their enemies openly, but endeavour to fall upon them by surprise. Those who never did them an injury are not secure from being murdered by them, when they can do it with privacy; and they often commit such actions for no other reason, as they say, than to try the goodness of their knives, or daggers. Many Macassers, as well as Europeans, have fallen sacrifices to this thirst for blood. Their daggers and assagays are commonly poisoned, as well as their small darts, which they can shoot at their enemies to a considerable distance by blowing them through a tube. Their clothing consists of a piece of red or blue cotton cloth wrapped round the body, and drawn

between the legs. The upper part of the body is quite naked. On the head they wear a piece of cotton cloth in the form of an handkerchief, with which they cover their hair, which is as black as pitch, and very long. On the other parts of the body, neither the men nor women suffer any hair to grow; they pull it out by the roots, in the same manner as the Mahometans and Indians do, as soon as it appears. The food is chiefly rice, fish, and pigings; and their beverage is water, though they are not destitute of "saqueer," or palm wine. The Bouginese women are in general much handsomer than those of the other Indian tribes; some of them, if their complexion had the same mixture of red and white as our females, would be accounted beauties in Europe. They are naturally of an amorous disposition, and are capable of undertaking any thing to gratify their inclinations. The Bouginese, who have in general adopted the mahometan religion, may have four wives, provided the husband can maintain them; but if they are not satisfied with each other, they may separate with as little trouble as they were united. They are a high spirited people, fond of adventures and emigration, and capable of undertaking the most dangerous enterprises. The appellation "Bugguese," has become, among Europeans in the east of India, synonymous with soldier, just as seapoy is in the west. The people of Celebes are very industrious, and they are very adventurous merchants; and the Bugguese, in particular, often find their way to the spice islands, in spite of the vigilance of the Dutch. They write their language from left to right, in a character peculiar to themselves; on the sea-coast they universally speak the Malay tongue, and have many Malay phrases in their own language. Their funerals are attended with very little ceremony. The body is wrapped up in a piece of white cotton cloth, and deposited in the grave, over which some sweet scented flowers are strewed, and two stones are erected, one at the head and another at the feet. Stavorinus's Voyage to the East Indies, vol. ii.

BONI, *bay of*, a bay in the kingdom of Boni, in the southern part of the island of Celebes. It is called Sewa by the natives, and Bugguese, or long bay, by the English. Of this bay we have the following account by Captain Forest. Having passed the strait between Celebes and Saleyer, called the "Budgeroons," keep on in a direction N.E. by N. about 130 miles, and you will find, near the west coast of the Sewa, a small island called "Baloonroo," visible 8 or 10 leagues off, and having some rocky islets at its east end. Farther on, about a day's sail, or about 60 miles, is the mouth of the river Chinrana, which takes its rise in the Warjoo country, the capital of which is Tofforo, lying a day's journey by water from the mouth of the river; it afterwards passes through Boni; it has a good muddy bar, passable by large ships, and is navigable a good way up; it has several mouths, and on its banks are many towns, which carry on a great trade in gold, rice, sago, cassia, tortoiseshell, pearls, &c. The anchorage is good off the river's mouth. Half a day's sail farther north, along the west coast of the Sewa, is the river Peenekee, which is not very considerable. Farther on are two places called Akolingan and Telludopin, which are pretty well inhabited. Continuing still north, you come to the river Sewa, not very considerable; then to the river Loo, famous for boat-building; then you come to Mankakoo, where are gold and plenty of sago, very cheap, and also cassia and seed-pearl. Being now come to the bottom of "Buggese bay," the sago-tree abounds very much; and in many parts of the Sewa, there are spots of foul ground, on which they fish for swallow, which they generally carry to Macasser, to sell to the China

junk. On the east side of the Sewa the country is not so well inhabited as on the west side. The south-east point of the Sewa is called "Pajungan;" where is a cluster of islands, rather small, among which is good anchorage. Stavorinus's Voyage, vol. ii. p. 213.

BONIEUX, a town of France, in the department of the Vaucluse, and chief place of a canton, in the district of the Apt. The place contains 2450, and the canton 6178 inhabitants; the territory comprehends 130 kilometres, and 6 communes; 8 leagues E. of Avignon.

BONIFACE, in *Biography*. There are nine popes of this name. *Boniface I.* succeeded Zosimus in the year 418; and when the schism, occasioned by a party that favoured Eulalius, was terminated, he was fully established in possession of the papal see in 419. Before his election he was a presbyter of irreproachable character, and after his advancement he was a lover of peace; and though he maintained what he called the just rights of the Roman see, in the jurisdiction which his predecessor had exercised over the bishops of Illyricum, he made no attempt to extend his authority and claims. He revoked the privileges granted by Zosimus to the see of Arles, and restored them to the sees of Narbonne and Vienne, which had been unjustly deprived of them; and with a moderation that redounds much to his honour, he refused to interfere in a dispute which took place between the clergy of Valence and Maximus, their bishop. He died at a very advanced age, November 4, 422; was canonized as a saint in the church of Rome; and his festival was kept on the 25th of October. Bede gives credit to the relation of miracles wrought by this pope, and Baronius (ad ann. 423.) says, that he relieved Rome in the time of a famine.

Boniface II., a Roman by birth, and a Goth by descent, supplied the vacancy occasioned by the death of Felix III. in 520; and upon the death of a competitor, named Dioscorus, obtained quiet possession of the papal chair. This pope confirmed the decrees of some Gallican bishops, who condemned the semipelagian doctrine; and in 531 he proposed to alter the mode of electing a pope, and to assume the prerogative of appointing his successor. He obtained a decree for this purpose, and actually nominated a deacon, whose name was Vigilus. But at a second council the Roman senate, in concurrence with the bishops and clergy, obliged the pope to revoke his former decree, and to acknowledge himself guilty of high treason. Boniface died in October, 532.

Boniface III., a native of Rome, succeeded Sabinian, after a vacancy of almost a year, in 607; and having ingratiated himself with the emperor Phocas, to whom he was deputed as a nuncio by pope Gregory, in 603, he obtained from this tyrant the title of "universal bishop," and "head of the church," which was taken from the bishop of Constantinople, and transferred to Boniface and his successors in the see of Rome. Thus, says Bower, was the power of the pope, as universal bishop and head of the church, or in other words, the papal "supremacy," first introduced. It owed its original to the worst of men; it was procured by the basest means, or by flattering a tyrant in his wickedness and tyranny; and according to the previously declared judgment of Gregory the great, it was in itself "anti-christian, heretical, blasphemous, and diabolical." Boniface afterwards assembled a council for settling the election of bishops, in which they were forbidden to nominate their own successors, and the consent of the people, clergy, and sovereign, and the confirmation of the pope, were made necessary. Boniface died in November 607.

Boniface IV., a native of Valeria, in the country of the Maris,

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Mari, was elected to the papal see in August 608; and having obtained from Phocas the grant of the pantheon, converted it into a church, dedicating it to the Mother of God and the Christian Martyrs. He held a council at Rome to settle some affairs of the English church, at which Mellitus, the first bishop of London, is said, by Bede, to have attended; but the acts of this council, and some pieces ascribed to Boniface, are thought to be spurious. He died in 615, and was sainted.

Boniface V., a native of Campania, and a presbyter of the Roman church, succeeded Deusedit in December 619. In 624 he sent the pall to Justus, the successor of Mellitus in the see of Canterbury, and interested himself in the propagation of Christianity in Britain, by sending letters and presents to Edwin the king of Northumberland, and also to his queen Edelberg, sister of Eadbald king of Kent, who having assumed the Christian profession, was allowed by her marriage articles the free exercise of it. He died in October 625. Some decretal epistles, relating to matters of small importance, are ascribed to him. According to Mosheim (*Ecc. Hist.* vol. ii. p. 185), this Boniface enacted that infamous law, by which the churches became places of refuge to all who fled thither for protection; a law which procured a sort of impunity to the most enormous crimes, and gave a loose rein to the licentiousness of the most abandoned profligates.

Boniface VI., was a Roman of infamous character, and succeeded Formosus in 896. Baronius (*ad ann.* 897.) will not allow him a place among the popes. He died soon after his election.

Boniface VII., denominated "Anti-pope," was a deacon of the Roman church, of the name of Franco, and advanced to the papal chair in 975, upon the death of Benedict VI. to whose murder he is said to have contributed. Soon after his election he was constrained by an adverse party to leave Rome and to fly to Constantinople; but he carried with him the treasures of St. Peter. Gerbert styles him "of all monsters of wickedness the most wicked." Upon the death of the emperor Otho II. in 984, he returned to Rome, and occupied the see in the room of John XIV. whom he displaced, imprisoned, and put to death. Franco died in 985; and he had rendered himself so odious by his tyrannical conduct, that his corpse was treated with the utmost indignity, and dragged naked through the streets.

Boniface VIII., a native of Anagni, and a descendant of the noble family of Cajetani, was employed by popes Martin IV. and Nicholas IV. in several important legations, and succeeded pope Celestine V. whom he artfully persuaded to resign, in December 1294. The beginning of the following year he was enthroned at Rome with great solemnity and parade; in the procession from St. Peter's, where he was consecrated and crowned, to the Lateran, for the purpose of being enthroned, he was mounted on a white horse, richly caparisoned, with the crown on his head, whilst the king of Apulia held the bridle in his right hand, and the king of Hungary in the left, both on foot. His subsequent conduct corresponded to the haughty grandeur of his installation. In order to secure himself against any future trouble from Celestine, he confined him in prison at Anagni, where he died. Failing to mediate a peace between James king of Arragon, and Charles II. king of Sicily, he formed an alliance against Frederic of Arragon, whom the Sicilians had made their king, and proceeded to excommunicate him and all his adherents; but he was at length obliged to confirm him in his dominions. His next measure was that of humbling the family of Colonna, two cardinals of which had opposed his election; for this purpose, after having declared the

whole family infamous by a public decree, confiscating their estates, and excommunicating all who countenanced or protected them, he ordered a crusade to be preached against them and their friends, demolished their houses and castles, and obliged them to seek shelter in foreign countries; and he moreover punished with utter demolition the city of Præneste, for its attachment to them. To Boniface is commonly ascribed the institution of the jubilee in 1300. See **JUBILEE**. In his attempt to mediate a peace between Philip the Fair king of France, and Edward I. king of England, he was charged with partiality to the latter, so that Philip could be prevailed on merely to agree upon a truce; and his enmity against Boniface, which was smothered for some time, at length broke out into a flame. Philip, with a view of supporting the war against England, prohibited the exportation of any gold or silver from the kingdom without his permission; and Boniface, apprized that this order was levelled against the see of Rome, issued a bull, forbidding secular princes to exact, and the clergy to pay, any sums from the ecclesiastical revenues, without his approbation. The animosity between the pope and the French potentate was increased by the arrogance with which a legate from Rome delivered the pope's message, enjoining the king of France, in common with other Christian princes, to aid the king of Tartary in a war against the Saracens, and by the subsequent arrest of the legate. Boniface, much enraged, dispatched a nuncio to demand his release; and in case of refusal, threatened to declare the kingdom devolved to the holy see, to absolve his subjects from their allegiance, and to summon all the Gallican bishops to Rome. The king resented this violent proceeding, renewed the prohibition against carrying money out of the kingdom, and forbade his ecclesiastics on any pretence to visit Rome. In these hostile measures the king was supported by the states of the nation, which appealed to a general council, and Boniface prepared to fulminate a decree of excommunication and forfeiture of his crown against Philip. Nogaret and Sciarra Colonna were sent, on this occasion, into Italy to excite the persecuted Ghibellines against the pope, who was then at his palace in Anagni. They secretly approached it with a body of troops, and made themselves masters of the person of Boniface and all his treasures. During the three days of his confinement the pope was treated with great indignity, particularly by Colonna. At length the people of Anagni, recovering from their consternation, rescued the pope from his captivity: who returned to Rome, where he was seized with a fever, which terminated his life in October 1303. He was buried at St. Peter's in a grand mausoleum, which he had erected for himself. Although Boniface has been jully extolled for his learning, intrepidity, and experience in public affairs, and for his patronage of literature; he was arrogant and overbearing, ambitious, crafty, and violent, and avaricious to such a degree, that he was intent upon accumulating riches to exalt the church and aggrandize his own relations. He was the author of several works, such as epistles and decrees, two discourses on the canonization of Lewis IX. of France, called St. Lewis; two famous prayers, one to our Saviour, and the other to the Virgin. He also caused to be published the sixth book of the decretals, and wrote a treatise entitled "De regulis juris."

Boniface IX., a native of Naples, descended from a noble family in reduced circumstances, whose name was Peter Thomacelli, was more distinguished by his prudence and address than for his profound and extensive learning, and was elected pope at Rome upon the death of Urban VI. in 1389. The greatest part of his pontificate was devoted to negotiations with his rivals at Avignon, Clement VII. and Benedict XIII.

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in which were displayed on both sides much cunning and artifice, and at the same time an inflexible resolution of retaining the tiara. Boniface was arbitrary in the exercise of power; and towards the end of the year 1394 he would have been massacred by the people, if he had not been seasonably rescued from the enraged multitude by the interposition of Ladislaus, king of Naples, who happened to be then at Rome. He afterwards retired to Perugia, and from thence he removed to Assisi; but on the approach of the jubilee year, 1400, the Roman people, apprehending, that in the absence of the pope it would not be celebrated with the usual solemnity, and the pecuniary interests affected, deputed an embassy to invite his holiness to Rome. Upon his arrival he was received with joy and invested with extraordinary powers, in the exercise of which he repaired and fortified the walls and towers of the city, and the castle of Angelo, and also placed garrisons in them, so that he made himself absolute master of the city. Some ascribe to Boniface the institution of Annates (See ANNATES); but though the origin of these is of more ancient date, he is allowed to have been in a very high degree avaricious and rapacious, to have sold church preferments to the best bidder, without regard to merit or learning, and to have made it his constant study to enrich his family and relations. He died of a paroxysm of the stone in 1404. Bower's Hist. of the Popes.

BONIFACE, called the "Apostle of the Germans," was a native of England, whose original name was "Winifrid," born in Devonshire, A.D. 670, and was educated in a Benedictine monastery at Exeter. This famous ecclesiastic, who was ordained a priest A.D. 700, with two companions, passed over into Friesland in 703, in order to preach the gospel among the heathens; but failing in his first attempt, on account of a war which broke out between Radbod the king of that country, and Charles Martel, he returned to England. However, he resumed his pious undertaking in 718; and at Rome he was solemnly empowered by the Roman pontiff, Gregory II. to preach the gospel not only in Friesland, but throughout Germany; which commission he executed with considerable success. In the year 723, he was consecrated bishop by Gregory II., who changed his name of Winifrid into that of Boniface; and he is said to have been the first who took a solemn oath of obedience to the pope, which he did at this time. Upon his return to Germany, with the instructions of the pope, and the peculiar protection of Charles Martel, he preached in Thuringia, Hesse, and Bavaria, and erected a great number of Christian churches. As these were too numerous to be governed by one bishop, this prelate was advanced to the dignity of archbishop, in 732, by Gregory III., under whose authority, and the auspicious protection of Carloman and Pepin, the sons of Charles Martel, he founded in Germany the bishoprics of Wurtzbourg, Buraubourg, Erfurt, and Aichstadt; to which he added, in 744, the famous monastery of Fulda. His last promotion, and the last recompence of his assiduous labours in the propagation of the truth, was his advancement to the archiepiscopal see of Mentz, A.D. 746, by pope Zachary, by whom he was at the same time created primate of Germany and Belgium. In his old age he returned again to Friesland, that he might finish his ministry in the scene of its commencement; but his piety and zeal were ill rewarded by that barbarous people, by whom he was murdered in 754, together with fifty ecclesiastics, who accompanied him, and who shared the same fate. He was interred in the abbey of Fulda, and canonized by the church of Rome, to which he was ardently devoted. His zeal for the glory and authority of the Roman pontiff equalled, if it did not surpass, his

folicitude for the service of Christ, and the propagation of his religion; and in combating the heathen superstitions, he resorted to other weapons than those which Christianity recommended, employing violence and terror, and sometimes artifice and fraud, in order to multiply the number of Christians. His epistles, and those of his coadjutors, first published with notes by Serrarius, in 1605, and re-published in 1629, are written in a barbarous style, and discover an imperious arrogant temper, a cunning and insidious turn of mind, an excessive zeal for increasing the honours and pretensions of the sacerdotal order, and a profound ignorance of many things, the knowledge of which was indispensably necessary in an apostle, and particularly of the true nature and genius of the Christian Religion. The Benedictines have published his statutes, and some of his sermons. Bower's Hist. of the Popes, vol. iii. Mosheim's Eccl. Hist. vol. ii. p. 205, &c. Cave's Hist. Lit. t. 1. p. 622. Dupin, Eccl. Hist. cent. 8.

BONIFACE, count of the Roman empire, one of the two generals of Placidia, the mother of Valentinian III., Aetius being the other (see AETIUS), who have been deservedly named as the last of the Romans; was the intimate friend of St. Augustine, bishop of Hippo, but incurred his displeasure by marrying a wife of the Arian sect, after a solemn vow of chastity, and a resolution of retiring from the world, and by some other instances of licentious conduct with which he was charged. However the people applauded his spotless integrity, and the army dreaded his impartial and inexorable justice. Of his justice, the following singular fact is recorded. A peasant, who complained of the criminal intimacy between his wife and a Gothic soldier, was directed to attend his tribunal the following day; in the evening, the count, who had diligently informed himself of the time and place of the assignation, mounted his horse, rode ten miles into the country, surprized the guilty couple, punished the soldier with instant death, and silenced the complaints of the husband by presenting him, next morning, with the head of the adulterer. Boniface, having defended Marseilles, when attacked by Ataulphus, was rewarded by the emperor Honorius with the command of the troops in Africa, which province he rescued from the repeated attempts of John, who usurped the empire. Placidia, who assumed the government of the empire during the minority of her son, highly pleased with his bravery and loyalty, called him to court upon the death of that usurper, preferred him to the post of "comes domesticorum," and sent him into Africa with unlimited power. These marks of favour excited the jealousy of Aetius (see AETIUS), who artfully contrived, under the mask of friendship, to engage Boniface in a revolt, which took place in 427. Accordingly, Placidia declared him a public enemy, and sent troops against him. Having defended himself for some time, he found at length that he was likely to be overpowered; and therefore, after some hesitation, the last struggle of prudence and loyalty, he dispatched a trusty friend to the camp of Gonderic, king of the Vandals, with the proposal of a strict alliance, and the offer of an advantageous and perpetual settlement. The Vandals accepted the proposal, and Genserich, who succeeded his brother, and whose ambition had neither bounds nor scruples, transported his troops from Spain into Africa in 429, and obtained, by the concurrence of several favourable circumstances, an easy conquest. Placidia discovered, when it was too late, the artifice that had been practised by Aetius; and Boniface, who also perceived and lamented his error, returned to his allegiance. But his efforts to recover Africa were unavailing; and he was under a necessity of abandoning the country, and of returning to Ravenna, where

where he was kindly received by Placidia, and advanced to the rank of patrician, and the dignity of master-general of the Roman armies. The haughty and perfidious soul of Aetius was exasperated by the honourable mode of his reception, and he hastened to return from Gaul to Italy, with an army of Barbarian followers, and to decide his quarrel with Boniface in a bloody battle. Boniface was successful; but in the conflict he received a wound from the spear of his adversary, of which he expired within a few days, A.D. 432. Before his death he is said to have testified his forgiveness of Aetius's treacherous conduct, to such a degree, as to exhort his wife, a rich heiress of Spain, to accept him for her second husband. *Anc. Un. Hist. vol. xiv. Gibbon's Hist. &c. vol. vi.*

BONIFACE, NATALIS, an engraver of great merit, who flourished in Italy, towards the conclusion of the 16th century. His works are chiefly etchings, performed in a slight, fine style; and his small figures he executed with great spirit. His chief work was the plates composed by D. Fontana, architect to pope Sixtus V. concerning the removal of the Vatican obelisks. *Strutt.*

BONIFACIA, in *Botany* (J. Bauhin). See *Ruscus racemosus*.

BONIFACIO, or **BONFACIO**, in *Geography*, a sea-port town of the island of Corsica, department of Liamone, and chief place of a canton, in the district of Sartene, on the south coast, and in the strait between the islands of Sardinia and Corsica. The town is small and fortified, and the canton contains 3172 inhabitants; 28 leagues south of Bastia. N. lat. 41° 24'. E. long 9° 20'.

BONIFACIO Point. See **BALDIVIA**.

BONIFACIO Strait, commences near the town of the same name, on the S. E. of the island of Corsica; and its length to point Tico, the most northerly point of Sardinia, is 2½ leagues.

BONING, in *Surveying and Levelling*, &c. is the placing of three or more rods or poles, all of the same length, in or upon the ground, in such a manner, that the tops of them all may be in one continued straight line, whether it be horizontal or inclined, so that the eye may look along the tops of them all, from one end of the line to the other.

BONJOUR, WILLIAM, in *Biography*, a learned Augustin, was born at Toulouse in 1670; and at Rome, whither he was sent for by cardinal Norris in 1695, he became distinguished by his learning and piety. He was employed by pope Clement XI. in several matters of importance, and particularly in the examination of the Gregorian calendar. Bonjour had also the superintendance of the seminary established by cardinal Barbarigo at Montefuscone, and denominated the Academy of Sacred Letters. He was acquainted with almost all the oriental tongues, and more especially with the Coptic, or ancient Egyptian. Actuated by a zeal for acquiring knowledge, and for propagating the gospel, he visited China, where he died in 1714, whilst he was employed in forming a map of that empire. His works are, "Select Dissertations on the Scriptures;" "An Account of the Coptic MSS. in the Vatican;" "A Coptic Grammar;" and "A Roman Calendar." *Moreri.*

BONIS ARRELANDIS NE DISSIPENTER. See **ARRISTANDIS**.

BONIS non amovendis, a writ directed to the sheriffs of London, &c. where a writ of error is brought, to charge them that the person against whom judgment is obtained be not suffered to remove his goods, till the error is tried and determined.

BONIS, terris, et catallis rehavendis post purgationem. See **TERRIS**.

Arresto fatto super BONIS mercatorum. See **ARRESTO**.

BONITO, in *Ichthyology*, synonymous with the French *bonite*. This appears to be a name assigned indiscriminately to more than one or two kinds of fishes, although it seems to be confined in some degree to those of the **SCOMBER** genus. The *scomber pelamis* of Loefl. is the fish mentioned under the name of *bonito* by Osbeck, who also calls it *scomber pulcher*. The *bonito* is vaguely described as a large sea-fish, with a long, broad, and thick body; eyes, and likewise the gills, large; and the greater part of the body free from scales. It is observed still further to be a fish of great beauty, and very common in some seas; our East India ships usually falling in with immense shoals of them. It is impossible to say whether this may be the *scomber pelamis*, or not; but as a matter of opinion, we think it to be the same, because the latter is found in immense shoals between the tropics, and in the Atlantic ocean. The bonito of Bloch (*le bonite de Bloch*) bears the Latin name of *scomber farda*.

BONITON, the common French name of **SCOMBER amia** of Linnaeus.

BONIZO, in *Geography*, a town of Italy, in the duchy of Mantua, on the south side of the Po, opposite to Ostiglia.

BONKOSE, in *Ichthyology*, the *Sciæna nebulosa*, a fish discovered by Forkal in the Red sea. Bonkose is the name it bears in Arabia.

BONLIEU, in *Geography*, a town of France, in the department of the Ardeche; 5 leagues N. N. W. of Tournon.

BONN, in Latin *Bonna*, a small but populous and fortified city of Germany, in the circle of the Lower Rhine, and electorate of Cologne, or, according to the French arrangement, the chief place of a district, in the department of the Rhine and Moselle; the place contains 8837, and the canton 18,951 inhabitants; and its number of communes is 31. The number of houses is said not to exceed a thousand; and as it has little foreign trade, most of the inhabitants are attracted thither by its being the residence of the elector of Cologne. The streets are narrow, crooked, dirty, and badly paved, and in winter badly lighted. The public walks are few, and not very agreeable. The churches are flatly; and the town-house is adorned with fine paintings. The Jews at Bonn have a street to themselves, consisting of 21 houses; and their number is estimated at 250. Bonn was taken from Louis XIV. into whose hands it was surrendered by the elector, in 1673, by William prince of Orange; in 1689, by the marquis of Brandenburg; in 1703, by a detachment of the duke of Marlborough's army, after a siege of three weeks, and the loss on both sides of 2000 men; and on the 6th of October, 1794, by the troops of the French republic. It is situated 14 miles S. S. E. of Cologne, 30 E. of Aix-la-Chapelle, and 28 N. N. W. of Coblenz. N. lat. 50° 40'. E. long. 7'.

BONNA, in *Zoology*, synonymous with **BONASUS**; which see.

BONNAGHT, or **BONNAGH**, an old tenn, which occurs frequently in *Irish history*, and was the same with *coin and livery*; being a certain proportion of meat, drink, and money for the maintenance of a soldier, and sometimes free quarter. Hollingshead speaks of it as an Irish imposition, which beggared the farmers; and sir John Davis, the eminent attorney-general of Ireland in the reign of James I. in his justly admired tract, entitled "A Discovery of the Causes, why Ireland was never subdued," has these words: "But the most wicked and mischievous custom of all others, was that of *coin and livery*, which consisted in taking of man's meat, horse meat, and money, of all the inhabitants of

of the country, at the will and pleasure of the soldier, who, as the phrase of the Scripture is, *did eat up the people, as it were bread*, for that he had no other entertainment. This extortion was originally Irish, for they used to lay *bonnaght* upon their people, and never gave their soldiers any other pay. But when the English had learned it, they used it with more insolence, and made it more intolerable; for this oppression was not temporary, nor limited either to place or time, but because there was every where a continual war, either offensive or defensive, and every lord of a country, and every marcher, made war and peace at his pleasure, it became universal and perpetual, and was indeed the most heavy oppression that ever was used in any Christian or Heathen kingdom." The curious reader will do well to consult the whole passage in Sir J. Davis's Historical Tracts, p. 132. et seq. of the edition printed in 8vo. Dublin, 1787. This practice was forbiddea by the statute of Kilkenny passed in 1450, and by several succeeding acts, in one of which (under Henry VII.) it is called a *damnable custom*. Spenser, in his "View of the state of Ireland," seems, however, to think the statute unnecessarily severe in making it treason. Hollingshead. Irish Statutes. Spenser's State of Ireland.

BONNART, JOHN, in *Biography*, barber surgeon, and master of the college of surgeons at Paris, published, in 1629, "La Semaine des medicamens observée, et chefs d'œuvres des maitres barbiers chirurgiens de Paris," 8vo. It contains a course of study necessary for young men previous to their being elected into the college, with observations on the method of treating such complaints as come under their care. The author strongly recommends opening the jugular vein in cases of quinley. "Methode pour bien feigner les accidens qui arrive pour etre mal fait," 8vo. 1628. Haller Bib. Med. Eloy.

BONNAT, in *Geography*, a town of France, and chief place of a canton, in the department of the Creuse, and district of Gueret; the place contains 2032, and the canton 10,804 inhabitants; the territory comprehends 257½ kilometres, and 12 communes.

BONNAUD, in *Biography*, published, in 1770, "Degradation de l'espece humaine par l'usage des corps de baleine," 12mo. Paris. In this very sensible and ingenious little work, the author forcibly represents the various evils consequent on using staves stiffened with whale-bone: these are indigestion, and other disorders of the stomach, ruptures, and difficult respiration, often terminating in consumptions; besides, they not unfrequently occasion deformity of the body, which they are supposed by their admirers to contribute in preventing. Haller Bib. Med.

BONNAY, in *Geography*, a town of France, in the department of the Doubs, and chief place of a canton, in the district of Besançon, 2 leagues N. of Besançon.

BONNE, a town of Savoy, in the Lower Faucigny, 10 miles E. S. E. of Geneva. N. lat. 46° 11'. E. long. 6° 7'.

BONNE, a bay on the west coast of Newfoundland. N. lat. 49° 35'. W. long. 53°.—Also, a bay on the coast of Spain in the Mediterranean, nearly east from Malaga. N. lat. 36° 42'. W. long. 2° 40'.

BONNEBOSQ, a town of France, in the department of the Calvados, and chief place of a canton, in the district of Pont l'Evêque, 2 leagues S. W. of Pont l'Evêque.

BONNEFONS, JOHN, or BONNEFONIUS, in *Biography*, was born, in 1554, at Clermont in Auvergne, became an advocate in Paris, and, in 1584, lieutenant-general at Bar-sur-Seine, and died in 1614. He was distinguished as a Latin poet, and particularly by that kind of poetry, which

is the short verse of Catullus, abounding with diminutives and tender expressions. Of this kind is the piece entitled "Pancharis," which is reckoned the most elegant performance of any modern writer. It seems to have been the aim of Bonnefonius to imitate Joannes Secundus, the celebrated author of the *Basia*; and his resemblance, with regard to softness and sweetness, has approached the extreme of lasciviousness and effeminacy. His poems in heroic verse have also been esteemed. The *Pancharis* was published at Paris in 1588, and translated into French by La Bergerie; and all the poems of Bonnefonius are printed after those of Beza, in Barbon's edition of the latter, Paris, 1757. There are London editions in 1720 and 1727. A son of Bonnefonius distinguished himself by Latin poetry, chiefly written on public characters and events. *Nouv. Dict. Hist.*

BONNER, EDMUND, an English prelate of detestable memory as a persecutor of Protestants, was born, as it is generally believed, of poor parents at Hanley, in Worcestershire; but some have affirmed that he was the natural son of George Savage, rector of Davenham, in Cheshire. About the year 1512, he was admitted a student of Broadgate hall (now Pembroke college) in the university of Oxford, famous at that time for the education of civilians and canonists. In 1519, he took his degrees of bachelor of the canon, and bachelor of the civil law; and about the same time entered into holy orders. In 1525, he was created doctor of the canon law. More distinguished by his talents for business than for his learning, he was appointed commissary of the faculties by cardinal Wolsey, who conferred upon him a plurality of ecclesiastical benefices. After the cardinal's death, he contrived to insinuate himself into the favour of king Henry VIII., and became a zealous promoter of the reformation, as well as an advocate for the king's divorce from queen Catharine, and a strenuous supporter of the measures that were adopted for abolishing the pope's supremacy in this kingdom. He was also patronized by Cromwell, secretary of state, and employed as ambassador at several courts. In 1532, he was deputed on an embassy to Rome, to excuse the king's appearance to a citation at that court; and in 1533, he was sent to pope Clement VII. then at Marfeilles, to deliver the king's appeal from the pope to the next general council against his excommunication; and on this occasion he exposed himself by his boldness and indecent warmth to personal danger. He was likewise employed in other embassies to the kings of Denmark and France, and to the emperor of Germany. Being recalled from France in 1538, on account of the boldness with which he remonstrated against the protection afforded to an English traitor, he was nominated to the bishopric of Hereford, and, before his consecration, translated to the see of London in 1539. At the time of the king's death in 1547, he was ambassador at the court of Charles V. Till this time he appears to have concurred in promoting the reformation; and by the subserviency of his principles to his interest, as well as by his capacity for public business, he secured the favour and confidence of his tyrannical master. But from his subsequent conduct it is evident that he was secretly attached to the Romish religion; for soon after the accession of Edward VI., he scrupled to take the oath that was required for renouncing the pope's authority, and he protested against the king's injunctions and homilies, which, however, he had never read. But being committed to prison for disobedience, he afterwards recanted, and was released. Whilst he outwardly professed zeal for the reformation, he privately used all the means in his power for obstructing its progress and establishment. His conduct warranted the suspicions that were entertained of his sincerity; and in order to bring it to a test, he

he was ordered by the privy council to preach at St. Paul's cross on certain articles, connected with the principles of the reformation, and given to him in writing. But he performed this service in a manner so unsatisfactory, that, upon the complaints of Hooper and Latimer, commissioners were appointed to proceed summarily against him; the result of which was, that he was committed to prison, and deprived of his bishopric. These proceedings, allowed even by his enemies to be arbitrary and severe, roused his resentment; nor was he long obliged to wait for an opportunity of ample retaliation. Upon the accession of Mary to the throne, he was restored to his bishopric, by a commission dated August 1553; and in the convocation of the following year, he was appointed president in the room of Cranmer, who was committed to the tower. In this year he visited his diocese, and industriously rooted up all the seeds of the reformation. In the four succeeding years he was an active and savage persecutor; and he is said to have committed to the flames 200 persons, who avowed their firm adherence to the protestant religion, and who refused to embrace the gross errors of popery, besides imprisoning and torturing many more. Bonner's disposition was in the highest degree cruel and ferocious; and religious bigotry, grafted on a temper naturally savage, rendered him a fit instrument to be employed by the artful Gardiner in the condemnation and execution of heretics. But though his nature did not seem to recoil at this savage employment, he dreaded the increased odium that attended it, and refused any longer to be the executioner of the laws. However, in 1556, he concurred in the degradation of Cranmer, and enjoyed the malignant pleasure of triumphing over him with his usual insolence. In the following year his name was inserted in a kind of inquisitorial commission for searching after, and punishing all heretics, as all persons who were of the protestant religion were then denominated. Upon the accession of Elizabeth, he had the effrontery to accompany the other bishops in their progress for meeting her at Highgate; but she looked upon him with feelings of just indignation and horror, as a man polluted with blood. He remained for some months unmolested; but in May 1559, he was summoned before the privy council; and refusing to take the oaths of allegiance and supremacy that were tendered to him, he was deprived of his bishopric, and committed to prison. In this state of confinement he remained for some years, bearing his reverse of condition with a degree of cheerfulness which might have become a better man, and occasionally warding off, by keen and humorous repartees, the popular insults that were offered him. He died in prison, September 5, 1569; and was buried at midnight in St. George's church-yard, Southwark, lest any indignities should be offered to his remains by the incensed populace. Bonner was singularly savage in his natural temper, blustering and prophane in his conversation and manners, furious and violent in his conduct, gross and corpulent in his person, and in every respect fitted for the part he acted, as an unrelenting and brutal persecutor. He was generally regarded as a devotee of any fixed principles; and he has been charged even with Atheism. As a canonist and politician he was allowed to excel; but his knowledge of divinity was very imperfect, and he had no reputation for learning. However, several pieces, theological, controversial, and pastoral, were published under his name. By his interest with queen Mary, he obtained several advantages for the see of London, which his successors have enjoyed. *Biog. Brit.*

BONNET, CHARLES, an eminent natural philosopher, was born at Geneva in 1720, and educated under a domestic tutor, whom his father provided for him, as affording super-

rior advantages to those which he enjoyed in any of the public schools. At the early age of 16, he discovered that peculiar inclination of his mind, which led him to those studies that laid the foundation of his future fame and excellence. From the perusal of the *Speçtaele de la Nature*, he was induced to direct his particular attention to the structure and manners of the ant-lion, and added many curious observations relating to it, to the facts that had been previously collected by Mess. Poupard and Reaumur; and he was further led by the *Memoirs on Insects*, published by the latter, to repeat many of his experiments, and to discover new facts, which indicated in a youth of 18 a degree of sagacity and research that surprised and gratified this eminent naturalist, by whom he was encouraged to proceed. The interesting observations which he made on different species of caterpillars, and other insects, in the years 1738 and 1739, were communicated by him to Reaumur. His father had destined him to the profession of the law; but the study of natural history was his chosen and favourite employment. Having, in 1740, decided a question that had been left unsettled by Reaumur, respecting the multiplication of tree-lice, or aphides, without actual conjunction, he communicated a paper on this subject to the Academy of Sciences at Paris, and in consequence of it, had the honour of becoming a correspondent of that illustrious body. His eyesight was irreparably injured by the minuteness of his researches on the generation of these animals. In 1741, he found that many species of worms possess, in a degree, the reproductive power of the polype; and in 1742, he discovered that the respiration of caterpillars and butterflies, was effected by means of their pores called "Stigmata." The tænia, or tape-worm, was also a subject of his successful investigation. In 1743, he was advanced to the rank of doctor of laws, and on this occasion he totally abandoned the profession of the law. A paper on insects, which was this year communicated to the Royal Society of London, obtained for him the honour of being elected a member. His observations on aphides and worms, under the title of "*Insectology*," were published in 1744; and this work was introduced with a preface, in which he gave a brief sketch of his ideas concerning the developement of germs, and the scale of organized beings. This work was very favourably received by the public; but such had been the nature of his researches and the assiduity of his application, that his eyes and his health failed him; and he was reduced to the distressing necessity of laying aside his microscope, and of desisting from reading and writing. This self-denial, peculiarly afflictive to his ardent mind, he bore, however, with philosophical resignation; and by a total intermission of his studies he had the satisfaction of regaining a considerable degree of health and ease, though he was never able to employ his eyes as he had been accustomed to do. In 1746, he commenced a course of experiments on the vegetation of plants in moss and other singular substances; and in the following year he examined with minute attention the leaves of plants, with a view of ascertaining the appropriate action of their upper and under surfaces. He also employed coloured injections for the purpose of determining whether the sap ascends by the bark or wood; and he made various observations on vegetable monsters, and other circumstances of vegetation, which were communicated to the public in one of the most curious and original of his works, entitled, "*Inquiries into the use of the leaves of plants*," first published at Leyden, in 1754, 4to.; to which supplements have been added as late as the year 1779.

Bonnet, probably constrained to remit his attention to experiments by the circumstances already mentioned, directed

his speculative researches to the faculties of the human mind; and having collected a mass of materials on this subject, he published a kind of abridgment of them, under the title of an "Essay on Physiology," in 1755, at London. This work, which appeared without his name, and which he did not acknowledge for 30 years, contains a concise statement of the fundamental principles of his philosophy. "It traces the origin and progress of the human mind, from the first germ of life, to the development of all its faculties, the mutual dependence of which it points out, as deduced from actual observation. It enters into the difficult subject of human liberty, and endeavours to reconcile it with the divine prescience, and with the philosophical principle, that every effect must have an adequate cause. From the essential properties of the activity of the soul, and the effects of habit upon it, the whole art of education and government is deduced; and a system of the former is laid down, materially different from the usually established methods." Our author's metaphysical ideas were evidently founded on the principles of Malebranche and Leibnitz; but as he had freely discussed some points of a delicate nature, and which were likely to involve him in personal controversy, he chose to conceal his name. His next work, the fruit of five years' labour, was an "Analytical Essay on the faculties of the Soul," first printed at Copenhagen in 1760, 4to. at the expense of the king of Denmark. In this work he assumes the hypothesis of a statue organized like the human body, which he animates by degrees, and shews how its ideas would arise from impressions on the organs of sense. Although this performance was well received by some philosophers, it soon subjected the author to the charge of materialism and fatalism; but to this charge he made no reply. Accustomed to retirement, to which mode of life he was obliged to recur, on account of his deafness and other bodily infirmities, he sought the comforts of a domestic life; and in 1759, he married a lady of respectable family, the aunt of the celebrated Sauffure, with whom he passed 37 years of connubial felicity. In the prosecution of his physical system, Bonnet published at Amsterdam in 1762, his "Considerations on organized bodies," 2 vols. 8vo. The principal objects of this work were, to detail, in an abridged form, all the most interesting and well ascertained facts, respecting the origin, development, and reproduction of organized bodies; to refute the different systems founded upon "epigenesis;" and to explain and defend the system of germs. His "Contemplation of Nature," which appeared in 1764, Amst. 2 vols. 8vo., was a popular work, displaying the principal facts relating to the different orders of created beings, in an instructive and entertaining manner, and recommended by the charms of an eloquent style, with a constant reference to final causes, and the proofs of wisdom and benevolence in the creator. This was translated into several European languages, and enriched with notes by the author himself, and also by others, in a new edition. His concluding work was his "Palinogénie Philosophique," printed at Geneva in 1769, 2 vols. 8vo. This treats on the past and future state of living beings, and supports the idea of the revival of all animals, and the perfecting of their faculties in a future state. To this work he annexed "An inquiry into the evidences of the Christian revelation, and the doctrines of Christianity, which, with a piece "On the existence of God," was published separately at Geneva in 1770.

Towards the year 1773 he resumed his attention to natural history, and published, in Rozier's journal, a memoir on the method of preserving insects and fish in cabinets. In the following year he sent to the same journal a memoir on

the loves of plants, originating in the discovery of a kind of cleft or mouth in the pupil of a lily. Other memoirs contained a detail of his experiments on the reproduction of the heads of snails, and of the limbs and organs of the water salamander. He also made observations on the pipa or Surinam toad, on bees, on the blue colour acquired by mushrooms from exposure to the air, and on various other subjects in natural history. His reputation introduced him as an associate into most of the literary societies of Europe; and in 1783 he was elected into the select number of foreign associates of the academy of sciences in Paris. His correspondence was extensive, and his attention to public duties exemplary. In the great council of the republic into which he entered in 1752, and in which he had a seat till 1768, he distinguished himself by his manly eloquence in the support of wise and moderate measures, and his constant zeal in the cause of morals and religion, with which, in his opinion, the prosperity of the state was essentially connected. The last 25 years of his life were spent altogether in the country, where he enjoyed, with a competence, the intercourse of chosen friends. Some part of his time was employed in the education of youth, for which office he was admirably qualified. The revival of his works occupied near eight years of his life, and required a degree of application which was injurious to his health. This collection appeared at Neuchâtel, in 9 vols. 4to. or 18 vols. 8vo. and contains, besides the works already mentioned, several smaller pieces in natural history and metaphysics. They are all written in French. Towards the year 1788 he manifested alarming symptoms of a dropsy in the breast; and these became more aggravated in process of time, and occasioned a variety of sufferings which he endured with patience and serenity, till at length he was released by death, May 20, 1793, at the age of 73 years. Public honours were rendered to his remains by his fellow citizens: and his funeral eulogy was pronounced by his illustrious friend and kinsman, M. de Sauffure. *Mem. pour servir à l'Hist. de la Vie et des ouvrages de M. Charles Bonnet; Berne 1794. Gen. Biog.*

BONNET, JACQUES, published, in 1726, at Amsterdam, "Histoire de la musique," the history of music and of its effects, from its origin to the present time, explaining, in what its beauty consists, 4 vols. 12mo. This history was at first undertaken by the abbé Bourdelot, uncle to the editor of this work, and distinguished by his erudition. Bonnet, Bourdelot, brother of Bonnet, the first physician to the dukes of Burgundy, continued it after the death of his uncle, and at length arranged and digested the materials which he found among the MS. papers of his uncle and his brother. Indeed the first volume only was written by Bonnet; the three last were compiled in a patriotic fury by Frensch, a physician, in 1705; who died in 1707, in the flower of his age, having only arrived at his 33d year. He seems to have been wholly stimulated to this undertaking by the abbé Ragenet's parallel between the music of the Italians and the French, which, though written with the utmost circumspection and civility to France, M. Frensch thought too favourable to Italy; and instead of a continuation of the history of music, has given us nothing but a violent philippic against the abbé Ragenet, for daring to draw a parallel between the music of France and Italy, and a censure of all the most illustrious Italians of the 17th century, such as Carissimi, Luigi Rossi, Scarlatti, and Corelli; and setting up Lulli against them all, has formed his refutation of the abbé into three dialogues; in which two of the interlocutors are champions for Lulli, and only one, and that a lady, neither a deep logician, nor a powerful advocate for the Italians, is the heroine that undertakes their defence. But the poor Italians have no quarter

far given them; not only their music and fingering, but even their language is censured for its elisions, its metaphors, its similes, construction, and inverted phrases.

The execution of the Italians he compares to the dexterity of the soldier who was brought to Alexander, to exhibit a trick which he had acquired by infinite pains and practice, of chucking a pea into a distant hole which just fitted it. When all the reward which the great conqueror bestowed upon the soldier for his useless application of time was, to order him a peck of peas.

Indeed all the praise that is due to Bonnet for the first part of what he calls a history of music, is, the having collected materials towards a history of the art; but he was no musician, and equally unable to explain the theory of the ancients as the practice of the moderns; so that his work is totally devoid of taste, order, and useful information.

BONNET, or BONET. THEOPHILUS, an eminent and respectable practising physician, and voluminous writer in medicine, of Geneva, where he was born, March 5th, 1620. Following in the steps of his father and grandfather, he early attached himself to the practice of physic. After visiting several foreign academies, he was admitted doctor in medicine at Bologna, in 1643, and was soon after made physician to the duke de Longueville. Though he soon attained to high credit in his profession, and had a large share of practice, he dedicated a considerable portion of his time to reading, and to dissecting such subjects as the hospital afforded him, with a view of discovering the seats of the diseases, under which the patient had laboured; mistaking every deviation he observed from the natural structure of the viscera, or other parts of the body, and thus opening a new road for improving the science he cultivated. He also appears to have made extracts of every thing he deemed worthy of notice, from the various works he read. His hearing from some accident becoming defective, he withdrew from practice, and employed the last ten or twelve years of his life in arranging the materials he had collected. The first fruit of his labour, which he gave to the public, in 1668, was "Pharos medicorum," 2 vols. 12mo. This was printed again, much improved and enlarged, in 1679, in 4to. under the title of "Labyrinthi medici, extricati," &c. compiled principally from Bellonius and Septalius. In 1675, "Prothromus anatomice practicae, five de abditis morborum causis," fol.; the precursor of his principal work, "Sepulchretum, seu anatomie practicae, ex cadaveribus morbo denatis proponens historias et observationes," &c. 2 vols. fol. Gen. 1679, which far exceeded the expectation raised by the prodromus. It was enlarged by nearly a third part, and republished by Manget, 2 vols. fol. 1700, and was afterwards taken by Morgagni, as the basis of his work, "De sedibus, et causis morborum," by which the sepulchretum is in a great measure superseded. The author begins with observations on the appearances of the brain and other parts of the head; then of the contents of the thorax, abdomen, and pelvis; and lastly, of the extremities; forming an immense body of dissections, which he has illustrated by many pertinent and ingenious observations. "Cours de médecine, et de la chirurgie," 2 vols. 4to. 1679. An epitome of the art of surgery, with some sections relating to the practice of medicine, selected from the most accredited authors of the age. "Medicina septentrionalis, collectitia," 2 vols. fol. 1684. Shewing how largely the practitioners of the northern parts of Europe, Sweden, Denmark, Germany, Holland, and England, have contributed to the improvement of anatomy, surgery, and medicine, by extracts and accounts of the works of the principal writers of those countries. "Mercurius compilatitius, seu index medico-practicus, decisiones,

cautiones, observationes in singulis affectibus, &c. ostende istam medendi viam," fol. 1682. A most useful work, shewing under the name of every disease or affection where cases or observations may be found, and what authors have written upon them. Such an index continued to the present time, though very voluminous, would be highly useful. Bonnet also published "Epitome operum Sennerti," fol. 1685, and "J. D. Turqueti de Mayerne, de Arthritide," 1671, 12mo. and "Robaulti tractatus physicus, e Gallico in Latinam versus," 1675, 8vo. He died of a dropsy, March 3, 1689. Hall. Bib. Med.

BONNET, in a general sense. See CAP, HAT, MITRE, &c.

BONNET, in *Fortification*, a kind of little ravelin, without a ditch, having a parapet three feet high; anciently placed before the points of the salient angles of the *glacis*; being palisadoed round; of late also used before the angles of bastions, and the points of ravelins, and faussebrayes. See *Plate Fortif.*

The bonnet has two faces, from ten to fifteen, or more rods long: the parapet is made of earth, from thirty to thirty-six feet thick, and from nine to twelve feet high; it is environed with a double row of palisades ten or twelve paces distant from each other; hath a parapet three feet high, and is like a little advanced *corps du guard*.

BONNET à prêtre, or *priest's cap*, is an outwork, having at the head three salient angles, and two inwards.

It differs from the *double tenaille* only in this, that its sides, instead of being parallel, grow narrower, or closer at the gorge, and open wider at the front; on which account it is also denominated *queue d'aronde*, or swallow's tail.

BONNET, in *Geography*, a river of the county of Leitrim, in Ireland, which passes within four miles of Lough Clean, from which the Shannon issues, and carries boats into Lough Gilly, and thence into Sligo bay. Dr. Beaufort observes, that the day may come, when the spirit of enterprise and commerce will open itself a passage by this channel also. Beaufort.

BONNET, *St.* a town of France, in the department of the Higher Alps, and chief place of a canton, in the district of Gap, 2½ leagues N. of Gap. The place contains 1508, and the canton 10,284 inhabitants; the territory comprehends 245 kilometres, and 20 communes.

BONNET le Chateau, *St.* a town of France, in the department of the Loire, and chief place of a canton, in the district of Montbrison, 4 leagues S. of Montbrison. The town contains 1506, and the canton 12,945 inhabitants. The extent of the territory includes 192½ kilometres, and 10 communes.

BONNET le Castel, *St.* a town of France, in the department of the Pay de Dôme; 5 leagues N. E. of Brioude.

BONNET de Bruyères, *St.* a town of France, in the department of the Rhone and Loire, and chief place of a canton, in the district of Villefranche, 6 leagues N. of Villefranche.

BONNET de Chavagne, *St.* a town of France, in the department of the Isere, and chief place of a canton, in the district of St. Marcellin, 1½ league S. W. of St. Marcellin.

BONNET de Joux, *St.* a town of France, in the department of the Saône and Loire, and chief place of a canton, in the district of Charolles, 2½ leagues N. E. of Charolles. The town contains 1321, and the canton 6140 inhabitants; the territory comprehends 160 kilometres, and 7 communes.

BONNET, in *Heraldry*, a cap of velvet worn within a coronet.

BONNET pepper, in *Botany*. See CAPSICUM ANNUUM.
BONNET, in *Sea-Language*, an additional part of a sail.

fixed at the bottom or foot of the fore-sail, try-sail, and storm main-sails, of some vessels with one mast, in moderate winds. It is made like the foot of the sail for which it is intended, and has latches in the upper part, to correspond with and fall through holes in the foot of the sail, by which it is fastened.

The words in reference to it are, *lace on the bonnet*, that is, fasten it to the course; *shake off the bonnet*, that is, take it off the course.

BONNET *chinois*, in *Conchology*, is the common or trivial name applied by French collectors to the *PATELLA CHINENSIS*, in the same manner as we should call it in English the *Chinese bennet*, or limpet shell; thus also the French *Bonnet de Pologne*, for the *Limæan Buccinum testiculus*, &c.

BONNET *chinois*, in *Zoology*, the French name of *SIMIA SINICA*, Gmel. or Chinese ape of Pennant's synopsis, a species that inhabits the country of Bengal. See *SINICA*. Obs! The same animal is called *Gucnon couronnee*, by late French writers.

BONNETABLE, in *Geography*, a town of France, in the department of the Sarthe, and chief place of a canton, in the district of Mamers. The place contains 4587, and the canton 11051 inhabitants; the territory comprehends 105 kilometres, and 10 communes.

BONNETELLA, in *Entomology*, an European species of *TINEA*, described by Linnæus, in *Fn. Succ.* Fabricius and others. The wings are white, with two little silvery lines, the posterior one of which is waved.

BONNETIA, in *Botany*, (in honour of Charles Bonnet of Geneva,) Schreb. 915. Willden 1050. *Mahuria Aublet* 222. Juss. 434. *Encyc. method.* Class and order, *Polyandria Monogynia*. Nat. Ord. uncertain. Juss. *Gen. Char. Cal.* of one leaf deeply divided into five ovate, acute, concave segments, two larger than the others. *Cor.* petals five, ovate, somewhat obtuse, concave, longer than the calyx, the three superior smaller, upright; two lower larger, inclined, at a distance from each other. *Stam.* filaments very numerous, inserted into the receptacle, shorter than the coroll, dilated at the top. Anthers yellow, oblong, tetragonal. *Pist.* germ superior small, oblong. Style incurved. Stigma hollow, three-lobed. *Pericarp.* capsule dry, membranous, oblong, three-celled, three-valved, valves sharp pointed. *Seeds* many, small, black, oblong, involved in a coloured membrane, affixed to the three-sided receptacle.

Ess. Char. Cal. five-parted, two parts larger. *Cor.* five-parted, three smaller upright, two larger inclining. *Caps.* oblong, three-celled, three-valved, many-seeded.

Species. B. palustris. Lamark. *Illust. tab.* 464. A tree fifteen feet high, seven or eight inches in diameter; branches upright, chiefly towards the top of the trunk; leaves alternate, petioled, ovate, entire, smooth; petioles channelled, with two small stipules at their base; flowers purple, spiked, one, two, or three together, furnished with three icaly bractes, one larger at the base of the peduncle, the two others lateral. A native of Cayenne and Guiana.

BONNEVAL, CLAUDE-ALEXANDER, *Count of*, in *Biography*, a descendant of an ancient family of Limousin, was born in 1672, and having entered betimes into the army, served with distinction in Italy under Catinat and Vendome. Abandoning his country in 1706, and entering into the service of the emperor, a sentence was procured against him by the minister Chamillart, which subjected him to decapitation. Notwithstanding this proscription, he ventured to Paris, and publicly married a lady of the family of Biron. In 1716 he served against the Turks under prince Eugene, and was a major at the battle of Peter-Waradin, where he behaved with singular valour; but in 1720 he had a dis-

pute with prince Eugene, and challenged him, for which offence he was deprived of his employment, and condemned to a year's imprisonment. Upon regaining his liberty he meditated revenge, went over into Turkey, became a musk-man, and was created a bashaw of three tails, general of artillery, and at last master of the ordnance. In this situation he introduced European improvements among the Turks, and lived much esteemed to the age of 75 years. He left a son, who succeeded him in the office. He was a man of quick parts, courage, and ability; but singular in his conduct, quarrelsome in his disposition, and addicted to satire. Upon changing his religion, he said, "It was only changing his night-cap for a turban." With all his eccentricities he preserved a calm temper; and said, "In all my persecutions I never lost my appetite or good humour. Happy those who have philosophy in their blood!" His "True Memoirs," and his "New Romantic Memoirs," were published in London, in 1755. *Nouv. Dict. Hist.*

BONNEVAL, in *Geography*, a town of France, in the department of the Eure and Loire, and chief place of a canton, in the district of Chateaudun, seated on the Loire. The place contains 1551, and the canton 10,638 inhabitants; the territory comprehends 337½ kilometres, and 27 communes.

BONNEVILLE, a town of Savoy, the chief place of a district in the department of Lemau, and before the French revolution, the capital of Faucigny, seated on the banks of the Arve, at the bottom of a chain of rocks, which from this place diminish into hills. The adjacent country is a rich plain, producing plenty of wine and corn, but neither populous nor well cultivated. The place contains 990, and the canton 9286 inhabitants; the territory comprehends 165 kilometres, and 15 communes. N. lat. 46° 11' E. long. 6° 15'.

BONNEVILLE-des-Bouchoux. See **BOUCHOUX**.

BONNIE RES, a town of France, in the department of the Seine and Oise, and chief place of a canton in the district of Mantua; the place contains 769, and the canton 11,984 inhabitants; the territory comprehends 207½ kilometres and 27 communes.

BONNY, a town of France, in the department of the Loiret, and chief place of a canton in the district of Gien; containing about 1300 inhabitants; 3 leagues S.S.E. of Gien.

BONNY, a river of North Africa, which forms the æstuary of New Calabar, in the kingdom of Benin, discharging itself into the bay of Biafra. N. lat. 4° 40'. E. long. 6° 30'.

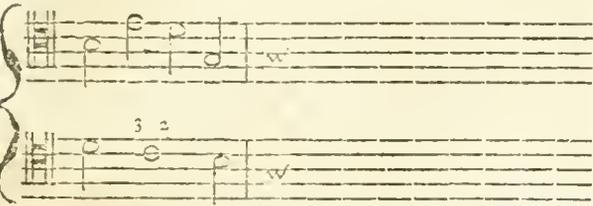
BONNY, in *Mineralogy*, a name given by our miners to a bed of ore found in many places in hills, not forming a vein, nor communicating with any other vein, nor terminating in strings, as the true veins do; it is a bed of ore of five or six fathoms deep, and two, or somewhat less than that, in thickness, in the larger sort; but there are smaller, to those of a foot long. They have their trains of float-stones from them, and often deceive the miners from the expectation of a rich lead vein. They differ from the squatts only in being round beds of ore, whereas those are flat. *Phil. Trans.* N° 69. p. 2098.

BONO *et malo*, *Writ, de*, in *Law*, a special writ of gaol-delivery was anciently used for each particular prisoner under this title: but these being found inconvenient and oppressive, a general commission for all the prisoners has long been established in their stead. 2 *Inft.* 43.

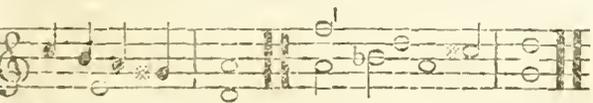
BONONCINI, GIO. MARIA, in *Biography*, Modanese Accademico Filarmonico di Bologna, and father of the celebrated John and Anthony Bononcini, published in 1673, a

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work entitled "Il Musico Pratico," or the Practical Musician, dedicated to the emperor Leopold, in thin quarto. This treatise contains many useful precepts and examples of composition; but is neither so accurate as to be implicitly followed, nor so ample as to supply all the wants of a musical student of the present times. Page 18, he speaks of a canon, in his opera terza, for fifteen hundred and ninety-two voices, or six hundred and forty-eight choirs; which, on account of the difficulty of finding such a number of singers, assembled together, he has reduced to twenty-two. In the historical part of this tract, his knowledge is not very profound, or reading extensive; and the authors he cites, in support of his information, give it no additional weight. The examples he has given of the use of the second, page 64, are, in many instances, erroneous, and such as can be found in the works of no good contrapuntist of the last century. The second is not only confounded with the ninth by this author, page 64, but improperly prepared and resolved.



This discord of the second seems to require one of the parts to remain stationary, till the suspended harmony is completed; but Bononcini often puts both parts in motion. In his example of counterpoint upon a plain song, page 76, there are other disallowances.



Much explanation and instruction are given for the ecclesiastical modes, but none of the keys, used in secular music, are defined or ascertained.

BONONCINI, JOHN, the celebrated opera composer and rival of Handel, was the son of Gio. Maria Bononcini, of Bologna, the subject of the preceding article. He first arrived in England in 1720, on the establishment of our famous "Corporation of the Royal Academy of Music," under the auspices of king George I. and the principal nobility and gentry in the kingdom; for the support of which 50,000*l.* were subscribed. We have now before us the original deed and covenant, with the seal and sign manual of all the subscribers, who became academicians, and bound themselves and their respective executors, administrators and assigns, to pay all such respective sum or sums as shall from time to time be demanded out of their subscription, &c. The king subscribed 1000*l.* and the rest, to the number of 73, in this original list, 200*l.* each.

It is a curious record to be in possession of the autography of such a number of the heads of our most ancient and illustrious families thus preserved. It is not, indeed, equally

important or honourable with the list of the barons who signed the Magna Charta; but it is such a memorial of our prosperity, good-humour, patronage of a polite art, and happiness, that we would give a fac-simile of each signature on a copper-plate, if we had room.

In order to render this academy as complete as possible, it was determined by the directors not only to engage a lyric poet in their service, but the best vocal performers that could be found in the several parts of Europe where there was a musical theatre, and the three most eminent composers then living who could be prevailed upon to visit this country. For this purpose Bononcini was invited from Rome, as he tells us himself, in the dedication of his Cantatas and Duets to George I. (*Qui mi trovo, eliamata da Roma per servizio della real Accademia di Musica*). Attilio Ariosti, from Berlin, was likewise engaged as a composer on this occasion; and Handel, who resided at this time with the duke of Chandos, at Cannons, was not only included in the triumvirate, but commissioned to engage the singers.

During the first year of this establishment, these three composers furnished new operas alternately, till January 1721, when, for dispatch, an act of the opera of Muzio Scavola was assigned to each of these masters; the first act to Attilio, probably from seniority, as he was far from young when he came hither; the second act to Bononcini, at that time about 50; and the third to Handel, the youngest of the three.

As this division of the drama seemed to imply a contention and trial of skill, the public took sides, perhaps less from feeling than the spirit of party; for party whets our appetites for pleasure as well as politics. Many of the nobility and gentry, who had been in Italy, and had witnessed the applause which Bononcini had received there as a composer, were partial to him here. While others who had visited the court of Hanover before the decease of queen Anne, and knew the favour in which Handel had stood with the elector, as a great performer on the organ and harpsichord, before his compositions were much known, and afterwards had heard his productions performed in London, were unwilling to be pleased with the compositions of his principal rival. Attilio, though a good musician, seems to have been out of the question; neither his same nor talents being equally splendid with those of the other two, by whom, and for whom, the conflict continued with as great a rage as between the houses of York and Lancaster, till the year 1727; when Bononcini, after the run of the last and best opera which he had composed in England, "*Astyanax*," quitted the contest with Handel, and ceased to write for the stage. But the feuds among the friends of these great musicians, which Swift's epigram had rendered so risible, did not end here, but continued as long as Bononcini remained in this country.

Here, as his biographer, it seems our duty to give his real character as a composer. He was seldom heard on the violoncello in this country, though as a performer on that instrument he was extremely admired in Italy; and his melody was, perhaps, more polished and vocal, though not so new as that of his powerful Saxon rival. Having been born and nursed in Italy, where singing was so highly cultivated, he was reported by all his countrymen to sing in a most exquisite taste. His recitative too, both in writing and utterance, was universally allowed to be the best of the time, and in the true genius of the Italian language; but as a correct, powerful, and inventive composer, he was an infant compared with Handel.

Of all the works which this celebrated composer published in England, his book of "*Cantate e Duetti*," dedicated to

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his majesty George I. in 1721, the year after his arrival here, seems the best. In 1722, his "Divertimenti da Camera, tradotti (translated or accommodated) pel Cembalo, da quelli composti pel Violino e Flauto," were published by himself, and sold at his lodgings in Suffolk-street. In these we meet with pleasing and masterly passages, but they are inferior in force, contrivance, and invention, to the lessons of Handel, that even his admirers, on a comparative view, must have regarded them as frivolous and trivial. The *adagios* are the best movements in them, and have notes of taste and passages of expression, which must have been then new to English ears. Bononcini, however, like other composers of his time, is very sparing of his passages, and indulges idleness and want of invention by frequent *rosalias*, or repetitions, which Handel seems always to avoid more than any composer of this period, except the Scarlattis, father and son. In several of these lessons the subject is heard in one part or other throughout a whole movement; as in the minuet, page 35, the first bar is perpetual.

His funeral anthem for the duke of Marlborough was set and performed the same year, 1722. The short symphony, and whole first movement are grand, and of a melancholy cast. The second movement has not much to recommend it. The third is more languid, than passionate or pathetic. The fourth is plaintive, but was not new at the time it was written. The fifth and last movement has musical merit, but none of true feeling, or genius; no "heart-rending sighs," or such exclamations of sorrow and affliction as would naturally be expected from a man of great abilities, who either felt the words or the loss of his patron.

Bononcini was a celebrated and voluminous composer long before he arrived in England: his eighth work, consisting of "Duetti da Camera," was dedicated to the emperor Leopold, and published at Bologna in 1691. The seven operas he composed during his residence in England, make but a small part of his dramatic productions. He produced two operas at Rome in 1694; after this he went to Vienna, where he composed many operas and oratorios for the imperial court and chapel. In 1720, he was again in high reputation as a dramatic composer at Rome, whence he was invited to London by the directors of the Royal Academy of Music. In 1732, he published "Twelve Sonatas for two Violins and a Bass." It was about this time that he was accused of arrogating to himself a madrigal composed by Lotti of Venice, and published in that city in 1705, in a work entitled "Duetti, Terzetti, e Madrigali a più Voci," dedicated to the emperor Joseph. The title of the madrigal is "La vita caduca," and has for initial line "In una siepe ombrosa." We are in possession of the book in which this composition was printed, and, upon examination, are extremely astonished that Bononcini would risk the great reputation of which he was already in possession, for a production which could increase it so little. The counterpoint of this madrigal is certainly correct, but it is dry, and all the subjects of fugue are such as had been used by thousands before Lotti was born. There are many madrigals by much older masters, particularly Luca Marenzio, Stradella, and the elder Scarlatti, that are learned and pleasing in modulation, and more fanciful and agreeable in the traits of melody that are used as subjects of imitation. Indeed, Bononcini's plagiarism was as weak as wicked. We need not doubt the truth of the charge, from an idea that his reputation was so well established, and his genius so fertile, that he had not the least occasion to have recourse to such illicit means of extending it. The crime of theft is very much aggravated, when the thief is not impelled to it by want. Rich men and misers have, however, been often detected in illegal appropriation. Yet upon

a careful and critical examination of the works of John Bononcini, we think his wealth did not consist in rich and deep mines of science, nor were his resources in learned and elaborate composition, either in the ecclesiastical or madrigal style, very great. His performance on the violoncello, his cantatas, and his operas, had been admired in every part of Europe; but not content with partial fame, he aimed at universality. In his anthem for the funeral of the duke of Marlborough, he attempted to rival Handel in his grand church style; and finding in how much veneration well written madrigals were held at the Academy of Ancient Music in London, where Handel at this time was regarded as a modern, and an innovator, he was tempted to risk the reputation he had fairly acquired, by trying to augment it in an illegal manner. Tradition had filled our minds with ideas of his abilities, which the examination of his works has diminished; while a strict scrutiny into the productions of Handel has greatly augmented our veneration for that composer. We have now before us, in a printed pamphlet, all the letters that passed between the secretary of the Academy of Ancient Music and signor Ant. Lotti on this occasion, with such testimonies and certificates, from the most respectable professors at Venice and Vienna, in proof of the madrigal in dispute having been composed by that master and not by Bononcini, that not the least doubt remains of the fact.

Soon after the funeral of the duke of Marlborough, the countess of Godolphin, who, upon the decease of her father, became duchess of Marlborough, as settled in his patent of creation, received Bononcini into her house in the Stable-yard, St. James's, and settled on him a pension of 500l. a year. Here he lived in ease and affluence, enjoying as an artist the *otium cum dignitate* in its full extent; the duchess having concerts twice a week, in which no other music was performed to the first people in the kingdom than the compositions of her favourite master, executed by the principal fingers of the opera. It is supposed that he gained a 1000l. by the book of cantatas which he published by a two-guinea subscription; many of the nobility subscribing for five or ten copies; the duke and duchess of Queensbury for twenty-five books each, and the countess of Sunderland alone for fifty. After the dispute concerning this madrigal, his importance and reputation diminished considerably; and about the year 1733 he quitted the kingdom. After which he resided at Paris for several years, where he composed masses and motets for the chapel royal. At the conclusion of the peace of Aix la Chapelle in 1748, he was invited to Vienna by the emperor of Germany to compose the music for that occasion, and is said to have been presented with eight hundred ducats for his trouble. After the celebration of the peace was over, quitting Vienna in company with Monticelli, he set off in the same post-chaise with this celebrated singer for Venice; where they were both engaged, Bononcini as composer, and Monticelli as first man, in the operas for the ensuing Carnival in that city. Here we lose sight of this renowned composer; who if we suppose him to have been no more than thirty years of age in 1691, when his eighth work was printed at Bologna, and dedicated to the emperor Leopold, he must at this time have attained his eighty-seventh year; which will give weight to the general opinion, that his life was extended to near a century!

BONONCINI, ANTONIO, brother of John, and an opera composer, little less renowned in Italy, than the author of *Griselda* and *Affyanax*. It has always been imagined that the famous opera of *Camilla*, the second attempt at that species of drama in England, in 1706, was set by John Bononcini; but we can find no proof of it in any one of the numerous volumes of operas in our possession, or dramatic records

records that we have been able to consult. "Camilla Regina de Volsci," written by Stampiglia, and set by Marc Antonio Bononcini, the brother of John, for the imperial court of Vienna, about the year 1697, was in such favour all over Italy, that it was performed at Venice, 1698; Bologna, 1705; Ferrara, and Padua, 1707; Bologna again, 1709; Udine, 1715; and a third time at Bologna, 1719; and seems to have been the opera that was performed in England, during 1706, fifteen times; 1707, twenty; 1708, ten; and 1709, eighteen; in all sixty-four times!

BONONIA, in *Ancient Geography*, a town of Gallia Cispadana, called Felinae, at the time when the Etruscans were masters of the northern part of Italy, and then their capital; supposed by some to have been founded by an Etruscan prince, denominated Felinus. But when these first possessors were driven away by the Boians, it acquired the name of Bononia. In the year of Rome 564, the Romans conducted a colony to this place, with a view of fortifying this side of the country. It afterwards became a municipal city; and owed much of its magnificence to Augustus. See *BOZOGVA*.—Also, a town of Upper Pannonia, placed by Ptolemy on the Drave.—Also, a town of Dacia Ripensis. Not. Imp.—Also, a town of Upper Mœsia, in the route from Viminacium to Nicomedia, between Dortion and Ratiaria. It. Antonin.—Also, a town of Lower Pannonia, in the route along the Danube, between Cusi and Cucci, 19 miles from Sirmium, according to Ammianus Marcellinus.

BONONIAN STONE, a small, grey, soft, glossy, fibrous, ponderous, sulphureous stone, about the bigness of a large walnut, or even of an orange; when broken, having a kind of crystal, or sparry tale within; found in the neighbourhood of Bologna, or Bononia, in Italy; and, when duly prepared, making a species of phosphorus. It is of no certain figure; but is sometimes round, sometimes oblong and cylindric, and sometimes denticular, which last kind is said to be the most shining and transparent. Its colours are various; some being ash-coloured, others of a sky-blue, some of a ferruginous colour, others yellow, others greyish white, and some almost perfectly white. The best for use are said to be the sky-coloured and the white. This stone is found in several parts of Italy, but especially in the district of Bologna, towards the Apennine mountains, and on mount Paterno, or Paterno, about five Italian miles from Bologna. They are most commonly found after heavy rains, among the earth washed off from the neighbouring mountains. In this case the several masses of it appear, when the earth is washed away, as bright as burnished silver, or with the glittering of tale resembling the gloss of a looking-glass. This stone is the ponderous spar, or combination of vitriolic acid with ponderous earth. See *SPAR*.

A chemist, whose name was Vincenzo Casciarolo, having gathered some pieces in a river at the foot of mount Paterno, carried them home, in hopes by the fire to draw silver out of them; but instead of what he expected, found that admirable phenomenon they exhibit, which consists in this, that having been exposed to the light, they retain it, and shine in the dark. This discovery was made about the year 1630.

The property of this stone is, that though it has no lucid appearance in the dark, until it undergoes a particular calcination, it becomes capable, by previous preparation, of imbibing, when exposed for a few minutes to the light of day, or even to the flame of a candle, such a quantity of light, that it afterwards shines in the dark for an interval from eight to fifteen minutes, like a glowing coal, but without any sensible heat. The light it emits is sufficient to read by, if the letters be placed near it. It does not retain its light long, but requires often renewing; and when well prepared,

its virtue will last five or six years, but seldom longer. The method of using it to the greatest advantage, is to remain for some time in a dark room, and to introduce the calcined substance immediately after its being exposed to the light.

M. Homberg is said to be the first person who taught us the true manner of preparing and calcining the Bononian stone, having made a journey to Italy on purpose to learn it. Though others allege, that the true art of preparing and calcining the stone is lost; there having been but one, an ecclesiastic, who had the true secret, and who is since dead, without communicating it to any person. See *Phil. Trans* N 21.

M. Homberg, on his return from his travels in Italy, brought with him a great number of these stones, and calcined 200 of them in so many different ways, that he at last found out the secret. His method was as follows:—He first scraped the stone all over, till it appeared like tale; then, having soaked it thoroughly in brandy, and inclosed it in a paste or crust made of other stones of the same kind pulverized, he calcined it in the fire, or a small furnace. After this operation, he took off all the powder of the crust in which the stone was inclosed. Both the powder and the stone, when brought into the dark from the open air, make a luminous appearance; and the former, if kept in a strong and well-stopped phial, when exposed to the air, imbibes the light, and if sprinkled on pictures and letters, illuminates them in the dark. In preparing the paste, the stone must be pulverized in a brass mortar. This circumstance is mentioned by Lemery, who, in his "Cours de Chymie," describes at large the whole process of preparing this stone, which he acknowledges to have learnt from Homberg himself.

The whole art of preparing this stone, so as to make it shine in the dark, is described at large in Hook's "Philosophical Collections," by sir Marc Antonio Cellio; and in a book of the same author, published at Rome in 1740, on this subject; and the substance has hence been called "Il Fosforo de Marc Antoa. Cellio."

The following has been stated as an approved method of calcining this stone. Make a cylindric furnace of iron or copper plates, 7 inches in diameter, and as many in height. Line the inside of it with a strong lute, so that the inside may be 6 inches wide in the clear hollow; at the top of this make four notches, 2½ inches deep, and 1½ inch wide; to this annex a cylindrical part of the same diameter, but a little higher; and at the bottom make two ash-holes, or air-holes, big enough to admit the hand. Line this, like the other, with good lute, and give it a bottom of lute, that it may more powerfully reflect the heat; and line the cover for the top with lute. Into this furnace introduce an iron-wire grate near the bottom, for sustaining the coals, and so as to admit of free access of air. On this grate lay some pieces of lighted charcoal, and over these some pieces not lighted; all bruised to the size of about a walnut. Some of the stones must be powdered, and those which are to be calcined must be dipped in stroga aqua vitæ, and while wet rolled in the powder, or the powder itself may be made up into thin cakes with mucilage of gum tragacanth. The stones, thus covered, or the cakes, must be laid upon the bed of charcoal close to one another, and another bed of small pieces of charcoal laid over them to the top of the furnace; the cover of the furnace is then to be put on, and the fire lighted. When the charcoal is entirely consumed, and the whole is cold, take out the stones, and, separating the crust from them, wrap them up in silk or cotton, and keep them close in a box for use. Preserve the crust taken off the stones;

for this shines as well as the stone; and being pulverized, may be rubbed over any surface for emitting light, the surface being first daubed over with the white of an egg in order to make it adhere; and this will shine like the stone. This kind of furnace is not absolutely necessary to the operation; but it is convenient to know the quantity of charcoal requisite for giving the shining quality to the stone; since an excess of heat destroys it, and too small a degree is not sufficient to produce it. The greatest degree of phosphorence seems to depend on a due application of the heat. An extreme degree of heat fuses the stone. For other methods of preparing this kind of phosphorus, see PHOSPHORUS. See also LIENT.

This property of affording a phosphorus by calcination, is common to the other gypsums, when pure from metallic or other heterogeneous mixtures; the artificial gypsums succeed equally with the natural, and it is found to belong to a variety of other substances. M. Margraaf observes, that all substances which have this property contain a vitriolic acid, united to an alkaline or calcareous earth.

M. Elpigni observes, that one Zagonius had a method of making statues and pictures of the Bononian stone, which would shine variously in the dark; but he adds, the person died without discovering his secret. See Phil. Trans. N^o 134.

BONONIENSIS, in *Ornithology*, the specific name of the greater lapwing, *tringa bononiensis* of Gmelin, and *vanellus bononiensis major* of Brisson. The legs of this kind are ochraceous; head and upper part of the neck chestnut; body above black, beneath white; throat and breast spotted with ferruginous. Gmel. *Obs.* This is larger than the common lapwing (*tringa vanellus*); the beak is yellowish and black at the tip.

BONONIENSIS, *passerculus bononiensis* of Brisson. This is *fringilla brachyura* of Gmelin, or short-tailed sparrow.

BONOSIANI, or **BONOSIACI**, in *Ecclesiastical History*, an ancient branch of **ADOPTIANI**, in the fourth century, denominated from their leader Bonosus, a bishop of Macedonia.

BONPLANDIA, in *Botany*. Cavan. 532. Clafs and order, *Pentandria Monogynia*.

Gen. Char. *Cal.* tubular, five-toothed. *Cor.* monopetalous, almost labiate; tube longer than the calyx; border with fine emarginate divisions; the two superior long and straight, the three inferior pendant. *Stam.* five inclining. *Pist.* germ superior; style capillary; stigma bifid; *Pericarp.* capsule ovate, three-fided; cells three; seeds three.

Species, *B. geminiflora*, an annual plant; leaves alternate, smooth, lanceolate, toothed; flowers violet, large, axillary, growing in pairs. A native of New Spain.

BONPOURNIKEL, a denomination given to a coarse kind of bread used in Westphalia. See **BREAD**.

BONS-HOMMES, or **BON-HOMMES**, in *Ecclesiastical History*, a sect of hermits of St. Augustin, founded by F. de Paula. They were brought over into England in 1283, by Edmund, earl of Cornwall, and settled at Ashing, in Bucks, besides which they had only one house more at Edington in Wiltshire. They followed the rule of St. Austin, and wore a blue habit.

The name is said to have arisen from Louis XI. of France, who used to call F. de Paula, prior of the order, *le bon homme*. Till then they had been called the *Minimi*, or order of Grammont. See **ALBIGENSES**.

BONSDORFII, in *Entomology*, a species of **CURCULIO**, of an oblong form. Colour white, with a black band and spots; snout fulcated and brown. Bonfd. Curc. Succ. Inhabits Sweden, and is half the size of *curculio fulciferis*.

BONTAIN, in *Geography*, a kingdom of the island of Celebes, situate on the south coast, and on the east shore of the bay of Boni. It is bounded on the west by the river Tino, which divides it from the kingdom of Tourattea; on the north, by the mountains which bear its own name; on the east, by the river Kalekongang; and on the south by the sea. It was anciently considered among the dependent allies of Macasser, and governed by their kings; but it has been twice conquered by the arms of the Dutch East India company and their allies, and was ceded to them, in property, by the treaty of Boni. The country is pleasant, and fertile in rice. It has a large bay, where ships may lie in perfect safety during both the monsoons. The soundings are good and regular, and the bottom soft mud; nor is there any danger in coming in, except from a ridge of rocks, which are above water, and are a good mark for anchoring. The highest land in sight is called "Bontain-hill." S. lat. 5° 30'; and when a ship is in the offing, at the distance of 2 or 3 miles from the land, she should bring this hill N. or N^{W.}, and then run in with it and anchor. In this bay there are several small towns; that which is called "Bontain," lies in the N.E. part of it (S. lat. 5° 10'. E. long. 117° 28'); and here is a small palisadoed fort, on which are mounted eight guns, that carry a ball of about eight pounds weight; it is just sufficient to keep the country people in subjection, and is intended for no other purpose; it lies on the south side of a small river, and there is water for a ship to come close to it. Wood and water are to be procured here in great plenty; likewise plenty of fresh provisions, at a reasonable rate: the beef is excellent, but it would not be easy to procure enough of it for a squadron. Rice may be had in any quantity, and also fowls and fruit: in the woods there are herds of wild hogs, which may be purchased at a low price, as the natives, who are Mahometans, never eat them; and fish may be caught with the seine. The tides are very irregular; it is commonly but once high and once low water in 24 hours, and there is seldom a difference of six feet between them. The inhabitants of Bontain, and those of Boele-Comba and Bera, are the best humoured, most peaceful and most tractable of all the subjects belonging to the Dutch company, in the whole island of Celebes.

BONTEMPI, **ANGELINI**, in *Biography*, a native of Perugia, and author of the first history of music in the Italian language with which we are acquainted. He was an able professor, of considerable learning, who flourished about the middle of the 17th century. His work, which has for title "Historia Musica di Gio. And. Angelini Bontempi," was published at Perugia, in small folio, 1695. It is become somewhat scarce, which enhances its value with collectors of books; and having being long unable to procure a copy, we imagined when one was found, from Brossard's character of the work, that we were in possession of a greater treasure than on examination it proved to be. For with great parade of his learning, science, and acquaintance with the Greek *theorists*, that are come down to us, he leaves us in as utter darkness concerning the *prædices* of ancient music as ever; and, to say the truth, he has furnished us with but little information concerning the modern of his own time, with which, however, as a contrapuntist, he seems to have been perfectly well acquainted. Indeed, by the frequent use he makes of scientific terms, his book, when casually opened, has more the appearance of a dry mathematical treatise, than the history of an elegant art.

The most curious and interesting part of his work, is the account which he gives of the discipline of the college of singers in the service of the pontifical chapel, and of the great masters who then flourished at Rome, who had distinguished

gained themselves in writing "Aila Palestrina" for the church; secular music was then but little cultivated, and less respected there, till operas and oratorios had made some progress in polishing melody, and in the just accentuation and expression of words.

BONTIA, in *Botany*, (in honour of Jacobus Bontius, a physician at Batavia, author of a treatise "De Medicina Indorum"). Linn. species 800. Syst. 579. Reich. 3. 200. Willden. 1208. Schreb. 1062. Jussieu 127. Class and order, *Didynamia Angiosperma*. Nat. Ord. *Personata*—allied to the *Solanæ*. Juss.

Gen. Char. *Per.* calyx one-leaved, five-parted; segments obtuse, erect, permanent. *Cor.* one-petalled, ringent; tube long, cylindrical; border gaping; upper lip erect, reflexed near the end, emarginate; lower semitrid, the size of the upper. *Stam.* filaments fimbriate, bending to the upper lip, the length of the corolla; anthers simple. *Pist.* germ ovate; style simple; stigma bifid, obtuse. *Pericarp.* drupe ovate, with an oblique apex. *Seed*, nut oval, one-celled, germinating.

Ess. Char. *Cal.* five-parted. *Cor.* two-lipped; lower lip three-parted, revolute. *Drup.* ovate, one-seeded, with an oblique apex.

Species, *B. daphnoides*, Barbadoes wild olive. (La Marek Illust. Tab. 546.) "Leaves alternate; peduncles one-flowered." Linn. A shrub four or five feet high; leaves rather stiff, lanceolate, smooth, green on both sides, lower ones serrate, upper ones entire. *Flowers* yellowish, with a line of dusky purple across the lower lip; axillary single, or in pairs; tube and lower lip hairy. It was cultivated by Mr. Bentick in 1695, and flowered with Dr. Sherard in June 1723.

Propagation and Culture. It is cultivated in Barbadoes for making hedges, and may be raised in England from seeds sown on a hot-bed early in the spring. It must afterwards be transplanted into a small pot filled with light earth, and plunged into a moderate tanner's bark hot-bed, with a large allowance of air and water in hot weather, but should always remain in the stove. It may also be propagated by cuttings in the summer. Being ever green, and growing in a pyramidal form, it makes a pretty variety in the stove.

BONTIA, (Brown Jamaic.) See *AVICENNIA germirans*.

BONTIA, (Pet.). See *EPIDENDRON carinatum*.

BONTIA, in *Conchology*, a species of *HELIX*, of which several varieties are described by Chemnitz. This shell is somewhat conic, ventricose, perforated, and pellucid, with the tip black; on the first whorl three yellowish bands; aperture ovate. *Helix bontia* is a native of Bengal; the shell is extremely fragile.

BONTIUS, JAMES, in *Biography*, a native of Leyden, was educated in philosophy and medicine, under his father Gerard; and being sent to the East Indies, practised physic at Batavia about the middle of the seventeenth century. On his return to Europe he wrote several valuable works on the diseases and practice of medicine of India. These are, "De conservanda valetudine, ac diæta sanis in India observandis;" "Methodus medendi, quæ oportet in India orientali uti;" "Observationes selectæ ex dissectione cadaverum ac autopsia descriptæ." He also published curious observations relating to the botany and natural history of those regions, more especially the vegetables used in medicine and diet in his work entitled "De Medicina Indorum," 1642, and afterwards, with Alpinus's work "De Medicina Ægyptiorum," 4to. 1718. He also published "Historia Nat. et Med. Indiæ orientalis," fol. in 1658. His brother Regnier was many years professor of medicine at Leyden, and rector of the university. He died in 1623. Haller. Bib. Med. Pract. et Botan.

BONTORY, in *Geography*, a town of Poland, in the palatinate of Bracław, 20 miles east of Bracław.

BONVINCINO, ALESSANDRO, called *Le Moretto*, in *Biography*, an eminent painter of history and portrait, was born at Rovate in 1514, and studied for some years under Titian, but he was enamoured with the designs of Raphael, which he accidentally saw; and devoting himself to the assiduous study of those master-pieces of art and genius, he became an exceeding good painter. His works are eagerly bought, and much admired for the tenderness of the penciling, the correctness and spirited expression of the figures, the neatness of the finishing, and the rich variety of the draperies, consisting of velvets, damasks, or satins, copied after nature, and wonderfully imitated. He was equally excellent in portrait, and placed by some persons in competition with Titian. He died in 1564. Pilkington.

BONUS HENRICUS, in *Botany*, (*Bauh. &c.*) See *CHENOPodium*.

BONZES, or **BONZUS**, a name given to the priests and religious of China, Japan, and Tonquin. This is the appellation under which the priests, who are attached to the worship of Fo (see Fo,) are generally known among Europeans. They are called "Talapoins" by the Siamese, "Lamas" by the Tartars, "Ho-shang" in China, and "Bonzes" in Japan. They generally live in a sort of community, in places apart, or consigned wholly to them. The island Pou-to, near Chufan, is a famous seat of bonzes, being wholly inhabited by them, to the number of 3000, all of the sect of Hoishang, or unmarried bonzes.

They live a kind of Pythagorean life, and have not less than four hundred pagodas, or temples, in this little island. They have also females, called bonzesses, a sort of nuns, who dedicate themselves to the worship and service of some temples or idols. They are obliged to abstain from all converse with men, and on that account are cloistered in large monasteries, like those of the Romish and Greek church. For incontinency these bonzesses are condemned by the mandarins to a kind of pillory called *Ranghi*, which see.

These bonzes, or Chinese priests of Fo, worship him under the forms of several animals, through which they pretend that he had transmigrated before he was deified; and ingrossing the worship of this imaginary deity to themselves, in the Chinese temples, they support and propagate it, with a view to their own personal emolument and influence, by the most unwarrantable impostures. They admit, however, the distinction between good and evil; and they declare, that, after death, rewards will be bestowed on the good, and punishments inflicted on the wicked, in places destined for the souls of each. They teach, that the god Fo appeared on earth for the purpose of saving mankind, and of restoring to the paths of salvation those who have strayed; that it is by him their sins are expiated; and that he alone can procure for them a happy regeneration in a future life. They enjoin the strict observance of five precepts; of which the first forbids the killing of any living creature, of whatever nature it may be; the second, the taking away of the goods of another; the third forbids men to pollute themselves by uncleanness; the fourth, to lye; and the fifth to drink wine. They, above all, recommend the practice of certain acts of mercy; such as, treating their bonzes well, building monasteries and temples for them, and supplying them with every thing necessary for their maintenance, as the most effectual means of participating the benefit of their prayers, mortifications, penances, and other meritorious actions, towards the atonement of their own sins, and for obtaining a happy transmigration in another life. On the other hand, they terrify those who withhold their benefactions from them with menaces; assuring them, that the y

shall hereafter revive in the form of dogs, rats, serpents, horses, and mules; and that they shall be for ever exposed to the most degrading and wretched transmigrations. These menaces seldom fail of making a deep impression on the minds of the credulous vulgar, inasmuch that they often persuade them to burn, at the funerals of their deceased relatives, paper gilt, or washed with silver, silk, cloth, and other garments, which, they pretend, will be converted into substantial gold and silver, and superb vestments, for the use of their parents and friends. Le Compte relates a story of an old man, who was led to believe, by the representations of these bonzes, that his soul should pass into the body of one of the emperor's post horses. The poor man was so distressed, that he could neither eat nor sleep, and his grief was such as to threaten the speedy termination of his life. He learned, however, that the souls of the Christians were exempted from these dreadful metamorphoses; upon which, he applied to one of the Jesuits for Christian baptism, assuring him, that he would rather be of that, or any religion, than transmigrate into a post-horse. The Jesuit complied with his request, and made his mind easy. These bonzes are perfectly acquainted with all the arts of hypocrisy and deceit; and dextrously practise them as occasions occur. They addict themselves to rigorous fasting, frequent watchings, and long prayers before the altars of Fo. When they cannot obtain gifts by cunning and address, they endeavour to procure them by exciting compassion, and by submitting to the severest penances, and practising the most rigorous austerities. With this view they often appear in public places, as frightful spectacles of mortification. They often drag along the streets heavy chains fastened round their necks, arms, and legs: they beat their heads against the stones and posts, and mangle their bodies, so that they are smeared with blood; they carry burning coals upon the tops of their naked heads; and some of them are carried about in a kind of sedan, the inside of which is stuck full of nails and spikes, so that they cannot stir without wounding themselves; and these nails they sell to the populace for a few pence, as amulets and preservatives against all harm, and as efficacious means of bringing down blessings on the purchaser and his family. By pretending to know the present state of the dead, and the future condition of the living, they contrive to extort money from the surviving friends, in order to procure for the deceased a speedy release and passage into a better state. Many other instances of their knavery are related by Du Halde, Le Compte, and other writers. Some of these are so atrocious in their nature, that the relation of them cannot be read without horror; and we are led to hope, that they are recited by the Jesuit missionaries, to whom the bonzes have been great enemies, and against whom they have excited various persecutions, with some exaggeration.

We read of their privately seizing men and women, and hurrying them away in a close sedan, where nothing is to be seen but the tops of their heads, and their eyes moving in a terrifying manner, to the next river or canal, and drowning them without mercy, before crowds of spectators, who are harangued by one of the fraternity into a firm belief that the persons so treated had earnestly requested to be thus dispatched out of the world, in order to obtain immortality in a future state. With all the external appearances of sanctity and austerity, these bonzes unite voluptuous manners and secret profligacy, of which various instances are recited. Notwithstanding the infatuation which induces the vulgar to support the popular superstition of the country, the condition and character of a bonze are generally despised in China. Most of these fanatical impostors are sprung from the dregs of the people. Those of Pegu, however, are said to be generally gentlemen of the highest extraction. See *PREV.* To

recruit and perpetuate their sect, they purchase young children, whom they betimes initiate in all their mysteries, and whom they instruct in every trick and deception which may render their profession profitable; these afterwards succeed them, and transmit their arts to other young bonzes, who are educated in the same manner. They are, in general, very ignorant, and unable to give an exact account even of the true doctrine of their sect. Although they have no regular hierarchy, they acknowledge superiors, whom they call "ta-ho-shang," or grand bonzes. This rank secures to those who have attained it particular distinction, and the first place in all religious assemblies at which they may be present. There are bonzes of all conditions; some destined only for collecting alms; others, better skilled in the art of speaking, and who have acquired some knowledge of the Chinese literature, are commissioned to visit the literati, and to insinuate themselves into the houses of the great; old men, rendered venerable by age, and by a grave deportment, are employed to exercise their talents among the female sex; these preside in all their assemblies, which, though not common, are held, however, in several provinces. These religious clubs are very lucrative to the bonzes. One of these priests enters the chapel, where the female devotees are assembled, and sings some anthems to the god Fo. At length, after having for some time repeated "Omio Fo," (Omio being the name of another deity more ancient than Fo, and worshipped by the Japanese under the name of Amida, which see), and after being stunned with the tinkling noise of several small kettles, upon which they beat, they place themselves at table, and the noisy devotion terminates with mirth and a good repast. On days of greater solemnity, the bonzes adorn their places of worship with several idols, and numerous paintings, exhibiting under various forms the different punishments inflicted on the wicked in hell. The prayers and fasting continue seven days, during which their chief business is to prepare and consecrate treasures for the other world. In every province of China there are temples, to which numerous votaries repair; some of them making pilgrimages thither from very remote places. The pilgrims climb these sacred mountains with great difficulty, and are sometimes dragged up on their bended knees. Those, whose age or infirmities, or urgent business, will not allow of their joining these devout caravans, commission some of their friends to bring them a large leaf filled with characters, and stamped by the bonzes in a particular corner. The centre of this leaf is occupied by the image of the good Fo. On the vestments of the god, and around his figure, are traced out a multitude of circles, intended for the following purpose.—The devotees of the god, whether male or female, wear hanging from their necks, or around their arms, a kind of chaplet, composed of 100 beads of moderate size, divided by three which are much larger; and a bead, still bigger, in form of a small gourd, ornaments the top of the chaplet. These beads they roll between their fingers, pronouncing the mysterious words "O-mi-to, Fo!" and each of these invocations is accompanied by a genuflection. When they have completed the number of 100, equal to that of the beads, they mark with a red stroke one of the circles which surround the figure of the god Fo, on the leaf stamped by the bonzes. This leaf becomes the register of all the prayers which they have repeated in the course of their lives. To verify its authenticity, the bonzes are, from time to time, invited to their houses, where they must attest the number of circles marked with red strokes, and imprint their seals on the leaf. When any of them dies, this valuable memorial is carried at the funeral with the greatest solemnity, and deposited in a small box closely shut and sealed: this they call "lou-in," or a passport for the other world; and it costs

costs a large sum of money to have all these formalities observed.

It has been already hinted, that the bonzes are peculiarly inimical to the progress of the Christian religion in China, Japan, &c.; and that they have excited a spirit of persecution against the European missionaries, who have hitherto been chiefly Jesuits of the church of Rome. These strangers, they say, have introduced themselves into China for the purpose of invading it; the new doctrine they preach is calculated, as they pretend, to procure followers, and a number of partisans, sufficient to second their efforts, when European troops and fleets shall be ready to attack them; and sometimes they allege, that the missionaries persuade people to embrace their doctrine merely by the aid of sorcery, and that they gain converts, and fix their attachment by lavishing gold and silver among them, of which they have great abundance, because they possess the secret of imitating and counterfeiting these precious metals. By such and similar representations, they have checked the zeal, and counteracted the efforts of Christian missionaries. *Le Compte. State of China. Du Halde's China, vol. i. Grossiere's China, vol. ii.*

It has been observed (see Embassy to China, vol. ii. p. 100.), that the likeness is so strong between the apparent worship of many of the priests of Fo, and that which is exhibited in churches of the Roman faith, that a Chinese, conveyed into one of the latter, might imagine the votaries he saw were then adoring the deities of his own country. On the altar of a Chinese temple, behind a screen, is frequently a representation which might serve for that of the Virgin Mary, in the person of "Shin-moo," or the sacred mother, sitting in an alcove with a child in her arms, and rays proceeding from a circle, which are called a glory, round her head, with tapers burning constantly before her. The long coarse gowns of the Ho-thangs, or priests of Fo, bound with cords round the waist, would almost equally suit the friars of the order of St. Francis. The former live, like the latter, in a state of celibacy, reside together in monasteries, and impose occasionally upon themselves voluntary penance and rigorous abstinence.

BOO-HADJAR, in *Geography*. See **AGAR**.

Boo-Jeamah, a river of Africa, in the province of Constantina, which runs along the western side of the marsh which separates betwixt Bona and the ancient Hippo. Over this river is a bridge of Roman structure.

Boo-Shatter, a town of Africa, in the kingdom of Tunis, said by Shaw (*Trav. p. 79.*) to be built on the ruins of the ancient Utica, which see.

BOOBERAK, a river of Africa, in the kingdom of Algiers, formed by the junction of the Nissah and Bugdourah. Its mouth, which is made up of a number of branches, is the eastern boundary of the province of Titterie.

BOOBY, a word of uncertain etymology, derived by Skinner from the Spanish *bofo*, foolish; but deduced by Junius from *bowbard*, an old Scottish word for a coward or contemptible fellow; denotes a dull, heavy, stupid person.

BOOBY island, in *Geography*, a small island in the West Indies, lying directly opposite to Mosquito bay, at the S. E. extremity of the island of St. Christopher's, and more than half a league from it, off the north end of Nevis island.—Also, a small island, supposed to be one of the islands called Prince of Wales's islands, extending from thence and Wallis's island, as far as New Guinea.

BOOBY, in *Ornithology*, the name of *pelecanus fula* in Cateby's Natural History of Carolina. The great booby of Cateby is a variety of *pelecanus bassanus*. *Brown booby* of

Latham, *pelecanus fiber*; *lesser booby*, *pelecanus parvus*; *spotted booby*, *pelecanus maculatus*.

BOODGE-BOODGE, or **BOOGE-BOOGE**, in *Geography*, a town of Hindoostan, the present capital of the territory of Cutch, and residence of its rajah. It is also called Booz, and placed in a map, to which Mr. Rennell refers, about 34 geographical miles to the E. or E. S. E. of the eastern branch of the Indus; 120 miles S. E. of Tatta, and about 200 W. of Ahmedabad.

BOODH, *Bouddha*, *Budha*, or *Buddou*, in *Mythology*, a deity very anciently and very generally worshipped in India. The name of this deity is variously expressed by different writers. In the Pali language, and among the Cingalese, his common name is Bouddha. Mr. Chambers, in the Asiatic Researches, writes Buddou; and Paulinus (Mus. Borg.), Budha; and from these two appellations we may easily deduce the Buddha or Butta of Beaufoibre and Bochart, the Bod of the Arabians, Bodda of Edrissi, *Bouddz* of Clemens Alexandrinus, and Baouth of M. Gentil. The name is said to be an appellation, synonymous with sage or philosopher, and expressive of wisdom. By Budha, says the learned Bryant, (*Anal. Anc. Mythol. vol. iii. p. 573.*) we are certainly to understand the idolatrous symbol, called by some nations Buddo; the same as Argus and Theba. In the mythology transmitted concerning it we may see a reference both to the machine itself, and to the person preserved in it. In consequence of which we find this person also styled Bod, Budhu, and Buddo; and in the west Butus, Battus, and Bæotus. He was said by the Indians not to have been born in the ordinary way; but to have come to light indirectly through the side of his mother. By Clemens of Alexandria, he is called Bounta; and in the history of this person, however varied, we may perceive a relation to the Arkite deity of the sea, called Poseidon; also to Aercalus and Dionusius; styled Bæotus and Thebanus. Different learned men have supposed Bouddha to have been the same with Noah, Moses, or Siphos the 35th king of Egypt; and sir William Jones supposed Bouddha to have been the same with Sefac or Sesostris, king of Egypt, who by conquest spread a new system of religion and philosophy from the Nile to the Ganges, about 1000 years before Christ. In order to reconcile some differences of opinion among the Hindoos, with regard to the time of Bouddha's appearance, this learned writer agrees with Giorgi in supposing, that they have confounded two Bouddhas; the younger of whom established the new religion, which gave great offence to the bramius in India, and was introduced into China in the first century of our æra; whereas the more ancient Bouddha preceded him by many centuries, and is referred by sir W. Jones, after a variety of computations, to the year 1027 before Christ. For want of adverting to this circumstance, he confounded the latter Bouddha with the Woden of the Goths. Mr. Chambers also remarked, that Pood or Poaden, which is the Siamese mode of pronouncing the Boodh of the Indians and Birmans, bears a striking resemblance to the Gothic Woden; and it is further suggested, that Boodh is the Dies Mercurii, the Wednesday, or Woden's day, of all Hindoos. But etymological reasoning, more especially when it interferes with chronology, is not sufficient to establish the identity of Boodh and Woden. According to the chronology of the Hindoos, which sir W. Jones has minutely investigated and detailed, Boudha was the ninth "Avatar," or descent of the deity, in his capacity of preserver, or the ninth incarnation of Vishnou, which was long antecedent to the existence of the deified hero of Scandinavia, who, according to some writers, was a contemporary of Pompey and Julius Cæsar, and who is placed by the author of the Northern

Antiquities, 70 years after the Christian æra. Besides, the attributes of Boodh and Odin are very different. The deity, whose doctrines were introduced into Scandinavia, was a god of terror, and his votaries carried desolation and the sword throughout whole regions; whereas the ninth Avatar (see Maurice's *Hist. of Hindoostan*, vol. ii. part 3.) introduced the peaceful olive, and appeared in the world for the purpose of preventing sanguinary acts. He severely censured the sacrifice of cattle, or depriving any being of life, and is denominated the author of happiness. His place of residence is said to have been discovered at Boodha Gaya in Bengal, by the illustrious Amara, renowned amongst men; and according to an inscription in Sanscrit, found on a stone in this place, and translated by Mr. Wilkins, (*Asiatic Researches*, vol. i. p. 284.) he caused an image of the supreme spirit Bood-dha to be made, and worshipped it according to the law, with perfumes, incense, and the like; and he thus glorified the name of that supreme being, the incarnation of a portion of Veechnoo: "Reverence be unto thee in the form of Bood-dha! reverence be unto the lord of the earth! reverence be unto thee, an incarnation of the deity and the eternal one! reverence be unto thee, O God, in the form of the God of mercy, the dispeller of pain and trouble, the lord of all things, the deity who overcometh the sins of the Kalee Yoog, the guardian of the universe, the emblem of mercy toward those who serve thee!" &c. As the doctrines of Boodh and Woden are different, and their æras are very remote, they must of course be different persons. The Buddha of the Hindoos is unquestionably, says sir W. Jones, the Foe or Fo of China; and M. de Guignes, on the authority of four Chinese historians, asserts, that Fo was born about the year before Christ 1027, in the kingdom of Cashmir. Mr. Chambers, following M. Gentil, and followed by Paulinus, conceives, by a very forced train of etymology, the Fo or Fohi of the Chinese to be a corruption of Boud-dha. Nor is the derivation of Tautos, Toth, or Touth, the Egyptian name for Hermes from Bouddha, less fanciful; and yet Fo-li, the progenitor of the Chinese, a military tribe, whom the Hindoos call the Chandravansa, or children of the moon, was, according to their Puranas or legends, Buddha, or the genius of the planet Mercury.

Among the various appellations by which the deity Buddha is known in several parts of the East, that of Godama is very common. This Godama, Gaudma, or Gotma, &c. as his name is differently expressed, is said to have been a philosopher, and is believed by the Birmans to have flourished above 2300 years ago; he is said to have taught in the Indian schools the heterodox religion and philosophy of Boodh. See **GODAMA**. The image that represents Boodh is called Gaudma or Goutum, which is now a commonly received appellation of Boodh himself: this image is the primary object of worship in all countries situated between Bengal and China. The sectaries of Boodh contend with those of Brahma for the honours of antiquity, and are certainly far more numerous. The Cingalese in Ceylon are Boodhists of the purest source, and the Birmans acknowledge to have received their religion from that island, which they call Zehoo. From thence it was brought, as the Rhahaans say, to Arracan, and it was then introduced into Ava, and probably into China; for the Birmans confidently assert, that the Chinese are Boodhists. Kæmpfer, speaking of the Budz, or Seaka, (Shaka, Shakya, Sjaka, or Sakya, denoting, according to Paulinus, the cunning, or the god of good and bad fortune,) says, (*Hist. Japan*. b. iv. c. 6.) "I have strong reasons to believe, both from the affinity of the name, and the very nature of this religion, that its author and founder is the very same person whom the Bramins call Buddha, and believe to be the

essential spirit of their Wisna (Vishnou) or their deity, who made his ninth appearance in the world under this name; the Peguers call him Samana Khutana." Where he treats concerning the introduction of Boodh into China, he says, (*id. ibid.*) "about the year of Christ 518, one Darma, a great saint, and twenty-third successor in the holy see of Seaka (Buddha), came over into China from Seitensoku, as the Japanese writers explain it, that is, from that part of the world, which lies westward with regard to Japan, and laid, properly speaking, the first firm foundation of the Boodhism in that mighty empire." Others say, that the sect of Boudha was introduced into China in the year of our æra 630, and that from China it extended itself to Japan, Tonquin, Cochinchina, and the most remote parts of Tartary.

Whatever may be the antiquity of the worship of Boodh, or Buddha, we can entertain no doubt of the wide extent of its reception and prevalence. In the island of Ceylon, in the extensive Birman empire, in the kingdoms of Siam and Cambodia, the prevailing religion is that of Bouddha or Godama, and Mr. Chambers (*Asiatic Researches*, vol. i. p. 162, &c.) has given very good reasons for believing that the worship of Bouddha extended all over India, and was not rooted out by the Bramins in the Deccan, so lately as the 9th, or even the 12th century of the Christian æra. From the history of Cashmire, presented to the sultan Aebur, on his first entrance into that kingdom, we learn, that Jelowk, one of its most powerful princes, tolerated the doctrine of Bouddh; and that it was not till the reign of Nerklh the 59th prince, A. D. 342, that the Bramins acquired the ascendancy over the followers of Boodh, and burned down their temples. In Nepal the most ancient religion is that professed by a sect who call themselves "Baryefu," and who seem to be worshippers of Bouddha. In Narhoara or Nehrwalch, the capital of the kingdom of Guzerat, we find that even after the Mahometan invasion, in the 11th century of our æra, Edrifi, who wrote in the 12th century, informs us, that the people continued in the worship of the idol Bodda or Bud. This Arabian geographer adds, that the worship of the prince of this country, who reigned on the Malabar coast, with the title of Balhara, and whose dominions extended over Guzerat, and the greatest part, if not the whole of Viliapour, was addressed to Bodda, who, according to St. Jerome and Clemens Alexandrinus, was the founder of the sect of the Gymnosophists, in like manner, says M. d'Anville, as the Bramins were used to attribute their institution to Brahma. If the conjectures of sir William Jones, relating to the inscriptions found at Mongheer, and on the pillar of Buddal, be well founded, the governing powers on the banks of the Ganges, as late as about the time of the birth of Christ, were of the sect of Bouddha; and however idle and ridiculous the legends and notions of the worshippers of Bouddha may be, they have been in a great measure adopted by the Bramins; but with all their defects and extravagances much aggravated, rajahs and heroes being converted into gods, and impossibilities accumulated on improbabilities. From various authorities, to which we might refer, it sufficiently appears, that the worship of Bouddha, or Buddou, has prevailed in several parts of India at a period prior to that of the Bramins; and that this has been the case even so late as the 9th and the 12th centuries of the Christian æra; and that this system forms the basis of that religion which the Bramins have brought with them into the southern parts of the peninsula of Hindoostan, into Madura, Tanjore, and Mysore. In those parts of India, and chiefly on the coast of Coromandel, and in Ceylon, the god Baouth, says M. Gentil, of whom, at present, they know no more in India than the name, was the object of worship;

but it is now totally abolished; except that there may be found some families of Indians, who have remained faithful to Baouth, and do not acknowledge the religion of the Brahmins; and on that account separated from and despised by the other cast. It is generally allowed, that about the time of Christ the Brahmins gained a superiority over the worshippers of Bouddha; and about 900 years afterwards, we find them totally overthrowing his doctrine in its native country, and persecuting his followers. The Vedas, which are commonly supposed to be the oldest books of the Brahmins, are of later date than the time of Bouddha, as is evident from the mention which they make of that personage. Asiatic Researches, vols. i. ii. and iv. Symes's Embassy to Ava, vol. ii. ch. 13. For a further account of the votaries of Bouddha, as well as the principles and rites of his worship; see BRACHMANS, GONDAMA, RAHANS, SAMANEANS and TIRINANNES. See also BIRMAN empire, CEYLON, CHINA, COCHINCHINA, SIAM, &c.

BOODICOTTA, in *Geography*, a town of the peninsula of India, in the Mysore country; 87 miles E. N. E. of Serriugapatam, and 33 E. S. E. of Bangalore. N. lat. 12 50'. E. long. 78 20'.

BOOG, or **BOGOE**, a small island of Denmark, between the island of Moen and Falster.

BOOGOO, in *Zoology*, the species of BAROON called *Simia maimon*, by Linnæus. See MAIMON.

BOOK, a writing composed on some point of knowledge by a person intelligent therein, for the instruction or amusement of the reader.

The word is formed from the Saxon *boc*, which comes from the Northern *buech*, of *buechans*, a *beech* or *service-tree*, on the bark of which our ancestors used to write.

Book may be defined more precisely, a composition of some man of wit or learning, designed to communicate, to prove, or illustrate some science, art, truth, or invention.

Book is distinguished from pamphlet, or single paper, by its great length; and from tome or volume, by its containing the whole writing on the subject. Isidore makes this distinction between *liber* and *codex*; that the former denotes a single book, the latter a collection of several; though, according to Scipio Maffei, *codex* signifies a book in the square form; *liber*, a book in the roll form. The primary distinction between *liber* and *codex* seems to have been derived, as Dr. Heylin has observed, from the different materials used for writing, among the ancients. From the inner side of the bark of a tree, used for this purpose, and called in Latin *liber*, the name of *liber* applied to a book was deduced; and from tablet, formed from the main body of a tree, called *caudex*, was derived the appellation of *codex*.

We say an old book, a new book; a Latin, a Greek book; to read, to write, to publish a book; the preface, the title, the dedication, the index of a book. To collate a book, is to see that it be perfect, and that none of the sheets be either wanting or transposed. Book-binders speak of folding, sewing, beating, pressing, covering, gilding, and lettering of books. See BOOKBINDING.

A large collection of books is called a library. An inventory of a library, in order to the reader's finding any book, is called a catalogue.

The history or *notitia* of books makes the first part, according to some the whole, of the literary science.—The principal points of the *notitia* of a book are, its author, date, printer, edition, versions, comments, epitomes, success, eulogies, censures, condemnation, suppression, adversaries, vindicators, continuators, and the like.

The history of a book is either of its contents, which is

given by analysing it, as is done by journalists and reviewers; or of its appendages, and accidents, which is the more immediate province of those called literators, and bibliothecarians.

The contents of a book are the matters delivered in it; which make the province of the author. Of these there is one principal matter, called the subject; in respect of which the rest are only incidents.

The appendages of a book are, the title, preface, epistle dedicatory, summaries, table of contents, index, and the like, which are the proper province of the editor, unless perhaps the title page, which is frequently usurped by the bookseller.

In the composition of a book, there occur sentiments, which are also the materials of it; method, the order where-in these are disposed; and style, or expression, which is the language in which they are clothed.

The giving of histories, catalogues, and bibliotecas of books, is said to have been first introduced by the Germans; we may add, that they have best succeeded in them; and to them the chief works of this kind are owing. 1. Alb. Fabricius has given us the history of the Greek and Latin books; Wolfius, that of the Hebrew books; Boecler, of the principal books in each science and faculty; Struvius, of the books of history, law, and philosophy; the abbot Fabricius, of the books of his own library; Lambecius, of those in the Vienna library; Le Long, of the books of Scripture; Mattaire, of the books printed before the year 1550; and Morhoff, a general literary history of this kind, under the title of Polybiblior. The various catalogues of choice libraries are useful and necessary for the same purposes: so are likewise the relations, &c. and the reviews which have been periodically published. See BIBLIOTHECA.

Books, as *to the materials of*, they were first written on stones, witness the Decalogue given to Moses (which is the oldest book we have any warranted account of); then, on the parts of plants, e. gr. the leaves, chiefly of the palm-tree; the rinds and barks especially of the tilla or philyra, and the Egyptian papyrus. By degrees, wax, then leather, were introduced, especially the skins of goats and sheep, of which, at length, parchment was prepared: then lead came in use; also linen, silk, horn, and lastly, paper itself. See PAPER.

The parts of vegetables continued long the common matter of books; inasmuch that most of the names and terms belonging to books, in most languages, are taken thence: as the Greek *libros*, the Latin *liber*, *codex*, *folium*, *tabula*, and the English *book* itself. We may add, that vegetable barks appear still in some measure retained for books in certain of the northern countries, as among the Calmuc Tartars, where a library was discovered by the Russians, of an unusual form as well as matter: the books were exceedingly long, but of no breadth; the leaves very thick, and made of barks of trees, smeared over with a double varnish; the ink, or writing, being white on a black ground. Hist. Acad. R. Infer. t. iii. p. 6.

Whatever were the materials used by the ancients for their books, they were liable to be easily destroyed by the damp, when hidden in the earth; and in times of war, devastation, and rapacity, it was necessary to bury in the earth whatever they wished to preserve from the attacks of fraud and violence. Accordingly, it is well known that persons, whose property was thus exposed, concealed in this manner, not only silver and gold, but wheat, barley, oil, and honey; and also their garments, and their writings. With this view, Jeremiah ordered the writings, which he delivered to Baruch, to be put in an earthen vessel. See chap. xxxii. In the same manner the ancient Egyptians made use of earthen urns, or pots of a proper shape, for containing what-

whatever they wanted to inter in the earth, and which, without such care, would have been soon destroyed. We need not wonder then, that the prophet Jeremiah should think it necessary to enclose those writings in an earthen pot, which were to be buried in Judæa, in some place where they might be found without much difficulty on the return of the Jews from captivity. Accordingly two different writings, or small rolls of writing, called books in the original Hebrew, were designed to be enclosed in such an earthen vessel; but commentators have been much embarrassed in giving any probable account of the necessity of two writings, one sealed, the other open; or, as the passage has been commonly understood, the one *sealed up*, the other left *open* for any one to read; more especially, as both were to be alike buried in the earth and concealed from every eye, and both were to be examined at the return from the captivity. In order to solve this difficulty, the ingenious Mr. Harmer (*Obf. on Script.* vol. iv. p. 4.) remarks, that though one of them is said to be *sealed*, it doth not follow that it was sealed in such a manner as not to be opened. Like modern deeds for the conveyance of land, it might have been sealed, though not with wax, yet, according to the present eastern manner, with ink, so as to be valid. Moreover, the word translated *open*, in reference to the evidence, or book which was open, is not the same that is twice used by Nehemiah, ch. viii. 5.; but it is a word, which signifies (1 Sam. iii. 7. 21. Dan. ii. 19. 30. x. 1.) the revealing of future events to the minds of men by a divine agency; and it is particularly used in the book of Esther, (ch. viii. 13.) to express a book's making known the decree of an earthly king. Consequently the *open book* of Jeremiah seems to signify, not its being then lying open or unrolled before them, while the other was sealed up; but the book that had revealed the will of God, to bring back Israel into their own country, and to cause buying and selling of houses and lands again to take place among them. This was a *book of prophecy*, opening and revealing the future return of Israel, and the other little book, which was ordered to be buried along with it, was the purchase deed. By adverting to the different modes of writing in the East, we obtain a satisfactory interpretation of a passage in the book of Job, (ch. xix. 23, 24.) and a distinct view of the beautiful gradation which is lost in our translation: "O that my words were now written! O that they were printed (written) in a book! that they were graven—in the rock for ever!" In the East there is a mode of writing, which is designed to fix words in the memory, but the writing is not intended for duration. Accordingly, we are informed by Dr. Shaw, (*Trav.* p. 194.) that children learn to write in Barbary by means of a smooth thin board, slightly covered with whiting, which may be wiped off, or renewed at pleasure. As many occurrences were effaced from the memory of the Arabs in the time of Job, as well as from their writing tables, as it now often happens in Barbary; Job expresses his wish not only that his words were written, and written in a book, from which they should not be blotted out, and graven in a rock, the most permanent mode of recording them, and much more effectual for perpetuating them than a book.

We find in Signior Castagnatta's account of the asbestos, a scheme for the making of a book, which from its imperishable nature, he is for calling the *book of eternity*. The leaves of this book were to be of the asbestos paper, the covers of a thicker sort of work of the same matter, and the whole sewed together with thread spun from the same substance. The things to be commemorated in this book were to be written in letters of gold, so that the whole matter of the book being incombustible and everlastingly permanent

against the force of all the elements, and subject to no changes from fire, water, or air, must remain for ever, and always preserve the writing committed to it. See PAPER.

Books, form of. The first books were in the form of blocks and tables, of which we find frequent mention in Scripture, under the appellation *sepher*, which the Septuagint render *αζυρις*, q. d. *square tables*: of which form the book of the covenant, book of the law, book, or bill of divorce, book of curses, &c. appear to have been. As flexible matters came to be wrote on, they found it more convenient to make their books in form of rolls, called by the Greeks *ρολωνια*, by the Latins *volumina*, which appear to have been in use among the ancient Jews as well as Grecians, Romans, Persians, and even Indians. And of such did the libraries chiefly consist, till some centuries after Christ. The form which obtains among us is the square, composed of separate leaves; which was also known, though little used, among the ancients; having been invented by Attalus, king of Pergamus, the same also who invented parchment: but it has now been so long in possession, that the oldest manuscripts are found in it. Montfaucon assures us, that of all the ancient Greek manuscripts he has seen, there are but two in the roll form; the rest being made up much after the manner of the modern books. See BOOK-BINDING.

The rolls, or volumes, were composed of several sheets, fastened to each other, and rolled upon a stick, or *umbilicus*; the whole making a kind of column, or cylinder, which was to be managed by the *umbilicus*, as a handle; it being reputed a kind of crime to take hold of the roll itself. The outside of the volume was called *front*; the ends of the *umbilicus*, were called *cornua*, *horns*; which were usually carved and adorned likewise with bits of silver, ivory, or even gold and precious stones. The title *Συλλαβος* was stuck on the outside. The whole volume, when extended, might make a yard and a half wide, and fifty long. Fabric. *Bibl. Antiq.* c. 19. § 7. p. 607.

Sir John Chardin informs us, in a note on *Is.* viii. 1. that the eastern people roll their papers, and do not fold them, because their paper is apt to fret. Whilst the Ægyptian papyrus was in common use, its brittle nature made it proper to roll up what they wrote: and as this had been a customary practice, many continued it when they used other materials, which might very safely have been treated in a different manner. This method of rolling up their books is referred to in the New Testament; and that they were of the same form much more anciently, we learn from *Jer.* xxxvi. 2. *Pf.* xl. 7, &c. &c.

It is customary not only to wrap up Oriental books and letters which are rolled up, in an elegant and costly covering; but to inscribe words on these coverings, which give a general notion of their contents. This practice of writing on the outside of the case of a letter, or book rolled up, seems to be at least as ancient as the time of Chrysostom, as we learn from a note of Lambert Bos on *Pf.* xxxix. 7. as it occurs in the *LXX.* v. 40, in our version. Chrysostom remarks, that they call a wrapper (*ελλημα*) the *Κεφαλις*, which is the word the Septuagint translators make use of to express the Hebrew word we translate volume: "In the volume of the book it is written of me." The learned father seems to suppose, that there was written *in* or *on* the covering of the sacred volume, a word or words which signified the "coming of the Messiah." But Chrysostom would hardly have thought of such an interpretation, if it had not been frequently done at Constantinople in his time, or by the more eastern princes that had business to transact with the Greek emperors, or been known to have been practised

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practised before those times among the Jews. Chrysoftom lived in the 4th century. Aquila, who is thought to have lived above 100 years sooner, and is allowed to be a most close translator of the Hebrew, uses, according to Bos, the same word *επιθυμα*, or wrapper, to express the Hebrew word we translate volume. He therefore supposed that what was written, to which this passage refers, was written on the covering or wrapper of the sacred books. This explanation suggests a much more agreeable mode of rendering the word than our English term *volume*; since every ancient Hebrew book was a volume, or roll, and consequently the passage merely expresses; "In the book it is written of me." But if we understand it of the *case* in which their books were wrapped up, the thought is not only clear and distinct, but very energetic, and amounts to this, that the sum and substance of the sacred books is, that "the Messiah cometh;" and that those words accordingly might be wrote or embroidered, with great propriety, on the wrapper, or case in which they were kept.

Another translation renders the word *επιθυμα*, which intimates that the motto was inscribed on the cylinder, round which books of this form were wont to be rolled. In this case, it was probably written on that part of the cylinder which reached beyond the parchment, linen, or whatever material was used, and which was convenient enough for exhibiting, in brief, what the purport of the volume was. Mr. Harmer (*Obs. on Script.* vol. iv. p. 111.) suggests, that the circle of gold, with the name of one of our Saxon princes upon it, and ornamented after the manner of those times, might be designed to case the end of the cylinder, or one of the cylinders, on which some book belonging to that monarch, or relating to him, was rolled; of which ancient piece of gold an engraving is given in the seventh volume of the *Archæologia*, or *Transactions of the Antiquarian Society*. This sort of casing to those cylinders used to be called the "Aestel."

To the form of books belongs also the *economy of the inside*, or the order and arrangement of points and letters into lines and pages, with margins, and other appurtenances. This has undergone many varieties: at first, the letters were only divided into lines, then into separate words; which, by degrees, were noted with accents, and distributed by points and stops into periods, paragraphs, chapters, and other divisions. In some countries, as among the Orientals, the lines began from the right, and ran to the left; in others, as in Northern and Western nations, from the left to right; others, as the Grecians, followed both directions alternately, going in the one, and returning in the other, called *boustrophedon*. In the Chinese books, the lines ran from top to bottom. Again, the page in some is entire, and uniform; in others, divided into columns; in others, distinguished into texts and notes, either marginal, or at the bottom: usually it is furnished with signatures and catch-words; also with a register to discover whether the book be complete. To these are occasionally added the apparatus of summaries, or side notes; the embellishments of red, gold, or figured initial letters, head-pieces, tail-pieces, effigies, schemes, maps, and the like. The end of the book now denoted by *finis*, was anciently marked with a *Ϸ*, called *coronis*, and the whole frequently washed with an oil drawn from cedar, or citron chips, strewed between the leaves to preserve it from rotting. There also occur certain *formula* at the beginning and end of books; as among the Jews, the word *תורתך*, *esto fortis*, which we find at the end of the books of Exodus, Leviticus, Numbers, Ezekiel, &c. to exhort the reader to be courageous, and proceed on to the following book. The conclusions were

also often guarded with imprecations against such as should falsify them; of which we have an instance in the Apocalypse. The Mahometans, for the like reason, place the name of God at the beginning of all their books, which cannot fail to procure them protection, on account of the infinite regard had among them to that name, wherever found. For the like reason it is, that divers of the laws of the ancient emperors begin with the *formula*, *In nomine Dei*. At the end of each book the Jews also added the number of verses contained in it, and at the end of the Pentateuch the number of sections; that it might be transmitted to posterity entire. The Masoretes and Mahometan doctors have gone farther; so as to number the several words and letters in each book, chapter, verse, &c. of the Old Testament, and the Alcoran. See *ALCORAN*, *BIBLE*, *MASSORA*, &c.

The kinds and denominations of books are various.

Books, with regard to their *use and authority*, may be divided into *human and divine*, also called *sacred and inspired* books.

Books, *Sibylline*, those composed by certain pretended prophetesses, deposited in the Capitol, under the care of *Dumoviri*. See *SIBYLS*.

Books, *Canonical*, those received and allowed by the church as parts of holy scripture. Such are the books of the Old and New Testament, as commonly bound up together. See *CANON* and *BIBLE*.

Books, *Apocryphal*, those excluded out of the canon, yet received and read in some churches. See *APOCRYPHAL*.

Books, *Authentic*, those which are decisive, and of authority: such, in the civil law, are the Code, Digest, &c. in our law, the Statutes, &c. Bacon de Augm. Sc. l. 8. c. 3.

Books, *Auxiliary*, those less essential, yet of use, as subservient to the others: as in the study of the law, books of Institutes, Formulæ, Maxims, Reports, &c.

Books, *Elementary*, those which deliver the first principles of sciences: such are those under the titles of Rudiments, Methods, Grammars, &c. by which they stand contradistinguished from books of a superior order, which aim at making farther advances in the sciences.

Books, *Library*, such as are not ordinarily read over, but turned to, and consulted occasionally; such are dictionaries, &c.

Books, *Exoteric*, those intended for the use of popular and ordinary readers.

Books, *Acroamatic*, those containing more secret and sublime matters, calculated for adepts and proficients in the subject.

Books, *Public*, the records of past times and transactions kept by public authority.

Books, *Church*, or *Ecclesiastical*, those used in the public offices of religion.

Books, again, with regard to their *scope and subject*, may be divided into *historical*, those which relate facts, either by nature or mankind; *dogmatical*, those which lay down doctrines, or general truths; *miscellaneous*, those of a neutral kind, containing both facts and doctrines; *historico-dogmatical*, those which only rehearse doctrines, or, at most, indicate the arguments by which they are proved, as Mallet's Geometry; *scientifico-dogmatical*, those which not only recite the doctrines, but demonstrate them, as Euclid's Elements. Wolf. Phil. Rat. § 3. c. 1. § 744. 750. 751. &c.

Books, *Pontifical*, among the Romans, were those appointed by Numa to be kept by the *pontifex maximus*; describing

cribing all the ceremonies, sacrifices, feasts, prayers, and other religious matters, with the manner, and circumstances, wherewith each was to be celebrated; these were also called *indigitamenta*, as containing the names of all the gods and the occasions, and *formulae* of invoking each. Liv. i. p. 23.

Books, *Ritual*, those which directed the order and manner of founding, building, and consecrating cities, temples, and altars; the ceremonies belonging to walls, gates, tribes, curiae, camps, and the like.

Books, *Augural*, called by Cicero *reconditi*, were those wherein the science of foretelling futurity, from the flight and chattering of birds, was contained. Cicero. Orat. pro domo sua ad pontiff. Serv. ad Æn. l. 5. v. 738. Lomei, de Bibl. c. 6.

Books, *Aruspicine*, those wherein the mysteries of divining from the entrails of victims are prescribed.

Books, *Acherontic*, those wherein the ceremonies and discipline of Acheron were contained; sometimes also called *libri Etrusci*, as being supposed to have been composed by Tages the Etrurian; though others pretend, that he had received them from Jupiter himself: some suppose these to have been the same with the *libri fatales*; others with the *libri aruspicini*. Serv. ad Æn. l. 8. v. 598. Lomei, ubi supra.

Books, *Fulgural*, those written touching thunder and lightning, and their interpretation. As that composed by the Tuscan nymph Bigois, preserved in the temple of Apollo. Serv. ad Æn. l. 6. v. 72.

Books, *Fatal*, those wherein the ages, or terms of the life of men were written, according to the Etrurian discipline. These were consulted by the Romans in all public calamities; and instructions taken from them, how to expiate the offended deities. Censor. de Die Natal. c. 14.

Books, *Black*, those which treat of necromancy, and witchcraft; or those which are printed in the old black letter, the Celtic character, now only retained by the Germans. The same denomination is also given to some other books, on account of the colour of their backs, or the dismalness of their contents; whence also *Red-book* and *Domesday-book*.

Books, *Good*, in the common usage, are those of devotion and piety, as soliloquies, meditations, prayers, &c. Vide Shaftesb. Charact. tom. i. p. 155. idem. tom. iii. p. 327. A *good book* in the bookseller's language, is a saleable one; in the language of the curious, a scarce one; in that of men of sense, an useful and instructive one.

Among five principal things which Rabbi Akiba recommended to his son, one was, that if he studied the law, he should take care to do it in a *good book*, lest he should be obliged to unlearn all again. Vide Cren. de Furib. Librar. See also farther, on the head of judging and choosing of Books.

Books, *Spiritual*, those which treat more expressly on the spiritual or Christian life, and their exercises, as to contemplation, &c.

Books, *Prophane*, such as do not treat of matters of religion.

Books, with regard to their authors, may be divided into *anonymous*, those without any author's name; *cryptonymous*, those whose authors' names are concealed in some anagram, or the like; *pseudonymous*, those which bear false names of authors; *posthumous*, those published after the author's death; *genuine*, those really written by the persons whom they pretend for their authors, and still remaining in the state wherein they were left by them; *spurious*, or *suppositi-*

tious, those pretended to be written by others than their real authors; *interpolated*, those which since their composition have been corrupted by spurious additions or insertions.

Books, with regard to their *qualities*, may be divided into *clear* or *perspicuous*, which, in the dogmatical kind, are those where the authors define all their terms accurately, and keep strictly to those definitions in the course of their works: *obscure*, those where words are used vaguely, and without defining; *prolix*, those which contain more things than were necessary to the author's design; as if in a book of surveying, a man should give all Euclid; *useful*, those which deliver things necessary to be known, either in other sciences, or in the business of life; *complete*, those which contain all that is known concerning the subject; *relatively complete*, those which contain all that was known concerning the subject, at a certain time; or, if a book were written with any particular design, or view, it may be said to be *complete*, if it contain neither more nor less than is necessary for the accomplishing of that end: in contrary cases, books are said to be *incomplete*.

Books, with regard to the *matter* of which they consist, may be divided into *paper-books*, those written either on linen and cotton paper, or on the papyrus, of which last kind few are now remaining. Montfaucon Pal. Græc. l. i. c. 2. p. 13. *Parchment-books*, *libri in membrana*, those written on skins, or pelts, chiefly of sheep. *Linen-books*, *libri lintei*, among the Romans, were those written on blocks, or tables, covered with a linen cloth. Such were the Sibylline books, and divers ancient laws, epistles of princes, leagues, annals, &c. Plin. Hist. Nat. l. xiii. c. 2. *Leathern books*, *libri in corio*, mentioned by Ulpian, are by Guilandinus taken for such as were written on barks, different from that usually written on; which was the *tilia*: by Scaliger, with more probability, for such as were written on certain skins, or certain parts of skins, different from those commonly used, which were the pelts, or back parts of sheep. Ulp. l. 52. Guiland. Papyr. Membr. 3. n. 50. Scaliger, and Guiland. *Block books*, *libri in scbedis*, those written on wooden planks; or tablets, smoothed for that purpose with an *ascia*, and a plane. Such were the ordinary books among the Romans. *Waxen-books*, *libri in ceris*, mentioned by Pliny, have occasioned some dispute. Herm. Barbarus suspects the term to be a corruption, and inclines to read *in scbedis*, instead of *in ceris*, on the authority of some ancient MSS. Others see no need of the emendation, since it is known the Romans sometimes covered their planks or *scbedæ*, with a thin skin of wax, to make them susceptible of erasements and amendments, which the *libri in scbedis* were not, and consequently were less fit for works that required elegance and accuracy than the waxen ones, which are also called *cera* or *libri ceri*. *Elephantine books*, according to Turnebus, were those written on thin slices, or leaves of ivory; according to Scaliger, those made of the guts of elephants; according to others, those wherein the acts of the senate, relating to the emperors, were written; according to others, certain huge or bulky books, consisting of 35 volumes, containing all the names of the 35 tribes. Salmuth. ad Pancirol. p. ii. p. 255. Guiland. Pap. Mem. 2. n. 48. Scal. ad Guil. p. 16. Calv. Lex. Jur. p. 534. Fabr. Descript. Urb. c. 6.

Books, with regard to their *manufacture* and *commerce*, may be divided into *manuscript*, those written with the hand, whether originally by the authors, called *autographi*, or at second hand by *librarii*, or *copyists*; *printed*, those wrought off from the press; *books in quires* or *sheets*, those not bound or stitched; *books in folio*, those wherein a sheet is folded but once, or makes two leaves, or four pages; *books in 4°*, where

where it makes four leaves; in 8°, where eight; in *duodecimo*, where twelve; in 16°, where sixteen; in 24°, where twenty-four.

Books, with regard to *circumstances* and *accidents*, may be divided into *lost*, those which have perished by the injuries of time, or the malice or zeal of enemies. Such are divers even of the ancient books of Scripture, written by Solomon, and others of the prophets. Fabr. Cod. Pseud. Vet. Test. tom. ii. p. 171. p. 247. Books *promised*, those which authors have given expectations of, which they have never accomplished. Janf. ab Almelooven has given a Bibliotheca of books promised, but still latent, or not published. Books *fictitious*, those which never existed: to which may be added divers feigned titles of books. Loefcher has published a great number of plans, or projects of books, many of them good and useful enough, if there were but books written corresponding to them. M. Dugono has a whole volume of *schemes* or *projects of books*, containing no less than 3000.

Books in *Ana*, *Anti*, &c. See *ANA*, *ANTI*, &c.

Books, the *scope* or *design* of, is various; that of some is to trace the origin of things discovered; of others, to fix and establish some truth, or raise some doctrine to a higher pitch or subtilty; of others, to remove some scruple, or prejudice, which had before obtained, or fix more accurate and precise ideas of things: of others, to explain the names and words used in different nations, ages, and sects; of others, to improve our knowledge of facts, and events, and shew the order and ways of Providence; lastly, others aim at divers, or all of these ends.

Books, the *uses* of, are numerous; they make one of the chief instruments, or means of acquiring knowledge: they are the repositories of laws, and the vehicles of learning of every kind: our religion itself is founded on books: "Without them," says Bartholin, "God is silent, justice dormant, physic at a stand, philosophy lame, letters dumb, and all things involved in Cimmerian darkness." De Libr. Legend. Diff. i. p. 5.

The eulogiums which have been bestowed on books are infinite: they are represented "as the refuge of truth, which is banished out of conversation; as standing counsellors, and preachers, always at hand, and always disinterested; having this advantage over oral instructors, that they are ready to repeat their lesson, as oft as we please." Books supply the want of masters, and even, in some measure, the want of genius and invention: and can raise the dullest persons, who have memory, above the level of the brightest without them. An author who wrote not inelegantly, though in a barbarous age, sums up all their praises. Vide Lucas de Penna ap. Morhoff. Polyhist. lib. i. cap. 3. p. 27. "Liber est lumen cordis, speculum corporis, virtutum magister, vitiorum depulsor, corona prudentum, comes itineris, domesticus amicus, congerio talentis, collega & consiliarius praesidentis, myrothecium eloquentiae, hortus plenus fructibus, pratum floribus distinctum, memoriae penus, vita recordationis; vocatus properat, justus festinat, semper praesto est, nunquam non morigerus, rogatus confestim respondet; arcanam revelat, obscura illustrat, ambigua certiorat, perplexa resolvit, contra adversam fortunam defensor, secundae moderator, opes adauget, jacturam propulsat," &c.

Perhaps their greatest glory is, the affection borne them by many of the greatest men in all ages: M. Cato, the elder Pliny, the emperor Julian, and others, are on record for a very extraordinary devotion to books. This last has perpetuated his passion by some Greek epigrams in their praise. Richard Bury, bishop of Durham, and lord chancellor of England, has a treatise express on the love of books. Philobiblion, five de Amore Librorum. Vide Plin. Epist. vii. lib. iii.

Cato's attachment to books may be observed in the following paragraph.

"M. Catonem vidi in bibliotheca sedentem multis circumfusum Stoicorum libris. Erat enim, ut scis, in eo inexhausta aviditas legendi, nec satiari poterat: quippe qui, ne reprehensionem vulgi inanem reformidans, in ipsa curia soleret legere, saepe dum fenatus cogere, nihil operæ reipublicæ detrahebat." Vide Cic. de Divin. lib. iii. n. 11. See also Cic. Orat. pro Arch. tom. iv. p. 2182.

Books, the *ill effects* objected to, are, that they employ too much of our time and attention; engage us in pursuits of no use to the commonwealth, and indispose us for the functions of civil life; that they render men lazy, and prevent their exerting their own talents, by furnishing them, on every occasion, with things that are the productions of others; and that our natural lights become weakened and extinguished, by inuring ourselves to see only with foreign lights: besides, that ill men are hereby furnished with means of poisoning the people, and propagating superstition, immorality, enthusiasm, or irreligion, which will always spread faster, and be received more greedily, than lessons of truth and virtue. Many other things are added concerning the emptiness of books, and the errors, fables, and follies they are fraught with: which, together with the multitude and perplexity of them, are such, that it may seem easier to discover truth in the nature and reason of things, than in the uncertainty and confusion of books. Add, that books have turned the other instruments of knowledge out of doors, as experiments, observations, furnaces, and the like, without which the natural sciences can never be cultivated to purpose; and that, in mathematics, books have so far superseded the exercise of invention, that the generality of mathematicians are now contented to learn the solution of problems from others; which is to relinquish the chief end of their science; since what is contained in mathematical books is properly the history only of mathematics, not the science, art, or talent of solving questions; which is hardly to be had from books, but only from nature and meditation.

Books, for the art of *writing*, or *composing*, we have much fewer helps and instructions than for the art of speaking; though the former be the more difficult of the two; as a reader is not so easy to be imposed upon, but has better opportunities of detecting faults than a hearer. A great cardinal, indeed, reduces an author's business to a few heads; were they but as easily practised as prescribed; "Let him consider who it is writes, what, how, why, and to whom." August. Valer. di Caut. in edend. lib. *The conditions required in a book* are, according to Selden, "solidity, perspicuity, and brevity:" the first will be best attained, by keeping the piece long by us, often reviewing and correcting it by the advice of friends: the *second*, by disposing the sentiments in a due order, and delivering them under proper and usual expressions: the *third*, by throwing every thing aside that does not immediately concern the subject. Were these rules observed, it would scarcely be possible for any, except an angel from heaven, to write many books. "Vix totidem quot Thebarum portæ vel divitiis ostia Nili." The custom is much altered since the times of the ancients, who carried their scrupulousness into what relates to the composition of books beyond all that has been above expressed; so August was the idea they formed of a book, that nothing would suffice less than its being a treasure: "thesaurus oportet esse, non libros:" no labour, no assiduity and exactness, were thought enough to fit a work for the public view: every sentiment and expression were to be maturely weighed, and turned on all sides; and not suffered to pass, unless every word were a pearl, and every page beset with

gems. So that they put the reader in possession in a single hour, of what had cost them perhaps ten years' intense thought and application. Such were those books, which were reputed "cedro digni," fit to be anointed with cedar-juice, and thus rendered incorruptible, for the instruction of all future ages.

Books, for the origin of, we have nothing that is clear: the books of Moses are doubtless the oldest of all that are extant; but there were books before them, for Moses cites several. A book of Enoch is cited in the epistle of Jude, v. 14. and 15. from which some endeavour to prove the reality of antediluvian writings; but the book cited by that apostle is generally allowed both by ancient and modern writers to be spurious. See BIBLE.

Of prophane books, the oldest extant are Homer's poems, which were even so in the time of Sextus Empiricus; though we find mention in Greek writers, of about seventy others prior to Homer; as Hermes, Orpheus, Daphne, Horus, Linus, Musæus, Palamedes, Zoroaster, &c. but of the greater part of these, there is not the least fragment remaining; and of the others, the pieces which go under their names are generally held by the learned supposititious. F. Hardouin goes farther: charging all the ancient books, both Greek and Latin, except Cicero, Pliny, Virgil's Georgics, Horace's Satires and Epistles, Herodotus, and Homer, as spurious, and forged in the thirteenth century, by a club of persons under the direction of one Severus Arcontius. Fab. Bib. Græc. lib. i. cap. 1. § 1. § 6. tom. i. Hardouin de Num. Herod. in Proluf. Act. Erud. Lips. an. 1710. p. 70.

Among the Greeks, it is to be observed, the oldest books were in verse, which was prior to prose; Herodotus's history is the oldest book extant of the prosaic kind. Strabo. Geog. lib. i. Heuman. Via ad Hist. Liter. § 20. p. 50. § 21. p. 52.

Books, the multitude of, has been long complained of: the complaint is as old as Solomon, who lived three thousand years ago: they are grown too numerous, not only to procure and read, but to see, to learn the names of, or even to number. England has more to fear on this score, than other countries; since, besides our own produce, we have, for some years past, drained our neighbours. However, as bishop Caramuel's scheme miscarried, which was to write about a hundred volumes in folio, and then prevail on the civil and military powers to oblige all their subjects to read them, we need not much regret the multitude of books.

In reality, there are few of the immense number of books which deserve seriously to be studied: for the rest, part of them, like this, are only to be occasionally consulted, and the rest read for amusement. A mathematician, for instance, ought not to be entirely ignorant of what is contained in the mathematical books: but then a general knowledge is sufficient, which may easily be had by running over the chief authors; out of whom references may be made, directing to the places where they may be found, when wanted. For there are many things which are much better preserved in books than in the memory; as astronomical observations, tables, rules, theorems, proportions, and in fine, whatever does not spontaneously adhere to the memory, when once known. For the less we crowd that faculty, the readier and freer will the genius remain for inventing.

Other books may be valuable in themselves, for some special purpose, or in some peculiar science, but are not fit to be perused except by those who are engaged in that particular science, or business. To what use is it for a divine, or a physician, or a tradesman, to read over the huge volumes of reports of adjudged cases in the law? Or for a lawyer to learn Hebrew and read the Rabbins, unless his inclination

leads him, and his leisure allows him to employ himself in this way? For improvement of knowledge and saving of time, it is of great importance for young persons to have the most proper books for his reading, recommended by a judicious friend.

Books of importance of any kind, and especially complete treatises on any subject, should be first read in a more general and cursory manner, to learn in some degree what the treatise promises, and what you may expect from the writer's manner and skill. For this purpose let the preface be read, and the table of contents, if there be any, before this first survey of the book. By this means you will not only be better fitted to give the book a first reading, but be much assisted in a second perusal of it, which should be done with greater attention and deliberation, and you will learn with more ease and readiness what the author professes to teach. In reading it will be useful to mark what is new or unknown to you before, and to review those chapters, pages, or paragraphs. Unless a reader has an uncommon and most retentive memory, we may venture to affirm, that there is scarcely any book or chapter worth reading once, that is not worthy of a second perusal. At least it will be proper carefully to review all the lines or paragraphs which were previously marked, and to recollect the sections which were thought truly valuable. There is another reason why it will be useful to take a superficial and cursory survey of a book, before we sit down to read it, and to dwell upon it with studious attention; and that is, that there may be several difficulties in it, which we cannot easily understand and resolve at the first reading, for want of a fuller comprehension of the author's whole scheme. Many such difficulties would be unravelled when we have proceeded farther in such books, or would vanish themselves upon a second reading. What we cannot thoroughly understand at first may be noted down as matter of subsequent consideration and inquiry, if the pages that follow do not happen to strike a complete light on those which went before. In perusing books that treat of subjects of natural, moral, or divine science, it should be considered that it is our business, not merely to know the opinion of the author, for this is but the mere knowledge of history; but truly to reflect, whether his opinions are just or not, and to improve our own knowledge of the subject by a careful investigation of it. With this view we should deal freely with every author whose works we read, and yield our assent only to evidence and just reasoning. If a writer on any particular subject, to which your attention is directed, maintains sentiments similar to your own, but does not explain his ideas, or prove his positions to your satisfaction, mark his defects, or faults, and endeavour to do it better, either in the margin of your book, or rather on some papers of your own. e. g. When the author is obscure, enlighten him; where he is imperfect, supply his deficiencies; where he is too concise, amplify, and set his notion, in a fairer view; where he is redundant, mark the paragraphs that ought to be retrenched; where he trifles and indulges to impertinence, abandon those passages, or pages; where he argues, observe whether his reasons be conclusive; if the conclusion be true, but the argument weak, endeavour to confirm it by better proofs; where he deduces any propositions obscurely, or doubtfully, make the justness of the inference to appear, and add further inferences or corollaries, if such occur to your mind; where you suppose he is mistaken, propose your objections, and correct his errors; what he writes so well as to approve itself to your judgment, as both just and useful, treasure up in your memory, and count it a part of your intellectual gains. If the method of a book be irregular, reduce it into form,

by an analysis of your own, or by hints in the margin : if those things are heaped together, which should be separated, distinguish and divide them. If several things relating to the same subject are scattered through various parts of the same treatise, let them be brought together into one view, by suitable references ; or if the matter of a book be really valuable and deserving the labour, you may arrange it in a better method, reduce it to a more logical scheme, or abridge it into a lesser form. All these practices will have a tendency to advance your own skill in logic and method, to improve your judgment in general, and to give you a more comprehensive survey of that subject in particular. When you have finished the treatise, with all your observations upon it, recollect and determine what real improvements you have made by reading that author. If a book have no index, or good table of contents, it is useful to make such as you are reading it ; taking notice merely of those parts which are new and well written, and well worthy of remembrance, or review. If the writer be remarkable for any peculiar excellencies, or defects in his style, or manner of writing, attentively observe them, and whatever ornaments or blemishes occur in the language, or manner of the writer, you may make just remarks upon them. One book perused in the manner now proposed, will tend more to enrich the understanding, than skimming over the surface of 20 authors. " There are many who read," says the excellent author of whose useful observations we are now availing ourselves, (see Watts's Improvement of the Mind) " with constancy and diligence, and yet make no advances in true knowledge by it. They are delighted with the notions which they read, or hear, as they would be with stories that are told, but they do not weigh them in their minds as in a just balance, in order to determine their truth, or falshood ; they make no observations upon them, or inference from them. Perhaps their eye slides over the pages, or the words slide over their ears, and vanish like a rhapsody of evening tales, or the shadows of a cloud flying over a green field in a summer's day ; or, if they review them sufficiently to fix them in their remembrance, it is merely with a design to tell the tale over again, and to shew what men of learning they are. Thus they dream out their days in a course of reading without real advantage. As a man may be eating all day, and for want of digestion is never nourished ; so these endless readers may cram themselves in vain with intellectual food, and without real improvement of their minds, for want of digesting it by proper reflection."

" Never apply yourselves," says the same writer, " to read any human author with a determination, before-hand, either for or against him, or with a settled resolution to believe, or disbelieve, to confirm, or oppose whatsoever he saith ; but always read with a design to lay your mind open to truth, and to embrace it wheresoever you find it, as well as to reject every falshood, though it appear under never so fair a disguise. How unhappy are those men, who seldom take an author in their hands, but they have determined before they begin, whether they will like or dislike him ! They have got some notion of his name, his character, his party, or his principles, by general conversation, or perhaps by some slight view of a few pages ; and having all their own opinions adjusted before-hand, they read all that he writes with a prepossession either for or against him : unhappy those who hunt and purvey for a party, and scrape together out of every author, all those things, and those only which favour their own tenets, while they despise and neglect all the rest !" The author subjoins an useful caution ; and wishes not to be understood, as persuading a person to live without any settled principles, by which to judge of books, men, and

things, or to be always doubting about his foundations. But having settled, upon good grounds, the most necessary and important principles of science, prudence, and religion, we should read, with a just freedom of thought, all those books which treat of such subjects as may admit of doubt, or reasonable dispute. When we peruse those authors who defend our own settled sentiments, we should not hastily conclude that all their reasonings are just and solid ; nor eagerly embrace all their lesser opinions, because we agree with them in the greater. When we read those authors who oppose our most certain and established principles, we should be ready to receive any information from them in other points, and not abandon every thing they say, though we are well fixed in opposition to their main object :

" Seize upon truth where-e'er 'tis found,
Amongst your friends, amongst your foes,
On Christian, or on heathen ground ;
The flower's divine where-e'er it grows ;
Neglect the prickles, and assume the rose."

Upon the plan of reading above stated and recommended, a few books well chosen, and thoroughly studied, may suffice. It may be added, that as knowledge is naturally advantageous, and as every man ought to be in the way of information, even a superfluity of books is not without its use, since hereby they are brought to obtrude themselves on us, and engage us when we had least design. This advantage, an ancient father observes, we owe to the multiplicity of books on the same subject, that one falls in the way of one man, and another best suits the level, or the apprehension, of another. " Every thing that is written," says he, " does not come into the hands of all persons : perhaps some may meet with my books, who may hear nothing of others which have treated better of the same subject. It is of service, therefore, that the same questions be handled by several persons, and after different methods, though all on the same principles, that the explications of difficulties, and arguments for the truth, may come to the knowledge of every one, by one way or other." Add, that the multitude is the only security against the total loss or destruction of books : it is this that has preserved them against the injuries of time, the rage of tyrants, the zeal of persecutors, and the ravages of barbarians ; and handed them down, through long intervals of darkness and ignorance, safe to our days. " Solaque non norunt hec monumenta mori." *Bac. de Augm. Sc. lib. i. August. de Trin. lib. i. cap. 3. Barthol. lib. cit. Diff. i. p. 8, &c.*

Books, *the scarcity of*, is an evil much more to be lamented, in the survey of past ages, than their multitude at any later period. Before the art of printing was invented, the trouble and expence of procuring copies very much retarded the progress of literature. The universal ignorance that prevailed in Europe, from the seventh to the eleventh century, may be ascribed to the scarcity of books during that period, and the difficulty of rendering them more common, concurring with other causes arising from the state of government and manners. The Romans wrote their books either on parchment, or on paper made of the Egyptian papyrus. The latter, being the cheapest, was of course the most commonly used. But after the Saracens conquered Egypt, in the seventh century, the communication between that country and the people settled in Italy, or in other parts of Europe, was almost entirely broken off, and the papyrus was no longer in use among them. They were obliged on that account to write all their books upon parchment ; and as the price of that was high, books became extremely rare and of great value. We may judge of the scarcity of materials for writing them from one circumstance.

There still remain several manuscripts of the 8th, 9th, and following centuries, wrote on parchment, from which some former writing had been erased, in order to substitute a new composition in its place. Thus, it is probable, several of the works of the ancients perished. A book of Livy or of Tacitus might be erased, to make room for the legendary tale of a saint, or the superstitious prayers of a missal. As the want of materials for writing accounts for the loss of many of the works of the ancients, and for the small number of MSS. previous to the 11th century, many facts prove the scarcity of books at this period. Private persons seldom possessed any books whatever; and even monasteries of note had only one missal. Towards the end of the seventh century, even in the papal library at Rome, the number of books was so inconsiderable, that pope St. Martin requested Sanctamand, bishop of Maestricht, if possible, to supply this defect from the remotest parts of Germany. In the year 855, Lupus, abbot of Ferrieres in France, sent two of his monks to pope Benedict III. to beg a copy of Cicero de Oratore and Quintilian's Institutes; "for," says the abbot, "although we have part of these books, there is no complete copy of them in all France." At the beginning of the tenth century books were so scarce in Spain, that one and the same copy of the bible, Jerome's epistles, and some volumes of ecclesiastical offices and martyrologies, often served several different monasteries. Among the constitutions given to the monks of England by archbishop Lanfranc, in 1072, the following injunction occurs: At the beginning of Lent, the librarian is ordered to deliver a book to each of the religious, for the perusal of which a whole year was allowed; and at the returning Lent, those monks who had neglected to read the books they had respectively received, are commanded to prostrate themselves before the abbot, and supplicate his forgiveness. In 1299, John de Pontiffara, bishop of Winchester, borrows of his cathedral convent of St. Swithin, at Winchester, "bibliam bene glossatam," that is, the bible, with marginal annotations, in two folio volumes; but gives a bond for the return of it, drawn up with great solemnity. For the bequest of this bible to the convent, and 100 marks, the monks founded a daily mass for the soul of the donor. If any person gave a book to a religious house, he believed, that so valuable a donation merited eternal salvation, and he offered it on the altar with great ceremony. The prior and convent of Rochester declare, that they will every year pronounce the irrevocable sentence of damnation on him, who shall purloin or conceal a Latin translation of Aristotle's Poetics, or even obliterate the title. Sometimes a book was given to a monastery, on condition that the donor should have the use of it for his life; and sometimes to a private person, with the reservation that he who receives it should pray for the soul of his benefactor. In the year 1225, Roger de Infula, dean of York, gave several Latin bibles to the university of Oxford, on condition that the students who perused them, should deposit a cautionary pledge. The library of that university, before the year 1300, consisted only of a few tracts, chained or kept in chests, in the choir of St. Mary's church. Among the statutes of St. Mary's college at Oxford, in 1446, one is, that no scholar should occupy a book in the library above one hour, or two hours at most, so that others shall be hindered from the use of the same. The famous library established in the university of Oxford by Humphrey duke of Gloucester, a munificent patron of literature, contained only 600 volumes. About the beginning of the 14th century, there were only four classics in the university of Paris, which were single copies of Cicero, Ovid, Lucan, and Boethius.

The price of books became so high, that persons of a moderate fortune could not afford to purchase them. In the year 1174, Walter, prior of St. Swithin's at Winchester, purchased of the monks of Dorchester, in Oxfordshire, Bede's homilies and St. Austin's psalter for twelve measures of barley and a pall, on which was embroidered in silver the history of St. Birinus converting a Saxon king. About the year 1400, a copy of John of Meun's "Roman de la Rose" was sold before the palace-gate at Paris for 40 crowns, or 33l. 6s. 6d. The countess of Anjou paid, for a copy of the homilies of Haimon, bishop of Halberstadt, 200 sheep, five quarters of wheat, and the same quantity of rye and millet. Even so late as the year 1471, when Louis XI. of France borrowed the works of Rhafis, the Arabian physician, from the faculty of medicine at Paris, he not only deposited by way of pledge a considerable quantity of plate, but he was obliged to procure a nobleman to join with him as surety in a deed, binding himself under a great forfeiture to restore it. Many other instances might be cited, in order to shew how scarce books were at the period to which we now refer, and with what difficulty, and at what extravagant prices, copies of them were procured; and therefore we can be at no loss in accounting for the extreme ignorance that prevailed. But when, in the 11th century, the art of making paper was invented, and more especially after the manufacture became general, the number of MSS. increased, and the study of the sciences was wonderfully facilitated. Indeed, the invention of the art of making paper, and the invention of the art of printing, are two very memorable events in the history of literature and of human civilization. It is remarkable, that the former preceded the first dawning of letters and improvement in knowledge, towards the close of the eleventh century; and the latter ushered in the light which spread over Europe at the æra of the reformation. Murat. Antiq. Ital. vol. iii. vol. ix. Mem. de l'Acad. des Inscrip. tom. ix. Hist. Lit. de France, par des Religieux Benedictins, tom. vii. Naudé Addit. a l'histoire de Louis XI. par Comines, ed. Frefroy, tom. iv. Robertson's Hist. Ch. v. vol. i. Wharton's Eng. Poetry, vol. i. diss. 2.

Books, to form a judgment of. Those who have treated of the subject, direct us to observe the title, the author's or editor's name, the number of the edition, the place where and the year when it is printed (which in old books is frequently marked at the end), and the printer's name, especially if it be a celebrated one; proceed then to the preface, and index of contents, and look for the author's design, and the occasion of his writing; consider also his country (each nation having its peculiar genius), which may sometimes be learned from the dedication; if his life be annexed, run it over, and note his profession, what rank he was of, and any thing remarkable that attended his education, studies, conversation, or correspondences with learned men; not forgetting the eulogies which have been given to the author, which often occur at the beginning, or even any critique or censure, especially if made by a man of judgment. If the preface does not give an account of the method of the work, run briefly over the order and disposition of it, and note what points the author has handled; observe whether the things and sentiments he produces be trite and vulgar, or solid, and fetched from greater depths. Note, whether he go in the common road, or make any innovation, and introduce any new principle.

But it is a small number of books we have opportunity of thus judging of by perusing them; besides, when we have read a book over, the judgment comes too late for many purposes. Life is too short, and time is too precious, to read every new book quite over, in order to find that it is

not worth reading. It seems necessary, therefore, to have other indications, whereby to prevent our being at the charge of procuring, or the pains of perusing a worthless book. Divers rules of this kind are given by Baillet, Struvius, Stollius, and others; which, though in reality no more than presumptions, and frequently liable to be falsified, are not without their use. The journalists de Trevoux objected to them all: "The shortest way," say they, "to judge of a book is to read it, if you be qualified in the subject; otherwise to refer yourself to those who are so." Heuman is somewhat more explicit; making it a mark that "a book is good, when it is esteemed by persons intelligent in the subject it treats of; and when those who commend it receive no advantage from the applause they bestow on it, nor are leagued with the author in any cabal, for espousing any particular principle, system, or party, in religion or learning." Baillet, Jugem. des Scav. tom. i. b. ii. p. 121. Struv. Introd. ad Not. Rei Liter. cap. 5. § 3. p. 390. Stoll. Introd. Hist. Liter. p. i. § 11. p. 9. Budd. de Criteriis boni libri, passim. Mem. de Trev. an. 1712. Art. 17. Heuman. Comp. Reipubl. Liter. cap. vi. § 11. p. 280.

But more particularly, it is an indication that a book is good; 1. If the author be known to excel in that talent more immediately necessary for such a subject; or have already published any thing on the same that is esteemed. Thus we may conclude, that Julius Cæsar will teach us the art of war better than Peter Ramus; Cato, Palladius, and Columella, agriculture better than Aristotle; and Cicero, oratory better than M. Varro: add, that it is not enough the author be skilled in the faculty, but that he be so in the particular branches of it, concerning which he treats; some, for instance, excel in the civil law, yet not in the public law; Salmatus proved himself an excellent critic in his Exercitatus. Plinian. but was much inferior to Milton in his Defensio Regia. 2. If the book be on a subject that requires great reading, it may be presumed good, if the author had a copious library, or could have access to one; or if he lived in a place where books were not wanting; though here is danger too of running into excess of quotations; especially, says Struvius, if the author be a lawyer. 3. A book which took up a long time in composing, cannot often fail of being good. 4. Books on points of doctrine by eclectic writers, are to be presumed better than those writ by the retainers to particular sects. 5. The age of a writer may also give us some indication: books, which require labour, are usually better performed by younger persons than those who are far advanced in years. 6. Another indication may be taken from the author's state and condition: thus, history written by a person who was an eye-witness to what he relates, or is concerned in public affairs, or has access to the public records, or other monuments, from whence intelligence may be drawn; who is not biassed by party, or any other indirect or sinister motive, will be supposed to be good. Thus Sallust and Cicero were well able to write the history of Cataline's conspiracy. D'Avila, de Comines, Guicciardin, Clarendon, &c. were present in the civil wars they describe; Xenophon, having an employment in the Spartan state, has treated excellently of that commonwealth; and Amelot de la Houffaye, by living long at Venice, was enabled to explain the secrets of their policy. Camden wrote annals of the affairs of his own time; Thuanus had correspondence with the best writers in every country; and Puffendorf had access to the public archives. So, in literary matters, we give credit to those who have the direction of libraries. 7. The time or age wherein the author lived may give some light; every age having, according to Barclay, its peculiar

genius and excellency. See Bartholin. Struv. Budd Heuman. Bail. lib. cit.

Some judge by the bulk or size of books; following the grammarian Callimachus's rule, that every great book is of course an ill one, *μεγα βιβλιον, μεγα κικρον*; a single leaf of the Sybil was doubtless preferable to the vast annals of Volubius: yet Pliny's observations will nevertheless hold true, that "a good book is so much the better by how much it is bigger." Plin. Epist. 20. lib. i. Martial prescribes a remedy against the largeness of a book, when that is the only complaint, read but a little of it:

"Si nimius videar, seraque coronide longus
Esse liber, legito pauca, libellus ero."

Yet is the smallness of a book a real presumption in its favour: he must be a poor author, who cannot furnish a pamphlet, or loose sheet, with things curious, and written with spirit; but to support the fame through a volume in folio, requires very extraordinary abilities indeed. Addis. in Spec. N^o 124.

There are some general mistakes, which persons are frequently guilty of in passing judgment on the books which they read. One is, when a treatise is written but tolerably well, we are ready to pronounce a favourable judgment of it, and sometimes to exalt its character far beyond its merit, if it agree with our own principles and support the opinions of our party. On the other hand, if the author be of different sentiments, and espouse contrary principles, we can find neither wit nor reason, good sense, nor good language in it. For avoiding or correcting this error, it should be considered, that books are never to be judged of merely by their subject, or the opinion they represent, but by the justness of their sentiments, the beauty of their manner, the force of their expression, or the strength of reason, and the weight of just and proper argument, which appear in them. Another mistake, which some persons fall into, is this: When they read a treatise on any subject, with which they have but little acquaintance, they find almost every thing new and strange to them, their understandings are much gratified and improved by many things unknown to them before; and hence they are led to admire the treatise, and commend the author: whereas, if they had previously attained a considerable degree of skill in that science, perhaps they would have found that the author had written very indifferently, that neither his sense nor his method was just and proper, and that he delivered nothing that was not very common or very trivial, in his discourses on that subject. On the other hand, if we have made ourselves masters of any particular theme of knowledge, and surveyed it long on all sides, there is scarcely any writer who much pleases us afterwards, because we find little or nothing new in him; and yet in a true judgment perhaps his sentiments are unexceptionably just, his illustrations clear, and his reasonings forcible, and all the parts of the discourse are well connected and set in a happy light; but we knew most of these things before, and therefore they do not strike us, and we are in danger of discommending them. There are some other follies into which persons are apt to be betrayed in forming their judgment of books. Some persons, who are of a forward and lively temper, and who are fond of intermeddling with all appearances of knowledge, will give their judgment of a book as soon as the title of it is mentioned. for they would not seem ignorant of any thing that others know; and especially, if they happen to have any superior character or possessions, they fancy they have a right to talk freely and to pronounce magisterially on every thing, even of a literary kind, that occurs. Thus, blind men will talk of the beauty

beauty of colours, and of the harmony or disproportion of figures in painting; the deaf will prate of discords in music; and those who have no pretensions to literature, will pronounce, with an unpardonable presumption, on books of science; and those who have little or no acquaintance with either the speculative or practical principles of religion, will arraign the best treatise on divine subjects, though they do not understand the very language of the Scripture, nor the common terms or phrases used in Christianity. Judges of another description set themselves up to decide in favour of an author, or against him, according to the company they have kept, and the judgment pronounced concerning a book by others of their own stamp or size, though they have no knowledge or taste of the subject themselves. These, with a fluent and voluble tongue, become mere echoes of the praises or censures of other men. Others, again, pass judgment from the secret stimulations of vanity, pride, or envy; and in order to justify an unwarrantable and severe censure, they will allege a mistake or two, which they have discovered, or a few sentiments and expressions not suited to their capricious taste and humour. It is, however, an indication of perverseness and prejudice, to rail at any human performance because it is not absolutely perfect. Horace has given us a better example:

“Sunt delicta tamen, quibus ignovisse velimus:
Nam neque chorda sonum reddit, quem vult manus, et
mens,

Posteque gravem per sepe remittit acutum;
Nec semper feriet quodcumque minabitur arcus
Verum, ubi plura nitent in carmine, non ego paucis
Offendam maculis, quas aut incuria fudit,
Aut humana parum cavit natura.”— De Art. Poet.

“Be not too rigidly censorious:
A string may jar in the best master’s hand,
And the most skilful archer miss his aim;
So in a poem elegantly writ,
I will not quarrel with a small mistake,
Such as our nature’s frailty may excuse.” RosCOMMON.

Another, and very frequent fault in passing judgment upon books, is this, that persons spread the same praises, or the same reproaches, over a whole treatise, which are justly applicable only to some detached parts of it. After all, when any person pretends to give his judgment of a book, we should consider whether he be a capable judge, or whether he may not lie under some unhappy bias or prejudice, for or against it, or whether he has made a sufficient inquiry to enable him for forming a just opinion. Watts’s Improvement of the Mind apud Works, vol. v. ch. 4—5.

See farther concerning books, in the writers on literary history, libraries, studies, learning, arts, and sciences; more especially in Salden, Bartholin, Hodannus, Sacchinus, Baillet, Buddeus, Saalbach, Putherbeus, Raynaud, Schufner, Lauffer, Schwartzius, Crenius, Morhoff, and others, who have written treatises expressly concerning books. Christ. Liberius, i. e. Gul. Saldenus, *βιβλιοφιλια, sive de Libris scribendis et legendis*, Ultraj. 1681. 12mo. et Amstel. 1688, 8vo. Struv. *Intro. ad Hist. Liter.* c. 5. § 21. p. 454. Th. Bartholin. *de Libris legendis*, 1678, 8vo. & Francof. 1711, 12mo. Struv. *loc. cit.* Jo. Fred. Hodanni *Dissert. de Libris legendis*, Hanov. 1705, 8vo. Fr. Sacchini *de Ratione Libros cum profectu legendi*, Lips. 1711, 12mo. Baillet, *Jugemens des Scavans sur les principaux Ouvrages des Auteurs*, tom. i. Chr. Frid. Buddeus, *de Criteriis boni Libri*, Jen. 1714. Chr. Saalbach. *Schediasma de Libris veterum*, Gryphis, 1705, 4to. Fabric. *Bibl. Ant.* cap. 19. § 7. p. 607. Reimm. *Idea Syst. Antiq. Liter.* p. 229, seq. Gab. Putherbeus, *de tollendis et expurgandis*

malis Libris, Par. 1549, 8vo. Theoph. Raynaud. *Erotemata de bonis ac malis Libris*, Ludg. 1653, 4to. Morhof. *Polyhist. Liter. lib. i. cap. 16. n. 28. p. 177.* Schufner, *Dissert. Acad. de Multitudine Librorum*, Jenæ, 1702, 4to. Lauffer, *Dissert. advers. nimiam Librorum Multitudinem*. *Vide Jour. des Scavans*, tom. lxxv. p. 572. Chr. Got. Schwartzius, *de Ornamentis Librorum apud Veteres*, Lips. 1705 and 1707. Tho. Crenius, *de Libris Scriptorum optimis et utilissimis*. Ludg. Bat. 1704, 8vo.; an extract of which is given in *Act. Erud. Lips. an. 1704*, p. 526, & seq.

The importation or sale of mass-books, or other popish books, is by stat. 3 Jac. I. c. 5. § 25. liable to a penalty of forty shillings.

The importation of books first printed in this kingdom, and reprinted abroad, is prohibited under a penalty of 5l. and double the value of every book so imported and sold. *Vide stat. 12 Geo. II. c. 36. § 1.*

There was a clause in the statute of the 8th of queen Anne, c. 19. empowering the chancellor, and some other great officers of state, to set the price of books; but this is now repealed by 12 Geo. II. c. 36. § 2.

The sole right of printing books bequeathed to the two universities of England, the four universities of Scotland, and the colleges of Eton, Westminster, and Winchester, are secured to them by stat. 15 Geo. III. c. 53. See *LITERARY Property*.

Books, *burning of*, was a kind of punishment sanctioned, both among the Greeks and Romans, by legal sentence. At Athens, the works of Protagoras were prohibited; and all the copies of them which could be collected, were burnt by the public crier. Diogenes Laert. l. ix. 52. At Rome, the writings of Numa, which had been found in his grave, were, by order of the senate, condemned to the fire, because they were contrary to the religion which he had introduced. Liv. l. xl. c. 29. Plin. xiii. 13. Plutarch. in vit. Numæ. As the populace of Rome were, in times of public calamity, more addicted to superstition than seemed proper to the government, an order was issued that all superstitious and astrological books should be delivered into the hands of the prætor. This order was often repeated; and the emperor Augustus caused more than 20,000 of these books to be burned at one time. Liv. l. xxv. c. 1. l. xxxix. 16. Tacit. *Annal.* vi. 12. Sueton. l. ii. c. 31. Sometimes the care of the execution of the sentence for burning books was committed to *triumviri* appointed on purpose; sometimes to the prætors; and sometimes to the ædiles. Labienus, whom from his satirical spirit some have called *Rabienus*, is said to have been the first who underwent the severity of it, under the emperor Augustus. His enemies procured a *senatusconsultum*, whereby all his books, published during several years, were ordered to be collected and burnt. The thing, says Seneca, (in the introduction to the fifth, or, as others reckon, the 10th book of his “*Controvertiæ*,”) then appeared new and strange to take revenge on learning! “*Res nova et infæcta, supplicia de studiis sumi!*” Cassius Severus, a friend of Labienus, hearing the sentence pronounced, cried aloud, that they must burn him too, since he had got all the books by heart; “*Nunc me vivum uri oportet, qui illos edidici.*” Labienus could not survive his books; but shutting himself up in the tomb of his ancestors, pined away, and was buried alive. It is related as somewhat singular, that a few years after, the writings of the person, who had been the cause of the order for burning Labienus’s books, shared the like fate, and were also publicly burned. In a manner somewhat similar, the works of Ben-Arias Montanus, who assisted to make the first catalogue of prohibited books, in the Netherlands,

therlands, were afterwards inserted in a catalogue of the same kind. The expression of Cassius above cited gave occasion to a law of Augustus against abusive writings. Tacit. Annal. l. i. c. 72. When Crenutius Cordus, in his History, called C. Cassius the last of the Romans, the ferate, in order to flatter Tiberius, caused the book to be burned; but a number of copies were concealed and preserved from the flames. Tacit. Annal. l. iv. c. 35. Antiochus Epiphanes caused the books of the Jews to be burned; and in the first centuries of our era, the books of the Christians were treated with equal severity, of which Arnobius (Adv. Gentes, l. iii. & iv.) bitterly complains. Eusebius informs us (Hist. Eccl. l. viii. c. 2.), that Dioclesian caused the sacred scriptures to be burned. After the spreading of the Christian religion, the clergy exercised against books that were either unfavourable or disagreeable to them, the same severity which they had censured in the heathens as foolish and prejudicial to their own cause. Thus, were the writings of Arius condemned to the flames at the council of Nice; and Constantine threatened with the punishment of death those who should conceal them. Socrates, l. i. c. 6. The clergy assembled at the council of Ephesus, requested the emperor Theodosius II. to cause the works of Nestorius to be burned, and their request was complied with. Cod. l. i. tit. 5, 6. The writings of Eutyches shared the like fate at the council of Chalcedon; and the same practice of burning books thought to be heretical with regard to religion, or injurious to the state in a political view, has been imitated in subsequent ages, and in various nations even of the Christian world.

Divers other ancient testimonies concerning the burning of books are given in Reimm. Idea Syst. Antiq. Liter. p. 389.

BOOKS, *Catalogue of.* See CATALOGUE.

BOOKS, *Censors of.* See CENSOR.

BOOKS, *Privilege of.* See PRIVILEGE.

BOOKS, *whitening of.* The following process for whitening prints, printed books, and paper, has been announced and described by M. Chaptal. Simple immersion in oxygenated muriatic acid, for a longer or shorter space of time, according to the strength of the liquid, will suffice to whiten an engraving. But in whitening the paper of a bound book, it is necessary that all the leaves should be moistened by the acid, and therefore the book must be well opened, and the leaves separated; and the boards must be made to rest on the edge of the vessel containing the whitening liquor. This liquor in the process assumes a yellow tint, and the paper becomes proportionably white. At the end of two or three hours, the book may be taken from the acid liquor and plunged into pure water; and the water should be renewed every hour to extract the remaining acid, and to dissipate the disagreeable smell. In order to render this process more effectual, the book-binders destroy the binding, unfasten the book, and separate its leaves; they then place these in cases formed in a leaden tub, with very thin slips of wood or glass, so that the leaves may lie flat and separate from one another at very small intervals. The acid is then gently poured into the tub, without deranging the leaves. When the paper is become sufficiently white, the acid liquor is drawn off by a cock at the bottom of the tub; and its place is supplied by clear, fresh water. The leaves are then dried, and, after being pressed, re-bound. The leaves may with greater advantage be placed vertically in the tub. With this view, M. Chaptal constructed a wooden frame, adjusted to the proper height, according to the size of the leaves proposed to be whitened. This frame supported very thin slips of wood, at the distance from one another of half a line. In each of these intervals he placed two leaves, and kept them

fixed in their place by two small wooden wedges, pushed in between the slips. When the paper was whitened, he lifted up the frame with the leaves, and plunged them into cold water, to take off the remaining acid, as well as the smell. By this operation books are not only cleaned, but the paper acquires a degree of whiteness superior to what it possessed when first made. This acid will also serve to destroy ink spots; but it has no action upon spots of oil, or animal grease; however, a weak solution of pot-ash will effectually remove stains of that kind. To oxygenate the muriatic acid, it is only necessary to dilute it, and mix it in a very strong glass vessel with manganese, in such a manner that the mixture may not occupy the whole content of the glass. Air-bubbles are formed upon the surface of the liquor; the empty space is filled with a greenish vapour; and, at the end of some hours, the acid may be further diluted with water, and then used. In order to remove spots of grease from books and prints, M. Deschamps, member of the Philosophical Society at Lyons, recommends to take out as much as possible of it by means of blotting paper; and then to dip a small brush in the essential oil of well rectified spirit of turpentine, heated almost to ebullition, and draw it gently over both sides of the paper, which must be carefully kept warm. This operation must be repeated as often as the quantity of grease imbibed by the paper, or the thickness of the paper, may render necessary. When the grease is entirely removed, the paper may be restored to its former whiteness, by dipping another brush in highly rectified spirit of wine, and drawing it, in like manner, over the place which was stained, and particularly round the edges, to remove the border that would still present a stain. Bibliotheque Economique, vol. i. See BLEACHING.

BOOK, *common-place.* See COMMON-PLACE.

BOOK, *text.* See TEXT.

BOOK, is also used for a part or division of a volume, or large work.

In this sense we say the book of Genesis, the first book of Kings, the five books of Moses, &c.—The Digest is contained in fifty books, the Code in twelve books.

Books are usually subdivided into chapters, sometimes into sections, or paragraphs: accurate writers quote chapter and book.

BOOK is also used for a list or catalogue of persons' names.—Such among the ancients were the *censores' books*, being tables or registers containing the names of all those who were censured or taxed under Augustus. Tertullian assures us, that our Saviour's name was found in the censorial book of Augustus. Adv. Marcion. lib. iv. cap. 7. See CENSUS.

BOOKS, in *Matters of Commerce*, denote the several registers wherein merchants and other dealers keep their accounts. Hence to *book*, is to register in a book.

We say, such a person's books are in good order; merchants cannot possibly do without books; they are even obliged by the laws to keep books. But more or fewer are required, according to the nature or extent of their dealings, or the precision and exactness they desire therein.

The ancients had also their books of accounts; witness the *codex accepti & expensi*, so often mentioned in Roman writers; and the *patrimonial books*, which were rentals, containing an account of the lands, goods, and chattels, and other effects belonging to each person.

Among the defects to which the trial by jury is subject, one is the want of a compulsive power for the production of books and papers belonging to the parties. In the hands of third persons, they can generally be obtained by rule of court, or by adding a clause of requisition to the writ or "subpoena," which is then called a "subpoena duces tecum."

But, in mercantile transactions especially, the right of the party's own books is frequently decisive; as the day-book of a trader, when the transaction was recently entered, as really understood at the time; though subsequent events may tempt him to give it a different colour. And, as this evidence may finally be obtained, and produced on a trial at law, by the circuitous course of filing a bill in equity, the want of an original power for the same purposes in the courts of law is a material defect.

BOOK-BINDING, the art of sewing together the sheets of a book, and covering them with a back, and strong paste-board sides, secured with leather, &c.

Binding is distinguished from stitching, as in the latter the leaves are only sewed, without bands or backs.

We say, *French-binding*, *law-binding*, *marble-binding*, *binding* in parchment, in sheep, in calves leather, &c. also *half-binding*, wherein the leaves are generally left uncut, and only the back covered with leather, the pasteboard sides being covered with marbled, or blue paper. *Dutch-binding* is where the backs are of vellum. The Italians are still contented to bind in a coarse, thick paper, called *binding alla rustica*, the inconvenience of which is its being liable to wear out without careful use. Without doubt, the art of binding is almost as ancient as the science of composing books; and both the one and the other followed immediately the first invention of letters. Whatever the matter might be, on which men first wrote, there was a necessity of uniting the several parts together; as well for the making them of one piece, as for the better preserving them; hence the origin of *book-binding*.

According to Olympiodorus (apud Phot.) it was one Phillatius, a learned man at Athens, who first taught the use of a kind of glue, to fasten the several leaves together; on which account a statue was erected to him.

Books, the manner of binding in volumes, i. e. of gluing the leaves together; that of rolling them on round pieces, or cylinders of wood, appears the most ancient; though that of binding them square, and of sewing several quires one over another, lays claim to considerable antiquity. The first of the two, which we call *Egyptian* binding, held a long time after the age of Augustus; but it is now disused, excepting in the Jewish synagogues, where they continue to write the books of the law on vellum sewed together; making, as it were, only one long page, with two rollers and their clasps of gold and silver, at each extremity.

The form now in use is the *square-binding*, which is said to have been invented by one of the Attali, kings of Pergamus; to whom we likewise owe the manner of preparing parchment, called in Latin, from the name of his capital, *Pergamena*, or *Charta Pergamea*.

Books, manner of binding. The first operation is to fold the sheets according to the form, viz. into two leaves for folios, four for quartos, eight for octavos, &c. which the workmen do with a slip of ivory or box, called a *folding-stick*; in this they are directed by the catch-words and signatures, which are the letters with the numbers annexed to them, at the bottom of the pages. The leaves thus folded, and laid over each other in the order of the signatures, are beaten on a stone with a heavy hammer to make them solid and smooth, and then pressed. Being thus prepared, they are sewed in a sewing-press, upon pack-threads or cords, which are called bands, at a proper distance from each other, and in a convenient number; which is done by drawing a thread through the middle of each sheet, and giving it a turn round each band, beginning with the first, and proceeding to the last. The common number of bands is six in folios, and five in quartos, octavos, &c. Sometimes they use a

saw to make places for the bands, which are sunk into the paper, so that the back of the book, when bound, is smooth, without any appearance of bands. After this the backs are glued, the ends of the bands being opened, and scraped with a knife, for the more convenient fixing of the paste-boards; then the back is turned with a hammer, the book being fixed in a press between boards, called *backing-boards*, in order to make a groove for admitting the paste-boards. The boards being then applied, holes are made for drawing the bands through, the superfluous ends being cut off, and the parts hammered smooth. Then the book is pressed in order for cutting; which is performed by a particular machine called a *plough*, to which is fixed a knife. After this the book is put into a press called the *cutting-press*, betwixt two boards, the one lying even with the press, for the knife to run upon; the other above it, for the knife to cut against.

The book being cut, the pasteboards are squared with a proper pair of iron shears; and it is then ready for sprinkling, gilding, blacking, or marbling the leaves. The colours with which it is sprinkled, are usually vermilion, or sap-green; which is done with a brush made with hog's bristles, holding the brush in one hand, and moving the hair with the other.

In the *French-binding* a book is put in parchment, i. e. a slip of parchment is applied over the back between each band, and the ends pasted on the inside of each paste-board. This preparation, called *indorsing*, seems peculiar to the French binders; who are enjoined by ordonnance to back their books with parchment on the penalty of 30 livres, and the re-binding of the book; it is done in the press, where the back being grated to make the paste take hold, the parchment is applied; and they afterwards add glue to fortify it.

In 1799 a patent was granted to Mr. John Williams and Mr. Joseph Williams, stationers, London, for an improved method of binding all sorts of books. By the specification it appears, that this invention consists of a back, of a semi-circular, semi-oval, or any other curved form, turned a little at the edges, made of iron, steel, copper, brass, tin, or any other metal, ivory, bone, wood, vellum, paper, leather, or any material capable of retaining a firm situation. This back, being put on the book before bound, so as just to cover but not to press the edges of the paper, will, when the book is opened, prevent its spreading on either side, and cause it to rise in any part which is opened to nearly a level surface. This firm back, turned at the edges, so as to cause all sorts of books to open freely, is the object of this patent. The method of binding, practised by the inventors, is as follows: they forward the paper in the usual manner; sew on vellum slips, glue, cut, clothe, and board, or half-board; and put on the firm back by fastening it at the sides, through holes, by vellum, or securing it by inclosing it in vellum or ferret wrappers, or other matters, passed down upon, or drawn through the boards. Mr. Ebenezer Palmer, stationer of London, obtained a patent in 1800 for an improvement in the mode of binding books, particularly account books of merchants. This consists in the addition of a certain metallic chain, which is made or applied in the following manner: first, provide several small bars of metal, about the thickness of a shilling, or more, according to the size and thickness of the book; the length of each bar being from half an inch to several inches long, in proportion to the strength required in the back of the book. At each end of every bar is made a pivot of different lengths, in proportion to the thickness of two links, which they are to receive. Each link is made in an oval form, and contains two holes, proportioned

portioned to the sizes of the pivots; and these links are of the same metal as the hinge; each of them being nearly equal in length to the width of two bars. The links are then rivetted on the pivots, each pivot receiving two of them, and thus holding the hinge together, on the principle of a link-chain or hinge. There are further two holes or more of different sizes, as required in each bar of the hinge or chain, by means of which each section of the book is strongly fastened to the same; which hinge, so fastened, operates with the back of the book, when bound, in such manner as to occasion the several sections to open so as to bring them on a parallel with each other, and consequently admit the ruled lines being written into, without any inconvenience, close to the back.

Manner of gilding books on the edges. The book, being put tight into the press, between two boards, is scraped with a knife called a *scraper*; and after that with another called a *smoother*, in order to take out all scratches. Being thus made smooth, they scrape a little yellow ochre upon the book, wet it with a little size-water, and rub it off with some clean shavings. The gilding-size is made with the white of an egg, mixed with water, and beat well together. The leaves being wetted with the size-water, with a brush, the gold is then laid upon it, and afterwards dried before the fire. When dried, it is burnished off with a dog's tooth set in a handle. See *GILDING ON PAPER*, &c. Blacking the leaves is done with fine antimony, the leaves being wet, and the antimony rubbed upon them until quite dry, when it is burnished like the gold.

The head-band is now added, which is an ornament of thread or silk, of two or three colours, placed at each extreme of the book, across the leaves, and woven or twisted, sometimes about a single, and sometimes a double piece of rolled paper, or, what is more lasting, of glued paper-thread.

For the covers; the skins used undergo several preparations, which we shall explain in calf, as being the leather most used; and as being that to which all the rest with a little variation may be referred. The calf-skin, being moistened in water, is cut to the size of the book, and the thickness of the edges pared off on a marble stone kept for that purpose. The cover is next smeared over with paste, made of wheat-flour; then stretched over the paste-board on the out-side, and doubled over the edges withinside. They then *cord the book*, or *bind it* firmly between two boards, to make the cover stick the stronger to the paste-boards and the back; on the exact performance of which depends a great part of the truth and neatness of the book. The back is then warmed at the fire to soften the glue, and the leather of the back is rubbed down, with a folding-stick or bodkin, to set and fix it close to the back of the book. It is now set to dry, and when dry, uncorded: the book is then washed over with a little paste and water, the edges and squares blacked with ink, and then sprinkled fine with a brush, by striking it against the hand, or a stick; or with larger spots

mixed with vitriol, which is called *marbling*. Two blank leaves, on each side, are then to be pasted down to the cover, and, when dry, the leaves are *burnished* in the press, and the cover rolled on the edges.

The cover is now glazed twice with the white of an egg; it is then filleted plain, or with gold; and at last polished with a polishing iron, passed hot over the glazed colour. If the book be required to be lettered, they paste a piece of red Morocco on the back, between the first and second band to receive the title in gold letters; and sometimes a second between the next bands underneath, to receive the number of the volume.

The plain binding, properly so called, is now complete; the gilding on the back and cover, as it makes a part of the *book-binder's* business among us (though, with the French, &c. it is a distinct profession), we shall here subjoin.

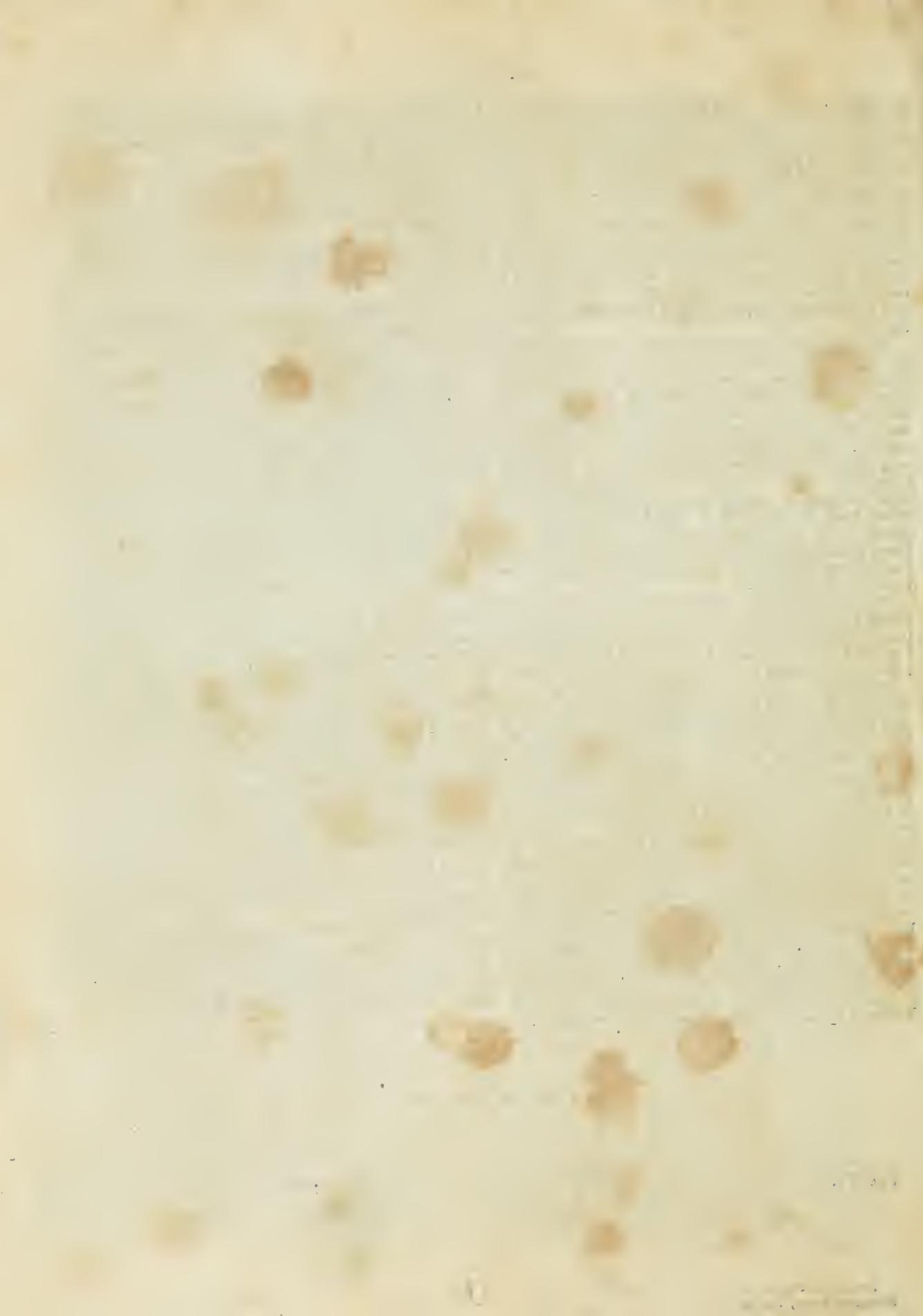
Manner of gilding books on the back and covers. In ordinary binding, they gild little else but the backs, and the outward edges of the cover. On the backs are gilt the title of the book, &c. with flowers, roses, knots, stars, &c. between the bands: on the covers are sometimes added compartments, arms, &c. All these ornaments are made with each its several gilding tool, engraved in *relievo*; either on the points of puncheons, as those of letters, roses, stars, &c. or around little cylinders of brass, as the lines, embroideries, &c. The puncheons make their impression, by being pressed flat down; and the cylinders by being rolled along by a handle, to which they are fitted on an iron stay, or axis.

To apply the gold, they glaze those parts of the leather, whereon the tools are to be applied, three or four times with a liquor made of the whites of eggs diluted with water by means of a sponge; and, when nearly dry, they slightly oil them, and then lay on pieces of leaf-gold, and on these apply the tools, with a careful even pressure of the hand, or roll the cylinders, both the one and the other, reasonably hot. If the figures be large, and require a *great relievo*, as arms, &c. they are beat or pressed down. The gilding thus finished, they rub off the superfluous gold, and polish the whole; the gloss of which is greatly assisted by a final pressing between horns peculiar for the purpose.

Our book-binders, for gilding on rough leather, make use of resin dried and powdered, instead of whites of eggs; and the gold leaf, first cut to a proper size, is laid on a hot somewhat oiled stamp, and pressed down: and thus the resin melts only in those parts where the hot stamp is applied, and the gold fixes on it, whilst the other parts of the leather remain rough as at first. Dr. Lewis's Com. Phil. Tech. p. 615. See *GILDING*.

Ahas. Fritsch, chancellor of the university of Jena, has a dissertation express concerning book-binders, *De Biblioprogis*; wherein he treats of the laws prescribed by these artificers, and the tax or price settled by the magistrate for binding books, of every sort in sheep-skin, vellum, &c.

END OF VOL. IV.



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